Notice

For information pertaining to undergraduate programs offered by the various Faculties and Schools at AUB, consult 2013–14 edition of the Undergraduate Catalogue.

Information in this catalogue applies to academic year 2013–14. The University reserves the right to make changes without prior notice in programs, course offerings, academic requirements, and teaching staff as the need arises.

Student Responsibility for Catalogue Information

Students are responsible for reading the information in this catalogue. Failure to read and comply with faculty and university regulations will not exempt students from whatever penalties they may incur.

All students are assigned post office boxes and email addresses. Students are responsible for checking their post office boxes and email regularly for official announcements and information.

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This catalogue and relevant updates can also be viewed at www.aub.edu.lb/registrar/Pages/index.aspx

Additional information about course requirements can be viewed on the on-line Banner Catalogue available at the AUB webpage.

The American University of Beirut is an affirmative action institution and an equal opportunity employer.
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### Academic Calendar 2013–14

#### Fall Term 2013–14

- **September 4**: First Semester begins for all faculties except Medicine
- **September 5–10**: Change of schedule for the first semester (Drop and Add)
- **September 9**: Opening Ceremony
- **September 11–18**: Late payment of fees for all students
- **September 20**: Set financial holds for all students who did not settle their financial account (Office of the Comptroller)
- **September 25**: Cancel registration for all students who did not settle their fees
- **October 4**: Deadline for submitting NSSF Declaration for the academic year 2013–14
- **October 15–17**: Al-Adha, holiday. No classes
- **November 4**: Hijra New Year, holiday. No classes
- **November 8**: Last day for withdrawal from courses for the first semester

#### Spring Term 2014

- **January 27**: Second semester begins for all faculties except Medicine
- **January 28–31**: Change of schedule for the second semester
- **January 30–February 6**: Late payment of fees for all students
- **February 9**: St. Maroun’s Day, holiday. No Classes
- **February 14**: Deadline for submitting NSSF Declaration for the second semester
- **March 4**: Last day for withdrawal from courses for the second semester
- **March 25**: Annunciation Day, holiday. No classes
- **April 14–17**: Advising for continuing students for the Summer 2014, and Fall 2014–2015
- **April 14–17**: On-line registration for continuing students for the Summer 2014
- **April 18–21**: Easter vacation
- **April 24–August 15**: Fall Term (2014–15) early (Phase I) on-line course registration for continuing students
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The University

The American University of Beirut (AUB) is a private, independent, non-sectarian institution of higher learning founded in 1866. It functions under a charter from the State of New York and is governed by a private, autonomous Board of Trustees.

The University has six faculties: Agricultural and Food Sciences, Arts and Sciences, Engineering and Architecture, Health Sciences, Medicine (including the Rafic Hariri School of Nursing), and the Suliman S. Olayan School of Business. At present, AUB offers programs leading to Bachelor’s, Master’s, MD, and PhD degrees.

The University became co-educational in 1922. The language of instruction is English.

Statement of Accreditation Status (SAS)

Degrees awarded by the American University of Beirut are officially registered with the Ministry of Higher Education in Lebanon and with the New York State Department of Education in the United States. AUB has been accredited as an institution since 2004 by the Commission on Higher Education of the Middle States Association of Colleges and Schools (3624 Market Street, Philadelphia, PA 19104, Tel. 267-284-5000). The University’s accreditation was most recently reaffirmed in June 2009, after the completion of an extensive self-study that was reviewed by educational experts chosen in consultation with Middle States. Over the last several years, a number of AUB faculties, in addition to the Medical Center, have also sought accreditation with more specialized bodies. In September 2006, the Faculty of Health Sciences’ Graduate Public Health Program became the first such program to be accredited by the Council on Education for Public Health (CEPH) outside of North America. One year later, the Rafic Hariri School of Nursing became the first nursing school beyond American territories to have its nursing programs accredited by the Commission on Collegiate Nursing Education (CCNE); it was reaccredited for 10 years in 2012 (see www.aacn.nche.edu/ccne-accreditation). In 2008, the AUB Medical Center received official accreditation from Joint Commission International (JCI), the international arm of the US-based Joint Commission on Accreditation of Healthcare Organizations (JCAHO). The Medical Center had previously been accredited by JCAHO from 1965 until 1983; however, the outbreak of civil war in Lebanon subsequently prevented periodic site visits by review teams. The Medical Center is also accredited by the American Nurses Credentialing Center (ANCC) as a provider of continuing nursing education. ANCC’s Magnet Recognition Program B granted AUBMC its prestigious Magnet designation in June 2009, making the Medical Center the first healthcare institution in the Middle East and the third in the world outside of the United States to be recognized in this way. Also in 2009, undergraduate and graduate programs offered by the Suliman S. Olayan School of Business were accredited by the Association to Advance Collegiate Schools of Business (AACSB). In July 2010, four undergraduate programs at the Faculty of Engineering and Architecture were accredited by ABET, Inc. (the Accreditation Board of Engineering and Technology) retroactive to October 1, 2008.

The University or its representatives are members of the American Council on Education (ACE); the Council of Graduate Schools (CGS); the Association of American Colleges and Universities (AACU); the Association of American International Colleges and Universities (AAICU); the Global Liberal Arts Alliance (GLAA); the American Association of Collegiate Registrars and Admissions Officers (AACRAO); the Arab Association of Collegiate Registrars and Admissions Officers (Arab ACRAO); the Association for Institutional Research (AIR); the College Board; the Association of International Educators (NAFSA); Student Affairs Administrators in Higher Education (NASPA);
the National Association of College and University Business Officers (NACUBO); the National Association of College and University Attorneys (NACUA); the Council for Higher Education Accreditation (CHEA); the Middle States Commission on Higher Education (MSCHE); the American Society for Quality (ASQ); the American Productivity and Quality Center (APQC); the National Association for College Admission Counseling (NACAC); the Overseas Association for College Admission Counseling (OACAC); and the American International Consortium of Academic Libraries (AMiCAL). Members of the AUB administration regularly attend meetings and professional development activities organized by these and other international organizations, as well as associations, syndicates, and other formal groupings located in Lebanon and the region.

Mission Statement

The American University of Beirut (AUB) is an institution of higher learning founded to provide excellence in education, to participate in the advancement of knowledge through research, and to serve the peoples of the Middle East and beyond. Chartered in New York State in 1863, the University bases its educational philosophy, standards, and practices on the American liberal arts model of higher education. The University believes deeply in and encourages freedom of thought and expression and seeks to foster tolerance and respect for diversity and dialogue. Graduates will be individuals committed to creative and critical thinking, life-long learning, personal integrity, civic responsibility, and leadership.

History

In 1862, American missionaries in Lebanon and Syria, under the American Board of Commissioners for Foreign Missions, asked Dr. Daniel Bliss to withdraw from the evangelical work of the mission in Lebanon to found a college of higher learning that would include medical training. It was felt that this college should have an American educational character, should be administered independently from the mission, and should be maintained by its own funds. Dr. Bliss traveled to the United States in the summer of 1862 to solicit funds for this new enterprise. By August 1864, he had raised $100,000 but, because of inflation during the Civil War, it was decided that he should raise a sterling fund in England to start the operations of the college, leaving the dollar fund to appreciate. After collecting £4,000 in England, Dr. Bliss traveled to Beirut in March 1866.

On April 24, 1863, while Dr. Bliss was raising money for the new school, the State of New York granted a charter under the name of the Syrian Protestant College. The college opened with its first class of 16 students on December 3, 1866.

The cornerstone of College Hall, the first building on the present campus in Ras Beirut, was laid December 7, 1871, by the Honorable William E. Dodge, Sr., then Treasurer of the Board of Trustees. At the ceremony, President Daniel Bliss expressed the guiding principle of the college in these words:

“This college is for all conditions and classes of men without regard to color, nationality, race or religion. A man, white, black or yellow, Christian, Jew, Mohammedan or heathen, may enter and enjoy all the advantages of this institution for three, four or eight years; and go out believing in one God, in many gods, or in no God. But it will be impossible for anyone to continue with us long without knowing what we believe to be the truth and our reasons for that belief.”

College Hall and the first medical building were completed and put to use in 1873, and the bell in the tower of College Hall pealed for the first time in March 1874. However, College Hall was extensively damaged by a savage explosion in the early morning of November 8, 1991, and the building had to be demolished. It was later rebuilt, and the new College Hall was inaugurated in June 1999.

Since the earliest years, the University has continually expanded and developed new faculties and programs. In 1867, it started the School of Medicine. Four years later, in 1871, both a school of pharmacy and a preparatory school were added. The latter became independent in 1960 and is now known as International College. In 1900, the University established a school of commerce which was later incorporated into the Faculty of Arts and Sciences. In 2000, it regained its independence and was later named the Suliman S. Olayan School of Business.

When the hospital (currently the American University of Beirut Medical Center) opened in 1905, a school of nursing—today the Rafic Hariri School of Nursing—was also established. In 1910, the University opened a School of Dentistry, which operated for thirty years. In the early years of the 1950s, several program expansions took place. The Faculty of Engineering and Architecture was established in 1951; the Faculty of Agriculture—now the Faculty of Agricultural and Food Sciences—first opened its doors in 1952; and the School of Public Health—now the Faculty of Health Sciences—was founded in 1954.

On November 18, 1920, the Board of Regents of the University of the State of New York changed the name of the institution from the Syrian Protestant College to the American University of Beirut; other charter amendments expanded the functions of the University.

At the end of June 2012, the number of degrees and diplomas awarded since June 1870 totaled 82,207.

<table>
<thead>
<tr>
<th>President</th>
<th>Dr. Daniel Bliss</th>
<th>1866–02</th>
</tr>
</thead>
<tbody>
<tr>
<td>President</td>
<td>Dr. Howard S. Bliss</td>
<td>1902–20</td>
</tr>
<tr>
<td>Acting President</td>
<td>Dean Edward F. Nickoley</td>
<td>1920–23</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Bayard Dodge</td>
<td>1923–48</td>
</tr>
<tr>
<td>Acting President</td>
<td>Dr. Stephen B.L. Penrose, Jr.</td>
<td>1948–54</td>
</tr>
<tr>
<td>Acting President</td>
<td>Dr. Constantine K. Zurayk</td>
<td>1954–57</td>
</tr>
<tr>
<td>President</td>
<td>Dr. J. Paul Leonard</td>
<td>1957–61</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Samuel B. Kirkwood</td>
<td>1961–65</td>
</tr>
<tr>
<td>President</td>
<td>Mr. Norman Burns</td>
<td>1965–76</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Samir K. Thabet</td>
<td>1976–77</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Harold E. Hoelscher</td>
<td>1977–81</td>
</tr>
<tr>
<td>Acting President</td>
<td>Mr. David S. Dodge</td>
<td>1981–82</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Malcolm H. Kerr</td>
<td>1982–86</td>
</tr>
<tr>
<td>Acting President</td>
<td>Dr. Calvin Pilkington</td>
<td>1984</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Frederic P. Herter</td>
<td>1987–93</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Robert M. Haddad</td>
<td>1993–96</td>
</tr>
<tr>
<td>President</td>
<td>Dr. David S. Dodge</td>
<td>1996–97</td>
</tr>
<tr>
<td>President</td>
<td>Dr. John Waterbury</td>
<td>1998–08</td>
</tr>
<tr>
<td>President</td>
<td>Dr. Peter F. Dorman</td>
<td>2008–</td>
</tr>
</tbody>
</table>

Marquand House, completed in 1879, is the campus residence of the president of the University.
All presidents have lived there during their presidencies, except for Dr. Calvin Plimpton, Dr. Frederic Herter, Dr. Robert Haddad, and Mr. David Dodge.

Three presidents died while in office: Dr. Howard Bliss, Dr. Stephen Penrose, and Dr. Malcolm Kerr. Dr. Kerr, the ninth president, was assassinated outside of his College Hall office on January 18, 1984.

Location and Climate
The University is situated in Beirut, Lebanon, at the crossroads of the Middle East. The campus on the Ras Beirut peninsula stretches along the Mediterranean shore and overlooks St. George’s Bay toward northern Lebanon and the snow-capped mountains to the east. The campus of around 61 acres has 64 buildings, including faculty and administrative buildings, five libraries, three museums, the Charles W. Hostler Student Center, two men’s and five women’s dormitories, and the Medical Center. The luxuriant flowers, shrubs, and trees make it one of the most beautiful campuses in the world.

Lebanon enjoys a Mediterranean climate and is pleasant and sunny for eight months of the year. The winter rainy season from November to March, however, is at times damp and cold. Although most Beirut buildings are centrally heated, warm clothing is recommended for the winter months. The average annual rainfall of 86 cm (34 inches) comes chiefly in the winter when the temperature may drop below 7˚C (50˚F).

Academic Services
The University

Archaeological Museum
Founded in 1868, the University Archaeological Museum is the third oldest museum in the Near East. It was established with a donation from General Cesnola, the American Consul in Cyprus, and the collection has since grown steadily. In 2006, the Museum was completely renovated with the construction of an additional mezzanine and an extensive reorganization in a chronological and thematic treatment of its collections. Today the museum exhibits a wide range of artifacts (15,000 objects; 10,000 coins) from Lebanon and neighboring countries. It traces humankind’s progress in the Near East from the Early Stone Age to the Islamic period. The collections on display provide educational benefits to students and scholars in Near Eastern archaeology.

The museum runs a research program including field excavations and publications of museum collections. Several types of educational activities (e.g., lectures, exhibitions, children’s programs, trips) are also organized in collaboration with the Society of the Friends of the Museum, which also runs the Museum Shop. The museum may be enjoyed by the public free of charge.

Opening hours are Monday through Friday, 9 am to 5 pm. The museum is closed during official and AUB holidays.

Center for Teaching and Learning (CTL)
The Center for Teaching and Learning (CTL) promotes and supports high quality teaching and learning in keeping with AUB’s mission of excellence in education and its commitment to independent thinking and life-long learning. The Center is an independent, multipurpose, interdisciplinary unit that serves all of the faculties at the University. It is administratively under the Office of the Provost. The CTL works in collaboration with AUB’s academic support services, especially the University Libraries, IT Academic Core Processes and Systems, and the Office of Institutional Research and Assessment.

Office of Information Technology (OIT)
The Office of Information Technology (OIT) is AUB’s and AUBMC’s central information technology service provider and a regional leader in technological initiatives for institutions of higher learning. The OIT strives to provide members of the AUB community, vendors, partners, affiliates, and others across the globe with secure, state-of-the-art and cost-effective information technology solutions that empower stakeholders to excel in the pursuit of their goals and in achieving leadership in education and healthcare. The OIT performs its duties in a team-empowered environment with integrity, transparency, and innovation. It is composed of specialized IT departments that are responsible for revamping, deploying, and maintaining systems and infrastructure services aimed at enhancing user productivity through seamless access to services and resources. The IT departments implement innovative solutions focusing on functionality, flexibility, manageability, standardization, security, and data safety. The IT organization manages, through its various departments, the hardware, software, and applications supporting many of the University’s academic and administrative functions. These include the Student Information System (AUBsis) operated by the Office of the Registrar; the Library Information System operated by the University Libraries; the Financial Information System (Oracle eBusiness Suite) operated by the Office of the Comptroller; the learning management system (Moodle) operated by the academic units; and the integrated hospital information system operated by the hospital administration and departments. The smooth and efficient functioning of these systems is overseen by a team of professional and experienced IT staff. You can view the services provided by the IT organization by visiting: www.aub.edu.lb/it/.

IT Academic Core Processes and Systems
The IT Academic Core Processes and Systems (IT-ACPS) department provides academic units with an IT-enabled environment and innovative solutions that facilitate creative teaching, high quality research, effective learning, and professional collaboration and development. IT-ACPS performs its duties transparently to empower stakeholders to advance and lead in education and research. IT-ACPS is responsible for providing services related to plagiarism prevention, e-Learning, student surveys, instructional design, and IT consulting. IT-ACPS advises faculty members, students, and the academic administration on the state-of-the-art technological facilities available for teaching and research. IT-ACPS provides a series of scheduled workshops on e-Learning and instructional design to all faculty members. It also provides stakeholders with face-to-face training sessions that help them to acquire confidence and capacity in a wide variety of computer applications. You can view the services provided by this department by visiting: http://www.aub.edu.lb/it/acps.

AUBnet Intranet and Internet Services
AUBnet provides a state-of-the-art wired and wireless network infrastructure ensuring high-speed, secure, reliable, and widespread access for AUB users across the entire campus and hospital, including all dorms and faculty apartments. AUB students can connect to AUBnet from public computer labs or personal laptops and mobile devices that access the campus-wide
wireless network. Using any web browser, students can take over a hundred online e-learning courses, most of which are computer-related.

With an AUBnet account, all students, faculty, and staff have full access to the internet, email, and personal websites. This access is subject to a monthly quota to ensure an optimum level of access across the community, with quota-free access after business hours and during holidays. The IT organization also maintains AUB’s official websites including the Digital Documentation Center’s website.

Computer Labs
In addition to providing internet access, computer labs also offer a variety of other resources to students, such as printers, CD burners, and secure network storage for personal data. They may also request access to servers hosting such applications as Microsoft Office, special software for statistics and graphics, and various programming languages.

Help Desk
Friendly and knowledgeable IT help desk specialists are always ready to support students, faculty, and staff. For IT-related support, contact the IT help desk by email at it.helpdesk@aub.edu.lb, dial ext. 2260, or visit in person.

For more information, visit our website: www.aub.edu.lb/it

Medical Center
The American University of Beirut Medical Center (AUBMC) is a private, not-for-profit, in-patient and out-patient teaching facility of the Faculty of Medicine. As a state-of-the-art tertiary/quaternary medical facility, it operates 352 beds (and is growing its bed capacity), serving 30,732 in-patients per year, and an out-patient facility receiving 318,721 visits (242,341 postcards, and 1,941 maps, as well as 51,067 photographs, of a unique and historical nature. These print and electronic collections are developed and enriched on a regular basis to support the academic and research programs of the University.

The libraries are fully automated and many of their resources, databases, electronic books, and references are remotely accessible, providing a modern and virtual environment that is conducive to research. They are equipped with a state-of-the-art electronic classroom and computer lab. Secure and reliable wireless connections are available in all the libraries. The libraries provide customized reference and instruction services through emails, to walk-ins, and in classes, in an active program of user education which promotes a culture of information literacy at all levels. Researchers from Lebanon, the region, and beyond continuously seek out the libraries for their unique, rich, and historical collections, particularly on Lebanon and the Middle East. The libraries open a total of 106.5 hours per week and 24/7 during reading and exam periods.

The Saab Memorial Medical Library (SML), (http://smlweb.aub.edu.lb/) is dedicated to the memory of Dr. Nicholas Saab (AUB School of Medicine graduate, 1959). The library has been functioning in its present quarters as part of the Medical Center since 1975, and qualifies as one of the best medical libraries in the Middle East. Its collection consists of 188 printed periodical titles, over 84,000 backfile periodical volumes, more than 5,000 electronic periodicals (8 in Arabic) and 800 electronic books and provide access to 87,701 electronic periodicals (8 in Arabic) and 800 journals on microfilm (599 in Arabic). The libraries currently subscribe to 5,000 electronic periodicals, 780 print periodicals (318 in Arabic), and 252 databases. There are about 1,139,340 audiovisual items of all formats, the majority of which are microforms of a substantial number of local and regional journals and newspapers going back to the late 19th century and early 20th century. The Archives and Special Collections contain 673 linear feet of archival material, 1,402 manuscripts, most of which are in Arabic and some are uniquely and/or rarely held resources, 8,146 volumes of theses, projects, and dissertations going back to 1907, 5,022 posters, 776 postcards, and 1,941 maps, as well as 51,067 photographs, of a unique and historical nature.

The libraries have a long history in Lebanon and in the region which is reflected in the rich collections that they own. The collections consist of 386,759 books in 464,708 volumes and 6,828 print periodicals (1,800 in Arabic) in 186,355 volumes. The libraries also own 218,293 electronic books and provide access to 87,701 electronic periodicals (8 in Arabic) and 800 journals on microfilm (599 in Arabic). The libraries currently subscribe to 5,000 electronic periodicals, 780 print periodicals (318 in Arabic), and 252 databases. There are about 1,139,340 audiovisual items of all formats, the majority of which are microforms of a substantial number of local and regional journals and newspapers going back to the late 19th century and early 20th century. The Archives and Special Collections contain 673 linear feet of archival material, 1,402 manuscripts, most of which are in Arabic and some are uniquely and/or rarely held resources, 8,146 volumes of theses, projects, and dissertations going back to 1907, 5,022 posters, 776 postcards, and 1,941 maps, as well as 51,067 photographs, of a unique and historical nature.

The libraries are fully automated and many of their resources, databases, electronic books, and references are remotely accessible, providing a modern and virtual environment that is conducive to research. They are equipped with a state-of-the-art electronic classroom and computer lab. Secure and reliable wireless connections are available in all the libraries. The libraries provide customized reference and instruction services through emails, to walk-ins, and in classes, in an active program of user education which promotes a culture of information literacy at all levels. Researchers from Lebanon, the region, and beyond continuously seek out the libraries for their unique, rich, and historical collections, particularly on Lebanon and the Middle East. The libraries open a total of 106.5 hours per week and 24/7 during reading and exam periods.

IT Medical Center Processes and Systems
IT Medical Center Processes and Systems (IT-MCPS) caters to the information technology needs of the hospital’s administration, clinical departments, and nursing services, and supports academic and research activities at the Faculty of Medicine. The Medical Center is presently going through a fast-paced computerization process focused on improving the provision of medical care and streamlining operations in accordance with JCI accreditation standards. Information technology plays an essential role in achieving this goal.

The integrated hospital information system comprises a web portal and web services that link various medical, clinical, and financial applications running on disparate platforms. This architecture allows us to transition gradually to new technologies without the need to compromise or re-develop existing solutions, while at the same time affording us the flexibility needed to develop the system in the highly dynamic fields of medical science and information technology.
week. With its rich, up-to-date medical collection, SML aims to promote research, education, and patient care in the medical and allied health fields. SML is a member of three consortia in Lebanon and the Arab world, and it provides training to medical librarians and healthcare professionals in Lebanon and the region.

**Office of Institutional Research and Assessment (OIRA)**

The Office of Institutional Research and Assessment (OIRA) coordinates institutional assessment and research activities. It is responsible for the collection, analysis, and dissemination of accurate and timely information about the University’s environment and performance. This information supports institutional operations, management, decision-making, and planning functions, and sustains excellence in student learning and community service.

The office also develops and conducts assessments for various purposes at institutional, regional, and international levels.

More specifically, the functions of OIRA are to

- act as a resource and repository for official institutional statistics, information, and policies;
- coordinate assessment and evaluation of University programs and processes (e.g., registration, admissions, advising) to support planning, decision-making, and improvement;
- formulate and implement data-gathering activities such as surveys, interviews, and focus groups for a wide variety of internal (e.g., accreditation) and external (e.g., comparison with peer institutions) uses;
- develop, administer, and report assessments required by the University for admissions, placement, program review, and other educational purposes;
- serve as a testing center for various international bodies and organizations; and
- administer instructor and course evaluations, and provide feedback to faculty members to improve teaching.

**Office of University Advancement**

The Office of University Advancement supports the mission of AUB by developing and strengthening relationships with key constituencies including alumni, donors, and friends. It raises money for University priorities such as scholarships, academic programs, and building projects; develops and strengthens relationships among AUB’s worldwide alumni and between alumni and the University; and is responsible for communicating news and information about the University through print and electronic media to both internal and external constituencies. The Office of University Advancement includes Development, Communications, Alumni Relations, and Advancement Services.
Admissions

The American University of Beirut seeks students of sound character and demonstrated academic achievement and promise. In accordance with the policies of its founders and with its equal opportunity policy, the University admits students regardless of race, color, religion, gender, disability, or national origin. While it attracts students from more than sixty countries, AUB primarily serves applicants from Lebanon, the Arab world, and other countries of the Middle East, and seeks to maintain geographic distribution within the region. The University values its strong ties with its alumni and considers the attendance of alumni children important to the maintenance of these ties and to the continuation of its traditions.

Graduate Studies

Study leading to the Master’s degree was begun at the American University of Beirut in 1904; the first Master’s degree was awarded the following year. Study leading to the degree of Doctor of Philosophy was initiated in 1961; the first PhD degree was granted in 1966.

Graduate study is under the direction of the graduate committees of the various faculties and the Board of Graduate Studies. The Board of Graduate Studies is accountable to the University Senate. The Graduate Council is the executive body with oversight of graduate programs at AUB.

New programs may be added upon recommendation by the faculty graduate committee and approval of the faculty(ies) concerned, the Board of Graduate Studies, the University Senate, and the Board of Trustees.

Graduate Council

The Graduate Council (GC) reports to the Provost of the University and plays a vital role in implementing the rules and regulations governing graduate work uniformly across the University, in accordance with policies approved by the Board of Graduate Studies (BGS) and the Senate, and as recommended by the faculties and schools. The Graduate Council facilitates and coordinates graduate education and follows up on the implementation of graduate policies and deadlines. The Graduate Council works closely with the BGS and Faculty Graduate Studies (FGS) Committees to provide mechanisms for the quality control of all aspects of graduate education. In cooperation with faculty, students, and staff, the Graduate Council undertakes preparatory steps and coordinates graduate recruitment programs to ensure a selection process from a highly qualified pool of student applicants; provides information about admissions to all graduate programs; administers graduate standards of scholarship and policy; and encourages the development and success of students through workshops, training activities, counseling, and initiatives which promote timely degree completion. The Graduate Council also administers AUB policies concerning graduate assistantship appointments.
Areas in Which Graduate Study Is Offered

The University offers both the master's degree and the degree of doctor of philosophy.

Master's Degrees

Faculty of Agricultural and Food Sciences

- Agricultural Economics (MS)
- Agricultural Extension (MS)
- Animal Science (MS)
- Eco-system Management (MS)
- Food Technology (MS)
- Irrigation (MS)

Faculty of Arts and Sciences

- Anthropology (MA)
- Arabic Language and Literature (MA)
- Archaeology (MA)
- Biology (MS)
- Chemistry (MS)
- Clinical Psychology (MA)
- Computational Science (MS)
- Computer Science (MS)
- Economics (MA)
- Education (MA)
- English Language (MA)
- English Literature (MA)
- Financial Economics (MA)

Faculty of Health Sciences

Masters of Public Health (MPH) with concentrations in:
- Health Promotion and Community Health
- Epidemiology and Biostatistics
- Health Management and Policy
- Epidemiology (MS)
- Population Health (MS)

Faculty of Medicine

- Biochemistry (MS)
- Human Morphology (MS)
- Medical Sciences (Interdepartmental) non-thesis (MS)
- Microbiology and immunology (MS)
- Pharmacology and Therapeutics (MS)
- Physiology (MS)

School of Nursing

- Advanced Nursing Practice, Adult Care (MSN)
- Nursing Administration (MSN)

Interfaculty Programs

- Neuroscience (MS): Arts and Sciences, Engineering and Architecture, and Medicine
- Nutrition (MS): Arts and Sciences, Health Sciences, and Medicine
- Environmental Sciences (MS):
  - Ecosystems Management (MSES): Agricultural and Food Sciences
  - Environmental Policy Planning (MSES): Arts and Sciences
  - Environmental Technology (MSES): Engineering and Architecture
  - Environmental Health (MSES): Health Sciences

PhD Degrees

AUB offers the Doctor of Philosophy degree in eight disciplines. The programs have been designed for students whose academic background and interest in specific research areas suggest a potential for scholarly success and significant contribution to the regional body of knowledge. Students will work on a specific research plan with a contributing scholar and mentor in their department.

PhD programs include the following:

Faculty of Arts and Sciences

- Arabic Language and Literature
- Cell and Molecular Biology
- Arab and Middle Eastern History
- Theoretical Physics

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1 Temporarily frozen
2 Pending final approval of NY Board of Education
English Language Proficiency Requirement (ELPR)

Applicants to any graduate program other than AUB graduates and graduates of recognized colleges or universities in North America, Great Britain, Australia, and New Zealand, must demonstrate proficiency in the English language. This can be done by submitting official test scores for (at least) one of the following tests: English Entrance Examination (EEE), Test of English as a Foreign Language (TOEFL), International English Language Testing System (IELTS), GRE (Verbal Part), GMAT (Verbal Part).

A score of 530 on the English Entrance Examination (EEE), or 583 on the paper-based Test of English as a Foreign Language (TOEFL), or 250 on the computer-based TOEFL or 97 on the internet-based TOEFL, or 7.0 on the IELTS, or 147 on the Verbal Part of the GRE (or 410 if the GRE test was taken prior to August 1, 2011), or 25 on the Verbal Part of the GMAT exempts applicants who have been admitted from taking additional English language courses.

ELPR Summary

<table>
<thead>
<tr>
<th>Test</th>
<th>ELPR Score for Graduate Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOEFL (computer-based)</td>
<td>250</td>
</tr>
<tr>
<td>TOEFL (paper and pencil)</td>
<td>583</td>
</tr>
<tr>
<td>TOEFL (internet-based)</td>
<td>97</td>
</tr>
<tr>
<td>EEE</td>
<td>530</td>
</tr>
<tr>
<td>IELTS</td>
<td>7.0</td>
</tr>
<tr>
<td>GRE General (Verbal Part)</td>
<td>147 (or 410)</td>
</tr>
<tr>
<td>GMAT (Verbal Part)</td>
<td>25</td>
</tr>
</tbody>
</table>

Applicants may also be admitted with English language proficiency test scores lower than those listed in the table above. In such cases, the applicants will be required to take English language courses upon starting their graduate degree programs, as per the table below.

English Language Courses

<table>
<thead>
<tr>
<th>Score on English language proficiency test</th>
<th>English Language course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer-based TOEFL</td>
<td></td>
</tr>
<tr>
<td>163–173</td>
<td>English 100A (15hrs. per week)</td>
</tr>
<tr>
<td>177–227</td>
<td>English 100B (10hrs. per week)</td>
</tr>
<tr>
<td>230–249</td>
<td>English 300</td>
</tr>
</tbody>
</table>

Applicants who score between 375 and 499 on the EEE, or between 490 and 570 on the paper-based TOEFL (or between 163 and 227 on the computer-based TOEFL or 57-87 on the internet-based TOEFL), may join the Intensive English Course (i.e. Eng 100A or Eng 100B), if approved by their respective departments. For further details on the Intensive English Course, see page 38 in the Undergraduate Catalogue. After successful completion of English 100A/B, graduate students must take English 300.

Applicants who score between 500 and 529 on the EEE or 573 and 582 on the paper-based TOEFL (or between 230 and 249 on the computer-based TOEFL or 88-96 on the internet-based TOEFL) are required to take English 300 during their first year as graduate students.
Summer Preparatory English Program

Applicants who score between 475 and 499 on the EEE, or between 550 and 572 on the TOEFL (or between 213 and 229 on the computer-based TOEFL or between 81 and 87 on the internet-based TOEFL), or between 6.0 and 6.5 on the IELTS, may take UPRG 001 Preparatory English for Graduate Students. Those students need to pass UPRG 001 with an average grade of 70 in order to enroll in their majors (see UPP section page 190 in the Graduate Catalogue).

UPRG 001 Preparatory English for Graduate Students

<table>
<thead>
<tr>
<th>Score on English language proficiency test</th>
<th>English Language course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer-based TOEFL</td>
<td>Paper-based TOEFL</td>
</tr>
<tr>
<td>213–229</td>
<td>550–572</td>
</tr>
</tbody>
</table>

- Applicants who do not submit official English language proficiency test scores or those whose test scores fall below 475 on the EEE, or 550 on the paper-based TOEFL (or below 213 on the computer-based TOEFL, or below 81 on the internet-based TOEFL), or below 6.0 on the IELTS, may also register in UPRG 001. Those applicants will not be able to join their graduate programs unless (1) they pass UPRG 001 with an average grade of 70 and (2) obtain a minimum score of 475 on the EEE, or 550 on the paper-based TOEFL (or 213 on the computer-based TOEFL, or 81 on the internet-based TOEFL), or 6.0 on the IELTS. For more information, students should contact their respective departments.

- After successful completion of UPRG 001, students must take English 300.

Further Requirements

An applicant’s scores on the tests below must be made available to the appropriate departments and faculty graduate committees in time for graduate study admission selection. It is the responsibility of applicants to register for, and to take, the required tests on the appropriate dates to ensure that the Office of Admissions receives the scores in time for admission selection.

- Applicants for graduate study in certain programs at the Faculty of Arts and Sciences are required to take the Graduate Record Examination (GRE) general test and submit the score along with the application form. Programs that require GRE are the following: Biology, Economics, Financial Economics, History and Archeology, Philosophy, Political Studies and Public Administration, General Psychology, Clinical Psychology, as well as the programs of MA in Middle East Studies, Economics, History and Archeology, Philosophy, Political Studies and Public Administration. GRE test scores are valid for five years after the testing year in which the applicant is tested.

- Applications missing the GRE will not be considered by departments. Some Departments in the Faculty of Arts and Sciences recommend that applicants present GRE Subject tests. Applicants are advised to check with the department or program to which they are applying regarding this requirement.

- Applicants for graduate study in Electrical and Computer Engineering, at the Faculty of Engineering and Architecture are required to take the Graduate Record Examination (GRE) general test and submit the score along with the application form. GRE test scores are valid for five years after the testing year in which the applicant is tested.

- Please note that applicants for the MBA program are required to take the Graduate Management Admission Test (GMAT).

Admission

Admission to Master’s Programs

Graduate study is offered on a selective basis to students who have shown distinct academic ability. Applicants for graduate study may be considered for admission in one of three categories:

Admission to the Master’s Degree Programs

To be considered for admission to the graduate programs at AUB, applicants must hold a Bachelor’s degree from AUB or its equivalent from a recognized institution of higher learning. Applicants who have a good record of academic achievement, and a potential for creative and independent work, may be admitted into one of the following categories:

- Admission as a Regular Graduate Student, with the possibility of financial assistantship as a graduate assistant
- Admission on Probation
- Admission as Prospective Graduate Student (FAFS, FAS and FEA)

The minimum admission requirements for all categories are described below. Additional requirements may be set by the individual departments/programs as approved by Faculty Graduate Studies Committee. Applicants are advised to check with the concerned department or program to which they are applying or with the Office of Admissions for additional requirements.

You may now submit your MBA application without providing the required GMAT scores.

However, you need to submit the official valid scores not later than one month after the application deadline. Otherwise, if accepted, your admission status will be accepted as a non-degree graduate student pending the submission of a valid GMAT score of a minimum of 570 by the completion of a maximum of 12 credits.

A valid score should be recent (no older than 5 years at the time the application is submitted) and no less than 570.

Upon registering for GMAT, applicants must specify that results be sent to the AUB Office of Admissions. Please use AUB's ETS school code (0902) to ensure official submission of test scores.

Some faculties and departments have additional requirements regarding admission to their programs. Prospective applicants should ascertain from the faculty/department/program concerned whether they meet all requirements. For detailed information regarding admission to a particular faculty or department, see the sections on graduate study in the relevant faculty and department sections.
Admission to the Master's program at AUB is competitive, based on the academic record and achievements of the applicant. Departments may also recommend admission for those students with particular research interests or characteristics, which are compatible with the areas of expertise of the faculty or the faculty goals within that program.

Applicants who hold degrees from institutions other than AUB must present, along with their official transcript, a letter from the institution awarding the degree indicating the denotation of their grading system in terms of its equivalence on a 4.0 GPA scale, or in terms of letter grades A, B, C with +/- scales. Alternatively, applicants may present an official letter from the Office of the Registrar of their respective institutions indicating the graduating class average of previous years along with standard deviation and class size.

Admission as a Regular Student
An applicant is considered for admissions as a regular student to a graduate program if he/she meets the following minimum admission requirements:

- An undergraduate average of at least 80 percent (or standardized equivalent from other institutions of higher learning) in the major field of study and a cumulative average of at least 75 percent (or standardized equivalent) for all work done at the undergraduate level leading to a Bachelor's degree or its equivalent from AUB or other recognized institutions of higher learning. In the Faculty of Engineering and Architecture and the Interfaculty Graduate Environmental Sciences Program (IGESP), an average of at least 80 percent is required for the last two years of undergraduate study or its equivalent at AUB or other universities as determined by the Faculty.
- Students who hold a minor in a field of specialization with at least 80 percent average may be considered for admission as regular students in that field.
- General GRE or GMAT test scores if required in the specific department/program/track. Scores up to five years old will be accepted in most programs requiring the GMAT or GRE scores. No minimum test score is required, but departments may set minimum required scores [refer to the specific program for more information].
- At least two letters of recommendation.
- A detailed statement of purpose (~400-500 words) for each choice (major or concentration) indicating the purpose for pursuing graduate study in the particular field at AUB, and specifying the applicant's research interests and/or practical experience in the field.
- Additional requirements that are specific to each graduate program as included in the department or program listings.
- Students from non-English-speaking countries must show proficiency in the English language. For additional information, refer to ELPR on page 37.

In selecting students to the Master's program, the Faculty Graduate Studies Committee recognizes other evidence of achievement—whenever present—such as research potential or experience, work experience, publications, or other creative work or scholarly activity. In considering such criteria, the Graduate Studies Committee of the Faculty will give serious consideration to departmental recommendations for admission in some cases to applicants who do not meet the minimum requirements of the undergraduate grade point average indicated above, but instead have presented clear evidence of creative activity and academic potential. Departments must present to the Faculty Graduate Studies Committee a justification of such admission recommendations. The Graduate Studies Committee will review these cases, and will make its final recommendation to the dean on a case-by-case basis.

Admission on Probation
An applicant is considered for admission on probation if he/she meets the following minimum admission requirements:

- An undergraduate average of at least 75 percent (or standardized equivalent from other institutions of higher learning) in the major field of study and a cumulative average of at least 75 percent (or standardized equivalent) for all work done at the undergraduate level leading to a Bachelor's degree or its equivalent from AUB or other recognized institutions of higher learning. In the Faculty of Engineering and Architecture and the Interfaculty Graduate Environmental Sciences Program (IGESP), an average of 75 percent is required for the last two years of study or its equivalent at AUB or other universities as determined by the Faculty.
- The requirements for application and the governing regulations for admission recommendations as presented under “regular admission” remain the same in this case.

In addition an applicant who does not meet the above minimum requirements but appears to have reasonable potential for success as a graduate student, as manifested by appropriate practical experience or a high score on relevant standardized exam such as GRE, may be admitted on probation.

A student admitted on probation must complete nine credits of graduate level courses during the first two semesters of graduate studies, must pass all courses, and must attain a minimum cumulative average of 80 in order to achieve the status of a “regular” student. If the student fails to meet any of these conditions, s/he will be dropped from the program. Students admitted on probation are not considered for financial assistantship until they achieve the status of a “regular” student.

Admission as a Prospective Graduate Student (FAFS, FAS, and FEA)
Applicants who hold a Bachelor’s degree in a major field of study other than the one to which they are applying, and who do not have sufficient academic preparation in the field, may be admitted as prospective graduate student who must complete certain undergraduate course requirements. Guidelines governing such course requirements are presented below.

To be considered for admission as a prospective graduate student, the applicant must have attained an undergraduate average of 75 percent (or standardized equivalent) in all work done at the undergraduate level leading to a Bachelor’s degree or its equivalent from AUB or another recognized institution of higher learning. In the Faculty of Engineering and Architecture, an applicant is considered for admission as a prospective graduate student if s/he attains an average of 75 at AUB for the last two years of undergraduate study or its equivalent at other universities, as determined by the Faculty, and has demonstrated good performance in courses related to the field being sought.

The requirements for application and the governing regulations for admission as presented under “regular admission” are the same in this case.

The following policies relate to undergraduate course requirements for students admitted into the prospective student category:

- Prospective students are normally required to take a minimum of 15 credits of undergraduate courses in the major field of study to which they are applying and must achieve an average of at least 80 percent in these courses to be admitted to the graduate program and begin work towards their Master's degree.
• Departments may recommend to the Graduate Studies Committee reducing the 15 credits minimum requirements for prospective students subject to the provision of supporting evidence and justification. Students who have taken courses in the intended field of study or in areas judged by departments as relevant to the intended field of study may have their requirements reduced. In considering undergraduate courses as prerequisites towards beginning an MA/MS/ME degree in a field of study, departments may recommend to the Graduate Studies Committee consideration of courses in other than the strictly defined field of study that they consider relevant. Outstanding work and/or research experience relevant to the intended field of study may (in exceptional cases) be considered in partial fulfillment of required courses. All recommendations to reduce the requirements below 15 credits require the approval of the Graduate Studies Committee of the Faculty following departmental justification.

• Departments may recommend to the Faculty Graduate Studies Committee waiving of some course requirements after the student's first semester, subject to justification and outstanding performance.

• For undergraduate courses taken prior to acceptance as prospective student to be considered as part of the 15 credit minimum requirements in the intended field of study, the average grade in these courses should be at least 80 percent or equivalent in other grading systems. For the purpose of change of status (admission after completion of requirements) to regular graduate student, a minimum average of 80 percent will be required in all 15 credits of undergraduate courses in the field (including the ones taken prior to acceptance). If an average of 75-80 percent is attained, the student may have his/her status changed to graduate on probation pending department recommendation and approval of the Faculty Graduate Studies Committee.

Prospective graduate students who have completed all undergraduate prerequisite courses except one, may begin taking one graduate course along with the last undergraduate course requirement, upon the approval of their department and the Graduate Studies Committee. The supplementary courses must be completed within four consecutive semesters.

Requirements for Dual Master's Degrees

Qualified graduate students may enroll and earn two master degrees in distinct fields from two programs in the same Faculty or in different Faculties. Dual master's degrees are degrees which have been proposed by two departments/programs from the same or different Faculties, recommended by concerned Faculties to the Board of Graduate Studies, and approved by the University Senate. In such cases, a student will be granted concurrently two degrees at the time of graduation contingent upon successful completion of requirements of each program. If tuition differs between the two programs, students will pay the higher of the tuitions. Students can register as dual degrees candidates only in programs that are approved by the University and are listed in the AUB graduate catalogue. The list is restricted to compatible pairs of Master degrees that students can pursue in parallel, so that their research stays focused. Please refer to the graduate catalogue to determine whether dual master's degrees are available in your areas of interest. New dual degrees should be initiated by the concerned departments for approval by the University Senate upon recommendation of the FGSC and respective Faculty(ies).

To fulfill the basic requirement for the two degrees, a student must complete a minimum of 18 credit hours of graduate course work in each degree program. The remaining credits include additional course work and a thesis for thesis option program or a project for non-thesis option that are credited for both master's degrees. In cases where a thesis option is offered by one program and a project by another, the thesis option must be adopted. The student will submit one thesis/project for the two degrees. The thesis/project must show relevant contribution from both fields of the dual degree programs. The thesis/project must be approved by both departments/programs and by the FGSC to which each program resides. The thesis/project committee for dual degrees must include at least one member from each degree program. The single thesis presented for dual degree programs cannot be used to satisfy the thesis requirements of any third or additional graduate degree programs different than those in the dual degrees.

The minimum total credit hours for a dual master's degree program if both programs require 30 credit hours for degree completion is 48 graduate credit hours which apply for both thesis and non-thesis option programs. If one of the programs for dual degrees requires 42 credit hours for completion and the other program requires 30 credit hours, the minimum total credit hours for the dual degrees is 60 credits including thesis/project as mentioned in the previous paragraph. Students must also meet any other specific requirements of each master's program.

The integration of the programs allows most students to complete the two degrees in an average of 2.5 to 3 years. That is one year less than would be required to complete the two degrees independently and is at least one semester longer than expected if enrolled in a single degree program.

Application Processes for Dual Master's Degrees

A student wishing to apply for dual degrees may submit a single dual degree application that will be sent to each degree program simultaneously when first applying for graduate admissions. If the student is already registered in one degree s/he may apply for the second degree no later than the end of a student’s second semester at AUB to be considered for the dual degrees.

• The student application will be considered separately by each department/program and must satisfy the admissions requirements of both programs and be accepted to both programs to be admitted to the dual degree.

• A student admitted to dual master's degree programs may receive a graduate assistantship from either or both of the participating units; the total sum cannot exceed what each unit provides for a graduate assistant for one academic year.

• A student admitted to dual master's degree programs will receive a single transcript identifying both degrees and the two program titles.

• A student may leave the dual degree programs before completion of both degrees. If the requirements for one degree have been fulfilled, that degree may be awarded.

Transfer Credit

Up to nine transfer credits may be applied to one of the two degree programs, or may be divided between the two degree programs. The transfer of credit follows university policy with regards to the minimum grade required for transferrable courses from other institutions.

Residence Requirement

To meet the minimum resident requirements for the Dual Master's Degrees, a student must register and be in residence as a graduate student for at least three regular semesters.

All requirements for the dual degrees must be completed within a period of five years after admissions to Dual Master's Degrees. Extension beyond the maximum allowed period of study requires approval from the Faculty/ies Graduate Studies Committee/s.
Admission to PhD Programs

Applicants who have an excellent record of academic achievement, and a potential for creative and independent work, may be admitted into one of the following categories:

- Admissions for Students Holding a Master's Degree
- Admissions for Students Holding a Bachelor's Degree

The minimum admission requirements for the two categories are described below. Additional requirements may be set by the individual programs as approved by the Faculty Graduate Studies Committee and the Board of Graduate Studies. Applicants are advised to check with the department/program administration to which they are applying or with the Office of Admissions for additional requirements.

Admission to the PhD program at AUB is competitive, based on the academic record and achievements of the applicant, and the research focus of the department/program.

Applicants who hold degrees from institutions other than AUB must present, along with their official transcript, letter(s) from the institution(s) awarding the degree(s) indicating the denotation of their grading system in terms of its equivalence on a 4.0 GPA scale, or in terms of letter grades A, B, C with +/- scales. Alternatively, applicants may present an official letter from the registrar’s office of their respective institutions indicating the graduating class average of previous years along with standard deviation and class size.

Admission for Students Holding a Master's Degree

Applicants to the PhD programs are expected to have demonstrated distinct academic ability. An applicant is considered for admissions to the PhD program if s/he meets the following minimum admission requirements:

- Holds a Master's degree in any of the disciplines approved by the department/program to which the candidate is applying from AUB or other recognized institution of higher learning with a minimum cumulative average of 85 over 100 or its equivalent.

- Submits a complete application including:
  - Transcripts of academic record from all the institutions that were attended after high school.
  - General GRE test scores. Scores up to 3 years old will be accepted in most programs requiring the GRE scores. The departments may set minimum required scores [refer to the specific program for more information].
  - A written statement of purpose (~400-500 words) indicating the purpose for pursuing graduate study in the particular field at AUB, and specifying the applicant’s research interests and/or practical experience in the field.
  - Three letters of recommendations.
  - A portfolio that includes a resume and samples of work if required by the specific program.

- Complete an interview either in person, by phone, or over the internet.

- Students from non-English-speaking countries must show proficiency in the English language. For additional information, refer to ELPR on page 37.

Admissions for Students Holding Bachelor's Degree

Applicants who have an excellent record of academic achievement, and a potential for creative and independent work at the Bachelor level, may be admitted into a PhD accelerated track at the Bachelor level if this track is available at the department/program.

An applicant is considered for admissions into a PhD track student if s/he meets the following minimum admission requirements:

- A bachelor degree in any of the discipline approved by the department to which the candidate is applying from AUB or other recognized institution of higher learning with a minimum major and cumulative average of 85 over 100 or its equivalent.

- The requirements for the application apply also for the accelerated PhD track.

The student should consult with specific programs to learn about minimum requirements for completion of the accelerated PhD track degree. It is possible that some programs will require that the student complete his/her Master’s degree before starting the PhD degree.

In selecting students to the PhD program, the Faculty Graduate Studies Committee recognizes other evidence of achievement – whenever present - such as research potential or experience, work experience, publications, or other creative work or scholarly activity. In considering such criteria, the Graduate Studies Committee of the Faculty will give serious consideration to departmental recommendations for admission in some cases for applicants who do not meet the minimum requirements of grade point average indicated above, but instead have presented clear evidence of creative activity and academic potential. Departments must present to the Faculty Graduate Studies Committee a justification of such admission recommendations. The Graduate Studies Committee will review these cases, and will make its final recommendation on a case-by-case basis.

Admission as a Non-Degree Graduate Student

This category applies to those who wish to take some graduate courses at AUB without working for a degree as part of the Continuing Education program. Applicants must hold at least a Bachelor’s degree from a recognized institution of higher learning. Applications should be submitted to the Office of Admissions along with the degree and transcript of record by June 30, 2014 if applying for fall 2014–15 or November 15, 2013 if applying for spring 2013–14 (those deadlines are rolling up till one month prior to the beginning of the semester). GRE test scores are not required in this case. Applicants should specify their intended course of study during their visiting status.

Applications are reviewed by departments where courses are to be taken on a case-by-case basis. Recommendations for admission as non-degree graduate student require the approval of the Graduate Studies Committee of the Faculty. Admission is offered normally for one semester, but may be extended for another semester following the approval of the department(s) where courses are taken and the Faculty Graduate Studies Committee.

Admission as a Visiting Graduate Student

This category applies to students who are on study abroad or as part of an exchange program.

Applicants must be a student at another recognized institution of higher learning pursuing graduate studies at Master’s or PhD level. Applications should be submitted to the Office of Admissions along with the degree and transcript of record by April 1, 2014 if applying for fall 2014–15 or October 1, 2013 if applying for spring 2013–14. GRE test scores are not required in this case. Applicants should specify their intended course of study during their visiting status. Applications are reviewed by departments where courses are to be taken. Recommendations are considered on a case-by-case basis.
for admission as visiting students require the approval of the Graduate Studies Committee of the Faculty.

Admission is offered normally for one semester, but may be extended to one year depending on the specific agreement and following the approval of the department(s) where courses are taken and the Faculty Graduate Studies Committee

**Deferred Registration of Admitted Students**

Graduate applicants who are offered admission for a semester and who do not register for that semester may be eligible for admission the following semester pending availability of places. A petition should be submitted to the Office of Admissions by December 15, 2013 for those accepted for Fall 2013–14 and wish to enroll in Spring 2013–14 and July 31, 2014 for those accepted for Spring 2013–14 and wish to enroll in Fall 2014–15.
General University Academic Information

Academic Rules and Regulations

The general policies, procedures and minimum requirements for advanced degrees are stated in this section; however, each program has specific degree requirements which are detailed in the respective program descriptions under later sections of this catalogue. Both general and program specific requirements must be fulfilled in order for the graduate student to receive a Master’s degree or PhD degree.

Academic Advisers

Each student has an academic adviser who must approve the student’s schedule each semester. Freshmen are assigned an adviser from a group of advisers appointed by the dean of the Faculty of Arts and Sciences. The adviser continues advising the student until s/he has been accepted into a major. Names of advisees and their respective advisers are available through the Student Information System (SIS).

Academic Dishonesty

Plagiarism, falsification of data, cheating and other forms of academic dishonesty, are serious violation of academic integrity and may result in dismissal. Students are expected to be familiar with the various forms of academic dishonesty as explained in the Student Code of Conduct on www.aub.edu.lb/pnp/generaluniversitypolicies/Documents/StudentCodeConduct/StudentCodeConduct.pdf

Plagiarism

Students who fail to credit properly ideas or materials taken from another commit plagiarism. Putting your name on a piece of work - any part of which is not yours - constitutes plagiarism, unless that piece is clearly marked and the work from which you have borrowed is fully identified. Plagiarism is a violation of the University's academic regulations and is subject to disciplinary action.

All AUB students are required to complete a plagiarism tutorial and pass a plagiarism test during the first semester they join the university. You can reach the “Plagiarism Tutorial and Test” by following this path: AUB Homepage › A-Z › Academic Computing Centre › Plagiarism Tutorial and Test.

You can take the test as many times as necessary. When you achieve 100 percent on the test, a notification will be generated and saved in your files in the Office of the Registrar. This notification will become part of your permanent record as evidence of your understanding of plagiarism and how to recognize it. Failure to pass the plagiarism test will prevent your registration for the next semester at AUB.
Correct Use of Language

Facility in clear, correct, and responsible use of language is a basic requirement for graduation.

Papers (term papers, essays, or examinations) that are ill-written, no matter what the course, may receive a lower grade for the quality of the writing alone.

The final grade in any course may be lowered for consistently substandard written or oral expression; in extreme cases a failing grade may be given for this reason alone.

See information on the English Language Proficiency Requirement (ELPR) on page 37 of this catalogue.

Leave of Absence

All graduate students are expected to make steady and satisfactory progress toward the completion of degrees. Students who are not enrolled for a period of more than 12 months will be considered to have withdrawn from the program unless they apply for a leave of absence and secure approval of the department, Faculty/School Graduate Studies Committee, and Graduate Council.

The leave of absence application can be up to one year at a time. The maximum period of approved leave of absence is for two years. An approved leave of absence does not count towards maximum residency. Non-enrollment by the student for one semester without securing leave of absence will count towards maximum residency.

Students who seek to return without having secured leave of absence approval after non-enrolment period of 12 months must reapply and will be considered for readmission following regular AUB application/admission procedures.

If re-admitted into the same graduate program then their earlier status as graduate student will count towards maximum residency.

The Leave of Absence Application Form should normally be submitted to the respective department/faculty at least one month prior to beginning of the semester in which absence is planned.

Attendance

(Also see Withdrawal from Courses.)

Attendance Policy

A student who is absent without excuse for more than one third of the number of sessions in any course may be dropped by the instructor of the course.

Classes and Laboratories

• Students are expected to attend all classes, laboratories, or required fieldwork. All missed laboratory or fieldwork must be made up. A student is responsible for the work that is done, and for any announcements that are made during his/her absence.

• Students who, during a semester, miss more than one-fifth of the sessions of any course in the first ten weeks of the semester (five weeks in the case of the summer term) are dropped from the course if the faculty member has stated in the syllabus that attendance will be taken.

• Students who withdraw or are forced to drop a course receive a grade of W.

• A student cannot withdraw, or be withdrawn, from a course after the announced deadline unless approved by the appropriate faculty committee.

Examinations and Quizzes

Students who miss an announced examination or quiz must present an excuse considered valid by the instructor of the course. The course instructor should then require the student to take a make-up examination.

Medical reports and/or qualified professional opinions issued by an AUB employee, AUH doctor, or by the University Health Services are accepted. Should there be a question about the validity of any excuse presented by the student, the matter should be referred to the appropriate faculty committee.

Category of Students

Full-Time Status

Full-time status is defined as the enrollment by the graduate student in:

• A minimum of nine credit hours during the fall or spring semester. Full-time and part-time graduate students retain privileges of library, email, and internet access even if not registered in courses in summer sessions on the condition that they have registered in the preceding spring semester.

• PhD degree candidacy status.

Auditing Courses

Those who wish to attend individual classes without receiving credit may apply as auditors. Applications to audit courses are available at the Office of the Registrar.

The applicant should:

• secure eligibility from the admissions office. An applicant is eligible to audit a course if s/he meets the following requirements:
  – Bacc. II, or equivalent, to audit an undergraduate course
  – Bachelor’s degree, or equivalent, from a recognized academic institution to audit a graduate course.

• secure approval from the instructor of the course.

• receive approval from the dean of the faculty/school offering the course.

• pay the tuition charge at the Office of the Comptroller (student accounts section).

• register as an auditor at the Office of the Registrar.
Applicants are not eligible to audit laboratory, studio, or seminar courses.

Since permission to audit is on a space-available basis, applicants are not permitted to register until after registration of regular students is complete.

The University does not grant academic credit for such work. Audit credits do not appear on transcripts.

**Full-Time Status for University Graduate Assistants and Graduate Research Assistants**

Financial aid covering tuition and stipends in the form of graduate assistantship (GA) or graduate research assistantship (GRA) are available for students at the graduate level in return for assisting faculty members in teaching and/or research for a specified number of hours per week in an academic department. University Graduate Assistants receiving financial support will acquire part-time or full-time student status depending on the number of credits registered for and the percent of support as per table below during the period in which they are receiving such support. GRA stipends and tuition support come from grants, either from the University Research Board (URB) or through external grant support and other sources. They supplement or substitute for the regular graduate assistantships and provide additional tuition or stipend support up to the limit set by the University. The table below also provides definitions for full-time minimum enrollment status for a graduate assistant (GA) or graduate research assistant (GRA) during fall or spring semester and during summer term. GA’s or GRA’s whose load is less than 100 percent while registered for less than 9 credits are considered part-time students.

**Full-time Status of GA and GRA (master degree level students)**

<table>
<thead>
<tr>
<th>GA Load (%)</th>
<th>Number of Registered Credits paid by AUB</th>
<th>Teaching Aid Service Hours</th>
<th>GRA Load (%)</th>
<th>Research Service Hours paid from Research Grants</th>
<th>Total GA+GRA Load (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>9</td>
<td>20</td>
<td>0%</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>67%</td>
<td>6</td>
<td>14</td>
<td>33%</td>
<td>7</td>
<td>100%</td>
</tr>
<tr>
<td>33%</td>
<td>3</td>
<td>7</td>
<td>67%</td>
<td>14</td>
<td>100%</td>
</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>100%</td>
<td>40</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Full-time Status of GA and GRA for Summer term**

<table>
<thead>
<tr>
<th>GA Load (%)</th>
<th>Number of Registered Credits paid by AUB</th>
<th>Teaching Aid Service Hours</th>
<th>GRA Load (%)</th>
<th>Research Service Hours paid from Research Grants</th>
<th>Total GA+GRA Load (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>6-9</td>
<td>20</td>
<td>0%</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>50%</td>
<td>3</td>
<td>10</td>
<td>50%</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100%</td>
<td>40</td>
<td>100%</td>
</tr>
</tbody>
</table>

PhD students who are on fellowships that provide financial support and tuition coverage have full-time-status at the University.

**Registration**

**Requirements**

Before proceeding to registration, new students must ensure that all requirements for registration are met, particularly conditions detailed in the admission letter from the director of admissions. These conditions include

- the English Language Proficiency Requirement (see page 37).
- evidence of having received the diploma, certificate, degree, or level of university education on the basis of which the student applied and admission was granted (see Requirements of Admitted Students for Registration).

A registration guide is distributed to every student before registration begins. Subsequent to confirmation that all conditions have been met, students should follow the steps in this guide.

Students can introduce final adjustments to their schedules during the add/drop period. The add/drop period normally extends for two days and begins one week after the first day of classes.

**Cross-Registration**

**Students Enrolled at AUB Taking Courses at Other Universities**

A student studying at the American University of Beirut may be allowed to cross-register for a course at other recognized institutions if all of the following conditions are met:

- the course is required by AUB.
- the course is not offered at AUB during the semester at the end of which the student expects to graduate.
- the course in which the student intends to cross-register is equivalent to a course that AUB offers (the number and title of each of the two equivalent courses should be clearly indicated).
- the chairperson of the department in which the student is majoring sends the Registrar a written statement confirming that all the conditions listed above have been met.
- the Registrar authorizes the student to cross-register; the student submits authorization to the concerned institution.

**Students Enrolled at Other Universities Taking Courses at AUB**

For purposes of cross-registration, students studying at other recognized institutions who wish to take courses at AUB must

- secure permission from their institutions to take specified courses at AUB.
- secure permission from the dean of the faculty concerned at AUB.
- present the above permissions to the AUB Office of the Registrar.
- register in accordance with the instructions specified in the registration guide (www.aub.edu.lb/registrar/Pages/registration.aspx)

**Courses and Grades**

Courses taken as part of a student’s graduate study program fall into one of two categories: graduate courses or prerequisite (Undergraduate courses). Each category may have different grading systems depending on the department/program.
Course Loads

Normally, the maximum number of credits that may be taken in a regular semester is 12 credits. The maximum number of credits that may be taken in the summer session is six credits. A student who wishes to enroll in more than the maximum number of credits must petition the Faculty Graduate Studies Committee to obtain permission.

Graduate Level Courses

- The minimum passing grade for a graduate course is 70 for a Master’s student and 75 for a PhD student.
- The minimum grade for a graduate student enrolled in a graduate course is 55.
- Results of tutorial courses, projects, or theses are reported as Pass (P) or Fail (F).

Prerequisite Courses

Prerequisite courses are undergraduate courses taken to make up for deficiencies in the student’s background.
- Prerequisite courses do not carry graduate credit.
- The minimum passing grade for a prerequisite course is 70; however, a department or program may set a higher minimum passing grade.

Change of Grade Policy

After grades are posted on the AUB Student Information System (AUBSIS), a change of grade is not allowed unless a demonstrable mistake was made in the correction of the final examination or in the calculation of the grade. In such a case, the instructor must complete a Change of Grade form and submit it to the chairperson of the department in which the course is offered, with the supporting evidence for the mistake warranting this change of grade. If the chairperson of the department approves the change of grade, s/he will sign the form and transmit it for final approval to the Dean (all Faculties except FAS) or to the FAS Student Academic Affairs Committee if the course is offered in FAS.

A student has the right to access his corrected exams including final exams and request review of his exams in case mistakes have been made in calculating grades or in corrections. The request by the student of the course instructor to review the course grade should take place within one week from the date of the posting of course grades. In case the review by the instructor results in a change of course grade, the instructor shall complete the Change of Grade form in accordance with the procedure outlined by the Faculty in which the course is offered.

If a dispute regarding the change of grade continues, the student should discuss the issue with the chair of the department. If the student is still not satisfied, s/he may submit a petition to the Faculty Academic and Curriculum Committee, requesting further consideration.

Incompletes

A student who receives an incomplete grade for a course must petition the appropriate faculty committee within two weeks from the date of the scheduled final exam for permission to complete the course. Coursework must be completed within one month of the start of the next regular semester. In exceptional circumstances, the appropriate faculty committee may decide to give the student additional time to complete a course.

Incomplete course work is reported as an “I”. Normally, “I” is followed by a numerical grade reflecting the evaluation of the student available at the end of the semester. This evaluation is based on a grade of zero on all missed work and is reported in units of five. If the work is not completed within the period specified, the “I” is dropped and the numerical grade becomes the final grade.

Transfer of Credits

Transfer of Credits into a Master’s Degree Program

Graduate courses taken beyond the Bachelor’s degree requirements at AUB, or at other recognized institutions, are not transferable for credit toward Master’s degree requirements, unless the applicant attained a cumulative average of at least 80 in the undergraduate courses taken in the major or related field of study. Only graduate courses in which the applicant earned an equivalent grade of 80 or above can be transferred. No more than nine credits are transferable provided they are not credits earned by internship, thesis, or practicum, and degree minimum residency requirement is maintained. Applicants who have completed a Bachelor of Engineering Degree (BE) and are applying for admissions to a Master of Engineering Program (ME) may apply for a waiver of up to nine credits of course work. For more details, refer to the Faculty of Engineering and Architecture section under “Criteria for Admission to Master’s programs” on page 244. Approval by the Faculty/School Graduate Studies Committee is required for all transfers.

Transfer of Credits from One Master’s Degree to Another

Graduate courses taken at AUB (or at other recognized institutions), in which the applicant earned an equivalent grade of 80 or above, may be transferred to another Master’s degree at AUB. No more than nine credits are transferable provided they are not credits earned by internship, thesis or practicum, and degree minimum residency requirement is maintained. Approval by the department or the academic unit concerned, and the Faculty/School Graduate Studies Committee is required for all transfers.

Calculation of the GPA

Credits earned at other institutions or at AUB beyond the requirements of the Bachelor degree and transferred into the Master’s program are not included in the calculation of a student’s grade average while pursuing Master’s degree. Such courses are reported as pass (P). Transfers of credit earned at the Master’s level from AUB are not subject to the above limitations but require the recommendation of the department chair and the approval of Faculty/School Graduate Studies Committee.

Transfer of Credits into a PhD Degree Program

Graduate courses taken beyond the Master’s degree requirements at AUB, or at other recognized institutions, are not transferable for credit toward PhD degree requirements, unless the applicant attained a cumulative average of at least 85 in the graduate courses taken in the major field of study. Only courses taken beyond the Master’s degree requirements in which the applicant earned an equivalent grade of 85 or above can be transferred. No more than six
credits are transferable provided they are not credits earned by internship, thesis, or practicum, and degree minimum residency requirement is maintained. Approval by the Faculty/School Graduate Studies Committee and the Graduate Council is required for all transfers.

Change of Major within Faculty and Interfaculty Transfer

A student enrolled in a Master’s degree program at AUB may apply to transfer to another program according to the following procedure:

- Change of major within the same faculty: The student may apply, following the set deadlines for graduate admissions process, for change of major within the same faculty by petitioning the department to which he/she is planning to join and securing its approval and the approval of the Faculty Graduate Studies Committee.
- Transfer to other faculties/schools from within AUB: The student should complete a new application to the desired program following the graduate admissions process and deadlines for consideration for admission in the new major.
- Transfer within an interfaculty program: The student should apply to the relevant interfaculty program committee seeking their approval and the approval of the Graduate Studies Committee of the receiving faculty.

Academic Standing of Student Working for a Master’s Degree

Good Standing

A graduate student is in good standing when his/her graduate grade cumulative average is 80 or above. A student must be in good standing in order to be awarded a degree.

Probation and Removal of Probation

The academic performance of the student is first evaluated by the department upon completion of nine credits of course work after initial enrollment towards the degree and then is evaluated every semester/term, thereafter.

Students Admitted on Probation

- A student admitted on probation has to complete at least nine credits of graduate level courses within the first two semesters of graduate studies, has to pass all courses, and has to attain a minimum cumulative average of 80 to achieve regular status.
- If the student fails to meet any of these conditions, s/he will be dropped from the program.

Students placed on probation during regular status residency

- A student is placed on probation if he/she attains a cumulative average of 70 or more, but less than 80 or fails any course taken for graduate credit.
- A student placed on probation due to average must remove the probation by the end of the following regular semester/term by attainment of a cumulative average of at least 80.
- A student placed on probation due to course failure should retake the course the next time it is offered and pass the course. In case this condition cannot be met, the student, in consultation with the adviser, must petition the Faculty/School Graduate Studies Committee.

The department or program in which the student is enrolled may recommend probation to the Faculty Graduate Studies Committee even though the student has attained an adequate cumulative average.

The Registrar sends proposed change in probationary status of enrolled graduate students to their respective Faculties/Schools Dean Offices within one week of the start of the semester/term for consideration by the Faculty/School. The Faculty/School Graduate Studies Committee issues through the Dean's Office the statement of the change of probation status to the graduate student with copies to the department chair, student adviser, and Registrar.

Dismissal

The Faculty Graduate Studies Committee may dismiss a Master’s student, in consultation with the department/program, from graduate study if any of the following conditions arise:

- Probation status due to average is not removed in the semester following the first probation excluding students admitted on probation (see previous section on probation and removal of probation).
- The student receives probation for a second time during the degree residency.
- The student attains a cumulative average of less than 70 after completion of 9 credits or fails two courses in one term.
- The student attains a cumulative average of 70 or above, but less than 80, in any term and fails one course in that term. (This rule does not apply to the first term of study.)
- The work of the student is considered to be unsatisfactory in the opinion of the department or program, and regardless of the grades obtained.
- The student fails the comprehensive examination twice or the thesis defense twice.

Requirements for the Master’s Degree

In addition to satisfying the general requirements set in the preceding sections, students working toward a Master’s degree must fulfill the minimum requirements described below. Some programs may have additional credit requirements for completion of a Master’s degree.

The award of a Master’s degree indicates that a student attained a higher level of knowledge and expertise in a particular field of study. A Master’s thesis often serves as the groundwork for future doctoral research.
Course Requirements

There are two types of Master's degree programs, namely, thesis and non-thesis Master's degrees. Some programs provide a choice of either a thesis or non-thesis option, others may have only the thesis or the non-thesis option.

- Students following the thesis option are required to complete a minimum of 30 credit hours of which a minimum of 21 graduate credit hours should be in course work and a minimum of six credit hours of thesis work. Normally, a maximum of three credit hours may be tutorial courses. Exceptions for individual students will require approval from the department chair and the Faculty Graduate Studies Committee.

- Students following the non-thesis Master's program are required to take a minimum of 30 graduate credit hours, three credits of which may be a project and should follow a course of study approved by the department/program and by the Faculty Graduate Studies Committee of the faculty.

- Students following the Master's of Public Health (MPH) are required to complete a minimum of 42 credit hours.

- Students following the Master's of Business Administration (MBA) program are required to take six credits of foundation courses (or to pass a related exemption test upon the approval of the program director). In addition, they must complete a minimum of 42 credit hours, a minimum of 39 graduate credit hours in course work, and a minimum of three credit hours of MBA project.

- Students holding an MD degree or working on a combined MS-MD degree are required to complete at least 10 graduate course credits and a thesis, in addition to the MD degree requirements.

Students receive credit for graduate level courses only. Students with deficiencies in their undergraduate preparation may be required to take additional course credits, as determined by the department/program concerned.

Language Requirements (Other than English)

Individual departments and programs may set their own non-English language requirements. Examination procedures for these languages should be approved by the Faculty Graduate Studies Committee.

Residence Requirements

To meet the minimum residence requirements for the Master's degree, a student must register and be in residence as a graduate student for at least two semesters, one semester and two summers, or four summers.

All requirements for the Master's degree must be completed within a period of four years after admission to graduate study. Students attending only summer sessions must complete all requirements within a period of six summers after admission to graduate study. Extension beyond the maximum allowed period of study requires approval from the Faculty Graduate Studies Committee.

Comprehensive Examination

All Master’s programs must require that the student register and pass a zero-credit comprehensive examination course. Comprehensive examinations often are written exams, sometimes oral, and sometimes both written and oral. They are usually taken after completing most of the course requirements for the degree. Timing of the examination is set by the department/program. The Pass (P) or Fail (F) is entered online or is reported to the Registrar immediately on the date the comprehensive examination is passed any time during the semester.

In general, a comprehensive examination is a test that covers a broad base of material. The purpose of the examination is to assess the student’s knowledge and capacities to earn a given graduate degree in the field of specialization. Depending on the degree program, it may test course knowledge, knowledge of the student’ proposed research area, and/or the general knowledge in the field. The student’s thesis committee or the department administers the comprehensive exam.

A student who does not pass the comprehensive examination may take it a second time in the following semester. Students who are unable to pass a program's comprehensive exam twice are dropped from the graduate program. Students who pass the comprehensive exam after one failure will have their initial failure reported as “PR” for progress in the first semester the course was registered in and the grade of “P” for passing the comprehensive exam will show on their transcript in the second semester the course was registered in.

Master of Public Health students are exempt from the requirement of a comprehensive exam. This requirement is replaced for all MPH students by PBHL 398: Culminating Experience Seminar.

Institutional Review Board (IRB)/Animal Care Committee (ACC) Requirements

All students conducting human subject research or animal related research for Master's theses or projects must obtain prior written Institutional Review Board and/or Animal Care Committee approval/confirmation or exemption, respectively.

Supervision of Master’s Thesis or Project

Thesis Proposal

When following a graduate program leading to the Master's degree with thesis option, the student is expected to meet with faculty members in the department to discuss with them possible thesis topics and arrange to have a thesis adviser. Normally, the thesis adviser is from among the full-time professorial faculty of the department/program or from another department/program in the University. In interdisciplinary programs, the thesis adviser is from an appropriate program at the University.

The student is expected to select a research topic in consultation with the thesis adviser and prepare a thesis proposal by the end of the second regular semester. The proposal must clearly state the problem addressed and the proposed contributions. The thesis proposal should also state the thesis objectives, scope of work with relevant literature, research methodology, and expected results.
A thesis committee is formed by the thesis adviser and the student in coordination with the chairperson/director of the unit according to the following conditions:

- Thesis committee should normally consist of at least three members from the professorial ranks chaired by the thesis adviser.
- In departments/programs, normally at least two members of professorial rank of the thesis committee must be members of the student’s department. The remaining member(s) can be from other departments at AUB or from an institution other than AUB.
- In case the thesis adviser is from another department at AUB, the chairperson will consult with the chairperson of the department to which the thesis adviser belongs.
- In interdisciplinary programs, the members of the thesis committee are drawn from full-time faculty members at AUB.

The thesis committee must be approved by the chairperson/director of the student’s department/program. The student must submit the thesis proposal to the committee and secure its approval. The committee members will evaluate the proposal in consultation with the thesis adviser.

The student will submit the thesis proposal with a completed Thesis Proposal form as required by Faculty or Program (Website) to the chairperson of the department, signed by the thesis adviser and all the members of the thesis committee, with the proposed dates of the comprehensive examination, and thesis defense, and courses taken so far. The student should indicate if the proposed research involves human subject research or animal related research and seek approval/confirmation or exemption of the Institutional Review Board and/or the Animal Care Committee.

Once approved, the chairperson forwards the thesis proposal with the names of the thesis committee members to the Faculty/School Graduate Studies Committee for its approval.

The Faculty/School Graduate Studies Committee will then inform the chairperson of the proposal approval or lack thereof, and the chairperson will communicate the decision to the thesis adviser.

It is the student’s responsibility, in coordination with thesis adviser, to keep members of the thesis committee informed of the progress of his/her work and to seek their input.

**Thesis format**

An AUB-approved thesis manual is available on the University Libraries webpage. The manual provides the style guide for all theses prepared by AUB students, and application of its instructions is mandatory for all theses-dependent degrees. Theses not conforming to the publication style outlined in the thesis manual are not accepted by the University. Students are welcome to visit the Archives and Special Collections, Jafet Library, any time during the semester.

For all matters not discussed in the Thesis Manual, theses must follow the form and style outlined in the latest edition of K. L. Turabian, *Manual for Writers of Term Papers, Theses, and Dissertations* (University of Chicago Press), or any other style specified by the department or program, provided the style conforms to the Thesis Manual.

**Thesis Defense**

A student is not allowed to defend his/her thesis unless he or she has passed the comprehensive examination. In order to defend the thesis, the student must be registered for the thesis in the session in which the student expects to graduate.

The thesis defense is open to the public and must be carried out no later than the dates specified on page 60.

The final draft of the thesis shall be submitted to each member of the thesis committee at least two weeks before the date of the thesis defense. The thesis defense shall be announced at least two weeks in advance. The total time allocated for the thesis defense should allow for answering all questions and should not normally exceed 120 minutes.

The thesis defense session is normally chaired by the thesis adviser and the student will be notified of the final decision by thesis committee immediately after completion of the thesis committee deliberations.

Pass (P) or Fail (F) is reported for the combined thesis and thesis defense. If Fail (F) is reported, the student may resubmit the thesis and defend it after a period of at least three months. Failure on the second attempt results in discontinuation of the graduate work.

If the thesis work involves human subject research or animal related research, the thesis committee must forward to the department chair a copy of the approval/confirmation or exemption letter of the Institutional Review Board and/or Animal Care Committee.

**Project and Project Defense**

In partial fulfillment of the requirements for the non-thesis Master’s degree, a student may be required to submit a project. Each student is then assigned an adviser who serves as the project adviser. The Master’s project topic proposal, and selection of the adviser and project committee members, should be approved by the Faculty Graduate Studies Committee.

The Master’s project committee should be composed of at least two members recommended by the department/program. The project topic proposal and selection of the adviser, and selection of project committee members, should be approved by the Faculty/school Graduate Committee at least four months before the project defense.

If the project work involves human subject research or animal related research, the thesis committee must forward to the department chair a copy of the approval/confirmation or exemption letter of the Institutional Review Board and/or Animal Care Committee.

The project defense is open to the public and must be carried out no later than the dates specified on page 60.

Pass (P) or Fail (F) is reported for project defense. If Fail (F) is reported, the student may resubmit the project and defend it after a period of at least three months. Failure on the second attempt results in discontinuation of the graduate work.

**Deposit of the Project/Thesis in the Library**

After passing the project/thesis defense examination, the student is required to deposit copies of the thesis in the library: The *Jafet Memorial Library* requires one hard copy of the Master’s project/thesis from students at the Faculty of Agricultural and Food Sciences, Faculty of Engineering and Architecture, Faculty of Arts and Sciences and Suliman S. Olayan School of Business. The Saab Medical Library requires one hard copy of the Master’s project/thesis from students at the Faculty of Medicine, the Hariri School of Nursing, and the Faculty of Health Sciences. The student should also provide the relevant library with a soft copy of the thesis.
saved as PDF (Portable Document Format) file. A library receipt must be delivered to the Office of the Registrar before the student is awarded the degree. The Registrar shall ensure that all names of students recommended to the Senate for award of the Master's degree in the thesis option have submitted their thesis copy to the library. The student should sign a release form indicating whether or not the library is authorized to supply copies of the thesis/project to other libraries or to individuals. The non-authorization option is valid for a period of two years only, after which copies of the project/thesis are supplied upon request.

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<tr>
<td>Deadline for approval of thesis topic and committee*</td>
<td>First Monday of the Summer term</td>
<td>First Monday of the Fall term</td>
<td>Last Monday of the preceding Fall term</td>
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<tr>
<td>Deadline for thesis defense*</td>
<td>Fourth Monday of the following Fall term</td>
<td>One week after the end of Fall term</td>
<td>One week before the end of Spring term</td>
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<td>September 30, 2013</td>
<td>January 3, 2014</td>
<td>May 9, 2014</td>
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<td>Deadline for thesis deposit at library</td>
<td>Ten days after the deadline of the thesis defense</td>
<td>Ten days after the deadline of the thesis defense</td>
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Master's Degree Graduation Requirements
To be eligible for graduation with a Master's degree from the American University of Beirut, a graduate student

- must have attained a cumulative course average of 80 or above.
- is not placed on probation by the time the course work is completed.
- must have completed the minimum credit hours of course work designated by the specific program.
- must have passed comprehensive exam.
- must have completed thesis requirements for thesis option degrees.
- must have completed project requirements for the non-thesis option degrees.
- must have met the residence requirements specified for the Master's degree.

Academic Standing of Student Working for PhD Degree

Good Standing
A PhD student is in good standing when his/her graduate grade cumulative average is 85 or higher. A student must be in good standing in order to be awarded a degree.

Probation and Removal of Probation
A student working for a PhD degree who has not yet advanced to candidacy can be placed on academic probation if s/he fails to make normal progress towards the degree.

The academic performance of the student is first evaluated by the department upon completion of the first nine credits of course work towards the degree and then is evaluated every semester/term thereafter:

- A student is placed on probation if s/he attains a cumulative average of 75 or more, but less than 85 or fails any course taken for graduate credit.
- A student placed on probation due to average must remove the probation at the end of the following semester/term by attainment of a cumulative average of at least 85.
- A student placed on probation due to course failure should retake the course the next time it is offered and pass the course. In case this condition cannot be met, the student in consultation with the adviser must petition the Faculty/School Graduate Studies Committee.

The department or program in which the student is enrolled may recommend probation to the Faculty Graduate Studies Committee even though the student has attained an adequate cumulative average. Probation of a PhD student may be removed by the Graduate Council upon recommendation from the Faculty Graduate Studies Committee.

The Registrar sends change in probationary status of enrolled PhD students to their respective Faculties/Schools Dean Offices within one week of the start of the semester/term. The Faculty/School Graduate Studies Committee issues the statement of the change of probation status to the graduate student with copies to the department chair, student adviser, the Graduate Council, and Registrar.

Dismissal
The Graduate Council upon recommendation from the Faculty Graduate Studies Committee and the Chair of Department may discontinue a PhD student from graduate study if any of the following conditions arise:

- Probation status is not removed in the semester following the first probation.
- The student receives probation for a second time during the degree residency.
- The student attains a cumulative average of less than 75 or fails two courses in one term.
- The student attains a cumulative average of 75 or above, but less than 85, in any term and fails one course in that term. (This rule does not apply to the first term of study.)
- The work of the student is considered to be unsatisfactory in the opinion of the department or program, and regardless of the grades obtained.

* The thesis proposal should be approved by the Faculty/School Graduate Committee at least eight months before the thesis defense.
The student fails the Qualifying Examination Part I (Comprehensive Examination) or Part II (Thesis Proposal Defense) twice.

The student fails the thesis defense twice.

Requirements for the Degree of Doctor of Philosophy

In addition to the particular rules of the various graduate programs as stated in their sections of this catalog, the following general rules apply to all Doctor of Philosophy programs.

The award of a Doctor of Philosophy degree indicates that a student has attained mastery of a field and has demonstrated the capacity to perform independent scholarly research. The doctoral degree is not awarded solely upon completion of a curriculum of courses, even though the student has done superior work in them; rather, it is awarded in recognition of creative scholarship as demonstrated by a substantial contribution in the candidate's chosen field.

Program of Study

Each doctorate student is expected to take such courses as may be required for both a strong foundation in the field and the development of a specialization.

Regular PhD Track Course Requirements for Students Holding Master’s Degrees

Each student, in consultation with his/her adviser, should finalize a program of study and submit it to the department within two semesters of beginning study toward the PhD degree. The Graduate Council monitors the progress of the student through annual reports on course and thesis work by chairpersons of the department/program. The following are main features of this PhD track:

- It must include a minimum of 48 credit hours beyond those required for the Master's degree of which a minimum of 18 credit hours must be in graduate level course work and a minimum of 24 credit hours of thesis work. Normally, a maximum of three credit hours out of the 18 credits of course work may be tutorial courses. Exceptions for individual students will require approval of the department chair and the Faculty Graduate Studies Committee.
- It will include a zero credit thesis proposal preparation course.

Accelerated PhD Track Course Requirements for Students Holding Bachelor Degrees

Each student, in consultation with his/her adviser, should finalize a program of study and submit it to the department within two semesters of beginning study toward the PhD degree. The Graduate Council monitors the progress of the student through annual reports on course and thesis work by chairpersons of the department/program. The following are main features of the accelerated PhD track:

- It must include a minimum of 78 credit hours beyond those required for the Bachelor's degree of which a minimum of 36 credit hours must be in graduate level course work and a minimum of 30 credit hours of thesis work. Normally, a maximum of six credit hours may be tutorial courses out of the 36 credits of course work. Exceptions for individual students will require approval of the department chair and the Faculty Graduate Studies Committee.
- It will include a zero credit comprehensive examination preparation course and a zero credit thesis preparation course.

The Graduate Council monitors the progress of the student through annual reports on course and thesis work by chairpersons of the department/program. The following are main features of the accelerated PhD track:

- It must include a minimum of 78 credit hours beyond those required for the Bachelor's degree of which a minimum of 36 credit hours must be in graduate level course work and a minimum of 30 credit hours of thesis work. Normally, a maximum of six credit hours may be tutorial courses out of the 36 credits of course work. Exceptions for individual students will require approval of the department chair and the Faculty Graduate Studies Committee.
- It will include a zero credit comprehensive examination preparation course and a zero credit thesis preparation course.

Language Requirements (Other than English)

Depending on the research topic, the thesis committee and the department may require proficiency in one or more foreign language. Examination procedures for these languages should be approved by the Faculty Graduate Studies Committee.

Residence Requirements

To fulfill the minimum residence requirements for the PhD degree, the student must register for at least six semesters beyond the completion of the Master's degree or eight semesters for the accelerated track beyond the Bachelor's degree. Requirements for the degree of Doctor of Philosophy must be completed within five years of starting graduate work beyond the Master's degree or six years for the accelerated track beyond the Bachelor's degree. Extension requires Graduate Council approval upon recommendation by the Faculty Graduate Studies Committee.

PhD Qualifying Exam

All PhD programs require that PhD students pass the qualifying exam. The PhD qualifying exam is two parts. Qualifying Exam Part I is a written comprehensive exam administered by the department/program or the thesis committee. The Qualifying Exam Part II is an oral thesis proposal defense exam administered by the thesis committee.

Qualifying Exam Part I: Comprehensive Exam

All PhD programs require that PhD students register and pass a zero-credit comprehensive examination course. Comprehensive examinations are written exams taken after completing a minimum of 15 credits of course requirements for the regular degree track and a minimum of 30 credits of course requirements for the accelerated degree track. Timing of the examination is set by the department/program no later than the fourth semester of the PhD student enrolment in the regular PhD program and no later than the sixth semester of the PhD student enrolment in the accelerated PhD track.

In general, a comprehensive examination provides assurance that all PhD candidates have acquired sufficient knowledge/background in their major field of study. For more details on the examination, the student should refer to his/her specific department/program requirements. The thesis committee or the department/program administers the comprehensive exam.

A student who does not pass the comprehensive exam may take it a second time in the following semester. Students who are unable to pass a program's comprehensive exam twice are dropped...
from the PhD program. Students who pass the comprehensive exam after one failure will have their initial failure reported as "PR" for progress in the first semester the course was registered in and the grade of "P" for passing the comprehensive exam will show on their transcript in the second semester the course was registered in.

Qualifying Exam Part II: Defense of Thesis Proposal
All students must successfully complete a qualifying examination defending their PhD thesis proposal. The second part of the qualifying exam (thesis proposal defense) is to be taken at least two semesters prior to thesis defense and is conducted by the student thesis committee. (More details on the policy regarding the defense of thesis proposal are provided following the section on PhD Thesis Proposal.)

Admission to Candidacy
Students are admitted to candidacy at least two semesters before obtaining their PhD degree. Students enter degree candidacy upon passing the qualifying exam (comprehensive exam and thesis proposal defense) and while in good standing. Students who are enrolled in degree candidacy are considered full-time students. While in degree candidacy, it is the responsibility of both student and adviser to maintain contact to ensure continuous progress towards the completion of the degree.

For admission to candidacy, students are expected to have:
- Completed all graduate course work requirements beyond the Master's degree in the regular PhD track.
- Completed all graduate course work requirements beyond the Bachelor's degree in the accelerated PhD track.
- Attained a cumulative average of at least 85 while in the regular or accelerated track doctoral programs.
- Completed other than English language requirements when applicable.
- Passed the first and second part of the qualifying exam (written comprehensive examination and thesis proposal defense) as set by the department.
- Is in good standing (not on probation).
- Enrollment in degree candidacy requires the approval of the Faculty Graduate Studies Committee upon department recommendation. Faculties must inform the Graduate Council when students have met all requirements and are ready to enter degree candidacy. Once a student is admitted to candidacy, enrollment in degree candidacy status must be continuously maintained for the academic year (i.e. fall and spring) until the degree is awarded. The only exception to this policy of continuous enrollment is if the Faculty Graduate Studies Committee and the Graduate Council have granted the student a formal leave of absence.

Supervision of Doctoral Thesis
During the first semester of graduate study, the department or program assigns an academic adviser to the student. The adviser guides and helps the student plan a course of study. Not all credits need to be in courses offered by the department/program in which the student is enrolled, but all credits must be in courses that, in the judgment of the department/program, are relevant to the field in which the student is specializing.

Normally by the end of the second semester, each student enrolled in a PhD program is assigned a thesis adviser who must be a full-time professorial rank faculty member. Normally, the thesis adviser is a full-time professorial rank faculty member of the department/program.

PhD students are expected to register for a thesis course during each semester in which they are carrying out work contributing to their PhD thesis. Instructions on choosing the appropriate course for which to register can be found at the following link: http://www.aub.edu.lb/units/graduate_council/Pages/regulations.aspx.

PhD Thesis Committee
The thesis committee should be composed of at least five members, one of whom should be from outside the department/program and one from outside the university. The thesis adviser and at least three of the thesis committee members must be of professorial rank. All members of the thesis committee must hold a doctoral degree in a relevant field. The chair of the thesis committee must be a full professor who is not the PhD thesis adviser (requirement of the Lebanese Ministry of Higher Education).

Members of the doctoral thesis committee are recommended by the student's thesis adviser and approved by the department, the Faculty Graduate Studies Committee, and the Graduate Council.

The doctoral thesis committee approves the thesis topic, research plan, conducts the thesis proposal defense (Part II of the Qualifying Exam) and conducts the thesis defense. The thesis proposal and the selection of the thesis committee should be approved at least two semesters before the student defends his/her thesis. The PhD thesis topic, examining committee, and admission to candidacy require Graduate Council approval.

PhD Thesis Proposal
When following a graduate program leading to the PhD degree, the student is expected to meet with faculty members in the department to discuss with them possible thesis topics and arrange to have a thesis adviser. The thesis adviser is from among the full-time professorial faculty of the department/program or from another department/program at the University.

The student is expected to select a research topic in consultation with the thesis adviser and prepare a thesis proposal. The proposal should be prepared by the end of the fourth regular semester for a regular track student and by the end of the sixth regular semester for an accelerated track student. The proposal must clearly summarize the thesis problem and the planned approach. The purpose of the proposal is to inform the thesis committee members and the department, in concise statements, of the candidate's research plan. It should state the thesis objectives, scope of work with relevant literature, research methodology, and expected results. The proposal must provide sufficient literature citations to indicate awareness of previous work and enough detail to show how the proposed work is expected to advance knowledge in the field.

The student must submit the thesis proposal to the thesis committee and get its preliminary approval to defend the proposal. The student, upon committee approval, will arrange for the thesis proposal defense date and time as applicable.

The student should indicate if the proposed research involves human subject research and/or animal related research and seek approval/confirmation or exemption of the Institutional Review Board and/or the Animal Care Committee.
Qualifying Exam Part II: Defense of Thesis Proposal

All students must successfully complete a qualifying exam defending their PhD thesis proposal. The second part of the qualifying exam (thesis proposal defense) is to be taken at least two semesters prior to thesis defense and is conducted by the student thesis committee. The student is expected to demonstrate the intellectual capacity to pursue and complete an independent research work that advances knowledge in the field of study. The student should register in the zero credit course preparation for thesis proposal or equivalent as recommended by the relevant program during the semester he or she intends to take the oral qualifying exam or the thesis proposal defense.

The criteria for passing the thesis proposal defense requires that the research topic is of PhD standard, original, clear in its contribution to existing knowledge, and the proposed methodology is appropriate. The student who fails the thesis proposal defense (part II of Qualifying Exam) should repeat it in a subsequent regular semester after addressing the comments of the thesis committee compiled by the thesis committee chair in the examination report.

The chair of the doctoral thesis committee upon satisfactory completion of the proposal defense and/or approval of the thesis proposal will send his/her assessment (Pass or Fail) to the department chair on the zero-credit course “preparation for thesis proposal” along with a signed copy of the thesis proposal by all members of the committee. The chair sends the recommendation and the doctoral proposal to the Faculty Graduate Studies Committee for approval. Upon approval, the Faculty Graduate Studies Committee forwards the decision to the Graduate Council which informs the Registrar, the Dean of the Faculty, Department Chair, and Advisor of the final decision of passing the oral qualifying exam and the approval of the thesis proposal. The chair will enter the P/F grade on the SIS.

Institutional Review Board (IRB)/ Animal Care Committee (ACC) Requirements

All students conducting human subject research or animal related research for PhD theses must obtain prior written Institutional Review Board and/or Animal Care Committee approval/confirmation or exemption, respectively before admission to candidacy.

PhD Thesis Format

In partial fulfillment of the requirements for the degree of Doctor of Philosophy, a student must submit a thesis based on results of original, independent research. Except in departments/programs in which the medium of instruction is not English, a thesis must be in English.

An abstract not exceeding 350 words must be submitted with the thesis. If a thesis is in a language other than English, the abstract must be written both in the project’s language and in English.

An AUB-approved thesis manual is available on the University Libraries webpage. The manual provides the style guide for all theses prepared by AUB students, and application of its instructions is mandatory for all PhD degrees. Theses not conforming to the publication style outlined in the thesis manual are not accepted by the University. Students are welcome to visit the Archives and Special Collections, Jafet Library any time during the semester.

For all matters not discussed in the Thesis Manual, theses must follow the form and style outlined in the latest edition of K.L. Turabian, Manual for Writers of Term Papers, Theses, and Dissertations (University of Chicago Press), or any other style specified by the department or program, provided the style conforms to the Thesis Manual.

Copies of the thesis should be submitted by the student to the thesis committee members at least two weeks before the thesis defense. Copies must be legible and durable. Additional copies may be required, as specified by the department or program concerned.

PhD Thesis Defense

The thesis/project defense is open to the public and must be carried out no later than dates specified on page 68. In order to defend the thesis, the student must be registered for the thesis in the session in which the student expects to graduate.

Final doctoral thesis defense will be announced to the university community so that interested members from faculty and student body may attend. The date, time and location for the defense must be sent at least two weeks in advance to the Graduate Council. A copy of the thesis abstract must accompany the defense announcement.

Pass (P) or Fail (F) is reported for the combined thesis and thesis defense. If Fail (F) is reported, the student may resubmit the thesis and defend it after a period of at least four months. Failure on the second attempt results in discontinuation of the PhD work.

If the thesis work involves human subject research and/or animal related research, the thesis committee must forward to the department chair a copy of the approval/confirmation or exemption letter of the Institutional Review Board and/or Animal Care Committee.

Deposit of the Thesis in the Library

After passing the thesis defense examination, the student is required to deposit copies of the thesis in the library: The Jafet Memorial Library requires one copy of the doctoral thesis from students at the Faculty of Engineering and Architecture and Faculty of Arts and Sciences. The student should also provide the library with a soft copy of the thesis saved as one PDF (Portable Document Format) file. A library receipt must be delivered to the Office of the Registrar before the student is awarded the degree. The Registrar shall ensure that all names of students recommended to the senate for award of the PhD have submitted their PhD thesis copy to the library. The student should sign a release form indicating whether or not the library is authorized to supply copies of the thesis to other libraries or to individuals. The non-authorization option is valid for a period of two years only, after which copies of the thesis are supplied upon request.
### PhD Degree Graduation Requirements

A student can graduate at the end of any academic semester provided the student has satisfied the following requirements:

- Attained a minimum cumulative course average of 85 excluding courses taken prior to admission to the program.
- Passed the Doctoral Qualifying Exam Parts I and II (Comprehensive and thesis proposal defense Examinations) as set by the department.
- Met program specific requirements for publication of thesis work by the time of graduation.
- Successfully defended a thesis of original scholarly work.
- Met the residence requirements and all pertinent AUB regulations.

### Disclosure of Student Records

The University may disclose routine information without prior written consent from the student. This information is of a directory nature and includes only the following items: student's name, degrees received, major field(s) of study, awards received, and participation in officially recognized activities and sports.

With the exceptions specified below, the University releases other information, including information from academic records, only upon written consent from the student. This consent must specify the information that is to be disclosed, state the purpose of the disclosure, and provide the names and addresses of the individuals or institutions to whom disclosure is to be made. However, the University may disclose information, including information on academic records, without prior written consent of the student:

- Upon the request of officers of other educational institutions where the student seeks to enroll (in such cases the student is given, upon his/her request, a copy of the information sent to the institution).
- As necessary to academic officers, academic advisers, and faculty members within the University.
- To parents of a dependent student.
- In compliance with a judicial order.
- To financial aid services in connection with financial aid for which the student has applied or which the student has received.

## Graduation Requirements

Students are strongly advised to prepare their registration schedules with their advisers to ensure graduation requirements are fulfilled. Failure to do so may mean that a student has to spend an additional semester, or more, to complete graduation requirements.

### Commencement Exercises

Commencement exercises are held at the end of the academic year. Students who graduate in October or February may participate in the commencement exercises. Graduates of October or graduates of February who wish to participate in the June commencement exercises should notify the Office of the Registrar of their intention by completing Form CE1 and submitting it to the Office of the Registrar.

Students who graduate in June have places reserved for them in the June commencement exercises. June graduates who opt not to participate in the commencement exercises should complete Form CE2 and submit it to the Office of the Registrar. June graduates who do not receive their degrees during the commencement exercises and who have submitted Form CE2 within the above-indicated deadline can receive their diplomas at the Office of the Registrar at a date subsequent to commencement.

### Names on Diplomas and Degrees

Names on diplomas and degrees are spelled exactly as they appear on passports or identity cards. According to the Lebanese Ministry of Education, names of Lebanese students should include first name, father's name, and family name. Names on AUB diplomas and degrees appear both in Arabic and English. If a name on a passport or an identity card does not appear in both languages, then the name that does not appear in one language will be spelled on AUB diplomas and degrees according to the personal preference of the student.

### Recognition of AUB Degrees by the Lebanese Ministry of Education

The Lebanese Ministry of Education recognizes all degrees awarded by the American University of Beirut provided students are admitted on the basis of the Lebanese Baccalaureate, or its equivalent, as determined by the Lebanese Ministry of Education.

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<table>
<thead>
<tr>
<th>For PhD candidates Graduation in</th>
<th>Summer 2012–13</th>
<th>Fall 2013–14</th>
<th>Spring 2013–14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadline for approval of thesis topic and committee*</td>
<td>Second Monday of the Summer term</td>
<td>Two weeks before end of preceding Spring term</td>
<td>First Monday of the preceding Fall term</td>
</tr>
<tr>
<td>Deadline for thesis defense*</td>
<td>Fourth Monday of the following Fall term</td>
<td>One week after the end of Fall term</td>
<td>One week before the end of Spring term</td>
</tr>
<tr>
<td></td>
<td>September 30, 2013</td>
<td>January 3, 2014</td>
<td>May 9, 2014</td>
</tr>
<tr>
<td>Deadline for thesis deposit at library</td>
<td>Ten days after the deadline of the thesis defense</td>
<td>Ten days after the deadline of the thesis defense</td>
<td>Ten days after the deadline of the thesis defense</td>
</tr>
</tbody>
</table>

* The thesis proposal should be approved by the Faculty/school Graduate Committee at least eight months before the thesis defense.
evaluated by their respective governments. It is the responsibility of students to ensure the degrees they receive from AUB are duly evaluated by their respective governments.

Medical Record

An entrance medical record form is sent to all admitted students who have committed to enroll in AUB. It is to be completed by the student’s family physician and mailed as soon as possible, and before the period of registration, in the pre-addressed envelope provided by AUB. Alternatively, the completed medical record form can be delivered by hand to the Office of Admissions.

All new students must have a tuberculin test at the time of the preliminary medical check, held during registration, and must report 48 hours later for a check on the test. Upon clearing the medical test, the student is issued a clearance slip to proceed with registration. Students are not registered unless they obtain this clearance slip. Students who report late for the medical check are charged a late fee.

Medical checks may be completed in advance of registration provided that the student reports to the University Health Services on campus, and brings the letter of acceptance and the entrance medical record.

Returning students are not required to complete any medical forms. Important changes in the student’s medical condition and/or updating immunizations should be reported to a university physician by appointment at the Health Services Center early in the first semester. Information is kept confidential.

National Social Security Fund (NSSF) Medical Branch

Membership in the NSSF is mandatory by law for all Lebanese students excluding freshman and non-degree graduate students, and students that are older than 30 years, Non-Lebanese students may not join.

To facilitate enrollment in the NSSF Medical Branch, students are urged to bring the following items when registering:

- A photocopy of their Lebanese identity card
- Their NSSF number if already registered
- The NSSF number of their parent if insured with the NSSF through father or mother
- Family record is required of married students only

Health Insurance Plan (HIP)

The Health Insurance Plan (HIP) provides medical and hospital coverage to the AUB community, namely academic and non-academic staff, retirees, students, and IC staff and their families.

- Health insurance coverage is mandatory for all students, at 2nd class health care coverage, during their years of study at AUB; therefore, a student, new or continuing, registered for at least 6 credit hours, is automatically enrolled under the Health Insurance Plan (HIP). However, a student may be exempted from enrolling in HIP if s/he presents proof that s/he is covered by another healthcare insurance provider.
- HIP members are required to use exclusively the medical services of the AUB Medical Center (AUBMC). HIP coverage to students is limited to medical care inside Lebanon only.
- ‘Student’ means a person registered for a course of study at the University, whether working or not working for a degree, on a full-time or part-time basis. Auditors are not considered students.
- Graduate students registered for a thesis are eligible to continue HIP coverage for a period of two consecutive years only.
- Students who register at the beginning of the first semester are covered by HIP for twelve months, provided they do not graduate, withdraw, or are suspended and/or dropped from the University. HIP fee charges per semester are announced each year by the AUB Benefits Coordinator’s office.
- Students who register at the beginning of the second semester are covered until September 30 of the same year, provided they do not graduate, withdraw, or are suspended and/or dropped from the University. HIP coverage to students is limited to medical care inside Lebanon only.
- Students who register at the beginning of the summer session are covered until September 30 of the same year, provided they do not graduate, withdraw, or are suspended and/or dropped from the University.
- Students who register at the beginning of the summer session are covered until September 30 of the same year. Student coverage during the summer is strictly limited to the use of the AUB Medical Center (AUBMC) services.
- In case of emergency during the fall and spring terms only, and if students are not on campus or within the vicinity of the AUB Medical Center, students can report to the nearest medical service provider and get the needed care. Reimbursement of the bill cannot exceed 80 percent of AUBMC rates.
- Eligible married students may enroll their spouse and children, who are living with them in Lebanon, at the regular 2nd class rate as long as they remain duly registered at the University and are HIP members.
- Unlike other HIP members, students are not charged co-payment or cost sharing applied by the plan to out-patient services.

These guidelines are meant to be a mere summary of the provisions of the plan and are provided solely as a matter of convenience and in no way define or limit the scope or intent of any provision of the plan.
Passports and Visas

Foreign students joining AUB must have passports valid for a period of not less than 13 months from the date of joining the University; they should also secure an entry visa to Lebanon from the nearest Lebanese embassy or consulate in their country, in coordination with the Personnel Office, the Office of Admissions, and the Office of the Registrar, help provide the necessary certificates for registered foreign students to acquire residence permits from the Lebanese authorities.

Payment of Fees

All students must finalize registration, including payment of tuition and other charges, by the announced deadlines. For full instructions on payment of fees, see the Tuition Fees section on pages 73–74.

Study Abroad for Graduate AUB Students

AUB Graduate students may choose to study abroad for up to one year in an approved program of study, without losing their status at AUB. They may apply for an established program at a university that has an exchange agreement with AUB, or they may initiate their own proposal in coordination with their thesis and program advisor for study abroad at a university of their choice that is recognized by AUB. In both cases, an application and approval of the Faculty are required.

PhD students are encouraged to spend some time at an overseas partner university to pursue their chosen research topic in coordination with their research advisor at AUB and a faculty co-advisor available at the host university. The exposure of PhD students to an alternative educational system is essential to the forming of well-rounded PhD graduates. The opportunity of studying abroad will open up a range of specialized courses that students may select to fulfill their graduate credits requirements.

In both cases, an application and approval of the faculty are required. More information regarding study abroad options and procedures is available from the Office of International Programs, and at the following link: http://www.aub.edu.lb/oip
Fees and Expenses

The American University of Beirut is a non-profit institution. Costs to students in tuition and other university fees are kept at a minimum consistent with the provision of high quality instruction and adequate facilities and equipment. The University reserves the right to change any or all fees at any time without prior notice. Such changes are applicable to students currently registered with the University as well as to new students.

Students are not permitted to enter classes at the beginning of the term until their fees are paid or special arrangements have been made with the Office of the Comptroller (see below). All fees are quoted in Lebanese pounds and US dollars.

Payment of Fees

• Each AUB student must pay all his/her tuition and other university fees.
• Statements of fees are available on the AUB website.
• All students must complete registration and the payment of tuition fees and other charges, according to the academic calendar on pages 16–18 for the first and second semesters. Under special circumstances, late payment is permitted during a period of no more than five working days after the announced deadline, and is subject to a late payment fee of $100.
• Checks must be issued to the order of the bank concerned using the following format: Pay to the order of (Name of Bank)—Account AUB.
• Students with zero or credit balances must inform the Office of the Comptroller—Students Section via email at compt_sas@aub.edu.lb—to finalize their registration.
• Sponsored students, staff dependents, graduate assistants, and student staff members should contact the Office of the Comptroller—Students Accounts Section—before the payment deadline in order to finalize their registration.
• Students who demonstrate financial need must formally apply to the Office of the Comptroller for deferred payment arrangements for tuition fees, according to the academic calendar on pages 16–18 for the first and second semesters. Applications for deferrals are not accepted thereafter. Deferred payments are not a right and are only agreed to under specific and special circumstances. Students who arrange for deferred payments are still required to complete all registration formalities within the set deadlines. Deferred payment arrangements are not permitted for the summer session in any faculty.
• Applications for deferred payment arrangements are reviewed by the Office of the Comptroller which is responsible for administering all deferred payment arrangements.
• All students who apply for deferred payment arrangements, must pay at least 50 percent of the net amount of tuition due. All other charges must be paid in full with no deferrals. A student must pay a deferred payment application fee of $33, and an interest of 1 per cent per month on the deferred amount. Should the student's application be approved, the student must pay the balance of tuition, the deferred application fee of $33, and the late payment fee, if applicable. All payment must be concluded by the announced deadlines.
• Every student granted deferred payment arrangements must sign a statement indicating agreement that failure to complete payment by the set deadline will result in receiving no credit for the semester in which the student has defaulted on payment.
• Due dates are not extended nor are late payment fees waived for any reason.

• Students are expected to meet all financial obligations to the University by the appropriate due date. For any student who fails to promptly meet his/her financial obligations, the University reserves the right to place an encumbrance on the student’s record that prevents registration for future semesters and the release of transcripts and diplomas, and also prevents access to other university services. It is each student’s responsibility to be informed of all registration and fee payment dates and deadlines.

Up-to-date schedules for registration and payment of fees are available through the Office of the Registrar. This information, as well as the tuition fee tables, is also on the following websites:

http://www.aub.edu.lb/comptroller/Documents/doc/Tuition%20Fees%202009-2010.pdf

Office of the Registrar
American University of Beirut
PO Box 11-0236
Riad El Solh 1107 2020
Beirut, LEBANON
Tel: +961 1 374274/374444
Ext: 2570/2571
Fax: +961 1 744469
Email: registrar@aub.edu.lb

Withdrawals

In the event a student withdraws for justifiable reasons after registration, fees are refunded according to the following schedule for the fall and spring semesters:

• Before the official start of classes 100% of full tuition and other fees
• During the first week of classes 75% of tuition
• During the second week of classes 50% of tuition
• During the third week of classes 25% of tuition

The following schedule is applied in refunding fees for the summer session:

• Before the official start of classes 100% of full tuition and other fees
• During the first week of classes 75% of tuition
• During the second week of classes 25% of tuition

For additional information, contact:

Office of the Comptroller—Student Accounts Section

American University of Beirut
PO Box 11-0236
Riad El Solh 1107 2020
Beirut, LEBANON
Tel: +961 1 353195/350000
Ext: 2473/2478
Fax: +961 1 744465

1 Other charges include health insurance plan, internet fee, social activity fee and NSSF
AUB offers financial aid to qualified students in the form of need-based financial aid grants and loans, merit scholarships, student work-study, and graduate assistantships. In 2011–12 the University awarded $15.6 million in need-based grants and merit scholarships and an additional $4.7 million in funds for graduate assistantships and student employment.

Financial need is a necessary condition for a financial aid grant. Need is assessed for each student, yearly, on the basis of factors such as family income, number of siblings enrolled in school/university, assets such as home(s), car(s), and other property, and major changes in financial status. Assessments are made by the Interfaculty Committee for Financial Aid using an application for financial aid completed by a student and his/her family before the required deadline. For new students living in Lebanon, an interview is usually required to help the committee assess need. Further need assessment may be carried out through house visits when deemed necessary. Need is a necessary but not sufficient condition for financial aid.

### Need-Based Financial Aid Grants

Grants are outright awards of assistance, mainly for undergraduate and medical students, based on demonstrated need. Additional, partial small merit awards are made to new needy undergraduate students with records of high scholastic achievement. Other graduate students may receive such grants, if eligible, in small amounts to cover a small part of the tuition. Selection is based first on need and then on academic performance. Students applying for the first time for financial aid may obtain applications from the Office of Financial Aid, West Hall, American University of Beirut, or can download the application from the AUB homepage: www.aub.edu.lb under the link Admissions then Tuition and Financial Aid. New students applying for the academic year 2013–14 must complete and submit the application with all required supporting documents by February 4, 2013. Previous financial aid applicants re-applying for the academic year 2013–14 must complete the application on-line and submit a printed copy of the on-line application along with supporting documents by March 31, 2013. The required documents should be delivered in person to the Office of Financial Aid in the basement of West Hall. Awards are usually announced by the end of May for students admitted to the fall semester and by mid-January for students admitted to the spring semester.

### Need-Based Student Loans

In September 2003 a loan program for students at the Faculty of Medicine was started to support the AUB financial aid program, allowing further financial support to those students finding it difficult to complete their medical studies. In 2004 undergraduate students in the Faculty of Engineering and Architecture (second year and on) also benefited from this program, followed by nursing students in 2005. In 2006 the loan program was extended for undergraduate business students, second year and on. The program is now available for the six faculties of AUB. Loans will be offered to Lebanese undergraduate students who have at least a Junior status or equivalent and who have received financial aid. The students would apply for financial aid as usual, however, if eligible, the students would receive financial assistance in the form of a grant from AUB and a loan from one of the participant banks who are supporting the government subsidized loan program. Students will pay interest only on the loan during their period of study and for a one year grace period after graduation, at which time the students start repaying the full loan principal and interest over a maximum period of ten years.
U.S. Federal Student Loans

Student loans are available for American students pursuing their studies at AUB. These low-interest loans are offered by the U.S. Treasury in the form of Direct Stafford and PLUS loans. Applications are submitted yearly online at www.fafsa.ed.gov. Students who are American citizens or permanent residents, enrolled at AUB in a regular degree program, and maintaining a satisfactory academic progress are eligible for U.S. federal student loans.

The need of eligible students is assessed by the Loan Unit in the Financial Aid Office based on established criteria by the U.S. Federal Student Aid program. Students will have to repay these loans over a period of ten years following a six months grace period. In 2011–12, 82 students were certified around $1 million in direct loans.

AUB and AUB’s Office of Financial Aid have developed a portal for obtaining consumer information about the University and its offered federal loans. This data can be used as a resource to identify important university information such as its academic programs, retention/completion information, financial aid procedures, various contacts, and more.

The consumer information portal is found at www.aub.edu.lb/faid/consumer_info.

Merit Scholarships

In 1999 the Board of Trustees of AUB established an AUB Merit Scholarship Program for new students. This program enables the University to award full-tuition merit scholarships each year to ten new undergraduates with outstanding academic qualifications. AUB merit scholarship awardees are selected from among the newly admitted undergraduate students on the basis of academic achievement and promise alone; no application is required for merit scholarships. Awards are renewable for each undergraduate year provided that the student maintains a minimum cumulative 85 percent average.

In 2006 AUB and the National Council for Scientific Research (NCSR) signed a cooperation agreement whereby the best three students in each of the four sections of the Lebanese Baccalaureate would be granted a full scholarship. The NCSR would provide 10 million Lebanese Pounds for each student while AUB would cover the remaining amount of the tuition in addition to the living expenses including boarding or transportation based on the student’s need.

Student Work-Study

As part of its financial aid program, the University provides full-time undergraduate and graduate students with the opportunity to participate in its student work-study program. Priority is given to students with financial need. Students contribute toward their educational expenses while also developing job skills in various campus offices and the Medical Center. Applications are available at the Office of Student Affairs and should be submitted online within certain deadlines announced for by the Office of Student Affairs. Placement is made on the basis of need, capability, and job availability. Students may work a maximum of 80 hours per month in the Fall/Spring Semesters and 60 hours per month in the Summer semester; the hourly rate is based on the type of work performed.

Graduate Assistantships

Assistantships covering partial or full tuition and partial living expenses are available to students at the graduate level in return for work at a specified number of hours each week for an academic department. Assistantships are made on the dual basis of their academic record and departmental needs. Application forms for new students are enclosed in the admissions application package. Continuing students may obtain application forms from the office of the dean of the faculty in which they are enrolled. Applications should be submitted early in the semester preceding the semester for which one is applying.
Office of Student Affairs

The Office of Student Affairs oversees student activities, athletics, counseling, student housing, career and placement services. The office also manages university-wide operations such as the bursary, the New Student Orientation and the work-study programs. The Office of Student Affairs provides services to students that enhance their overall well-being and create opportunities for them to enrich and broaden their educational experience.

The website has comprehensive information on all programs: www.aub.edu.lb/sao/Pages/index.aspx.

Contact
West Hall, ground floor, room 109 - 112
Tel: +961-1-374374, ext. 3170 or ext. 3171
Fax: +961-1-744478
Email: sao@aub.edu.lb
The office is open during regular work hours.

Student Activities

Student Activities aims to provide opportunities for student development through co-curricular activities that complement AUB's academic programs. The specific aims of the department are to:

• provide opportunities for student leadership in a variety of settings such as clubs/societies, student representative committees and student publications
• serve as an information resource for students about student life at AUB
• provide support services for student organizations
• promote diversity and civic responsibility
• coordinate and facilitate the work and events of AUB student organizations
• organize major campus events, such as the Outdoor Festival, the Folk Dance Festival and the New Student Orientation Program.

All activities organized by students must be approved by the Department of Student Activities and the Dean of Student Affairs. The department’s role is to supervise these activities and other student activities which take place in West Hall. West Hall hosts most student activities in addition to various AUB events sponsored by faculties, departments, centers, and alumni.

Contact
West Hall, ground floor, room 112-112 C
Tel: +961-1-374374, ext. 3197 or ext. 3182
Fax: +961-1-744478
Email: std-act@aub.edu.lb

Counseling

Adjusting to university life can be a difficult transition and a very stressful experience for many students. Personal difficulties, whether of a recent or long-standing nature, can hinder academic success and seriously affect a student’s quality of life and well-being.

Personal counseling is offered to AUB students to help them identify and address their issues and problems. This could include anxiety, depression, grief, substance abuse, eating disorders, and relationship and family problems. In fact, there are no restrictions as to what can be discussed in counseling.

The counseling team provides assistance to students with study-related issues such as test anxiety and time management. Counseling is free and confidential.

Contact
West Hall, 2nd floor, room 210
Tel: +961-1-374374, ext. 3178, 3158, or 3196
Email: ak28@aub.edu.lb, oa03@aub.edu.lb, nk63@aub.edu.lb, or ck05@aub.edu.lb

Career and Placement Services

The Career and Placement Services (CPS) aims at helping AUB students in their transition from being students to becoming professionals. The CPS encourages students to develop their career plans by providing resources, contacts, activities, workshops, seminars, job fairs, career events and career counseling. CPS strives to promote:

• Career Exploration and Decision Making
  Facilitating the exploration of career options and developing effective career planning skills.
• Skills Development
  Helping students develop skills within their academic disciplines to enhance their professional image.
• Experiential Learning
  Disseminating employment information and providing resources to explore changing trends in the global job market by different means including the AUB Mentor-Mentee Program.
• Career Placement
  Helping current and former AUB students to achieve their career goals through the development of lifetime career planning and job search skills. Assisting them in finding full-time employment, internships, and part-time jobs.
• Employer Development
  Building and expanding long-term relationships between the American University of Beirut and the employment community.
• Major employment events
  Organizing Annual Job Fair in April and Fall, special employment in September through which students are exposed to job opportunities available at firms with diversified industrial sectors.
• Social Media
  Using social media through Facebook and Twitter to advertise all career activities and interact with AUB students/Alumni.
University Sports

The University offers a wide range of sports, athletics, fitness and recreational programs through University Sports. The Charles Hostler Student Center has invigorated athletic life on the lower campus. It includes a gymnasium with three full-size basketball, volleyball, handball and futsal courts, a 25 meter indoor pool with a touchpad and electronic score board, a free weight area, cardiovascular training area, an activity room for dance and martial arts, two squash courts, a 400 meter track, an artificial turf field, an auditorium, an amphitheater, conference rooms and much more. Between May and October, students may use the AUB beach for swimming, water sports, beach volley, recreation, or relaxation.

There are four floodlit tennis courts on campus. Professional tennis lessons are available. Opportunities for competitive and team sports abound, as do options for individual recreational activities. Fitness and swimming courses are being offered all year round.

The following are some programs offered:

- Basketball (Men, Women, Junior)
- Soccer (Men, Women, Junior)
- Volleyball (Men, Women)
- Handball (Men)
- Tennis (Men, Women)
- Badminton (Men, Women)
- Rugby (Men and Juniors)
- Track and Field (Men, Women)
- Squash (Men, Women)
- Table Tennis (Men, Women)
- Body Building
- Karate
- Aerobics
- Pilates
- Dance
- Extreme Pump
- Youth Taek Won Do
- Beginning Swimming
- Fitness Swimming
- Water Polo
- Yoga
- Aqua Gym
- Power
- Fight-Do
- Lacrosse
- American Football (and a Cheerleading team)
- Swimming (Men, Women)
- Water Polo
- Yoga
- Aqua Gym
- Power
- Fight-Do
- Lacrosse
- American Football (and a Cheerleading team)
- Swimming (Men, Women)

Contact

Charles Hostler Student Center
Tel: +961-1-374374, ext. 3200 or 3201
Email: chsc@aub.edu.lb
Website: www.aub.edu.lb/~webchsc/

Student Housing

As one of the few residential universities in the Middle East offering a beautiful campus where a rich extracurricular activity prevails, strong and supportive communities flourished offering thousands of residents the chance to experience the wonders of community living.

The priority is to accommodate undergraduate applicants, mainly freshman students from outside Beirut as well as international students.

Freshman students whose parents reside outside Beirut are required to live in the University’s residence halls throughout their first year unless otherwise requested in writing by their parents. Graduate students may be considered subject to availability. Arrangements for University housing are made through the Office of Student Affairs.

The Residence Hall application is available on the student housing website and must be submitted online. Early application is strongly advised.

The application form must completed and returned to the Office of Student Housing according to the deadlines set by the Office of Student Housing for each semester (usually in July for the Fall term, and December for the Spring term). Each student applying to the residence halls for the first time must pay a “dorm deposit” fee of LL 300,000 which may be paid in cash at the AUB Cashier or by check issued In Lebanese Pounds or U.S. Dollars to the order of the American University of Beirut. This deposit will be reimbursed to the student upon graduation.

Students who do not live in a residence hall during the fall semester but wish to do so in the spring semester and/or summer session may apply and are assigned space subject to availability. For each semester the housing charges appear on the statement of fees issued to each student following the completion of the registration process; they vary depending on the type of accommodation selected as follows:

<table>
<thead>
<tr>
<th>Type</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double</td>
<td>LL 2,000,000 (double occupancy room with a shared floor bathroom)</td>
</tr>
<tr>
<td>Semi-private</td>
<td>LL 2,470,000 (two double occupancy rooms with their own bathroom)</td>
</tr>
<tr>
<td>Private</td>
<td>LL 3,265,000 (single occupancy room with a shared floor bathroom)</td>
</tr>
</tbody>
</table>

Off-Campus Residence Hall Rates

The above rates do not apply to the AUB women’s off-campus residence hall on Sidani Street where the rooms are divided into double, single and suites, each having its own bathroom, balcony, and telephone.

<table>
<thead>
<tr>
<th>Type</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double</td>
<td>LL 2,862,000</td>
</tr>
<tr>
<td>Private</td>
<td>LL 5,056,000</td>
</tr>
<tr>
<td>Suite</td>
<td>LL 5,418,000</td>
</tr>
</tbody>
</table>

Guest Rates

Residents have the right to host guests as per our guest policy (available on-line).
Residence Halls
There are seven student residence halls: five for women, two for men. The rooms are divided mainly into shared double and in rare instances, when availability permits, a few private rooms. The semi-private category is not available in the men's residence halls.

All residence halls have heating, air-conditioning, hot water, washing machines, dryers, irons, and wireless Internet. Each room is equipped with a bed, desk, chair, and closet.

Women's Residence Halls
Four women's halls are located on the lower campus overlooking the Mediterranean, while the fifth is located off-campus in the heart of Hamra area within a short walking distance from campus. The ground floor of each hall houses a reception desk, a kitchen, and a lobby for socializing, receiving guests and watching television with cable subscription. International pay phones, printers/photocopies, laundry facilities and vending machines with snacks and soft drinks are installed at the residence entrance.

Men's Residence Halls
The two men's residence halls are located in the west part of the upper campus, overlooking the splendid Mediterranean and close to Bliss Street, with its abundance of shops. The ground floor of each hall houses a reception desk, a kitchen, and a lobby for socializing, receiving guests and watching television with cable subscription. International pay phones, printers/photocopies, laundry facilities and vending machines with snacks and soft drinks are available on the ground floor.

Contact
West Hall, ground floor, room 112A-112B
Tel: +961-1-374374, ext. 3175, 3183
Fax: +961-1-744478
Email: stdhouse@aub.edu.lb

Bursary Program
A number of students from the Arab world and beyond are sponsored to study at AUB by their national governments, or through private institutions. The Office of Student Affairs provides administrative support and financial updates to the sponsoring institutions or embassies.

Contact
West Hall, ground floor, room 109-109 C
Tel: +961-1-374374, ext. 3174
Fax: +961-1-744478
Email: sao@aub.edu.lb

Work-Study Program
The Office of Student Affairs coordinates an extensive work-study program that provides work-study opportunities on campus and for eligible undergraduate and graduate students.

During the academic year 2012–13 over 600 students participated in the work-study program working with faculty and administration in various campus offices and in the Medical Center.

All full-time students in good academic standing may apply for open positions at the Office of Student Affairs. Selection is competitive.

Contact
West Hall, 3rd floor, room 326 – 318
Tel: +961-1-374374, ext. 3177/3187
Fax: +961-1-744478
Email: wspapr12@aub.edu.lb
Office of International Programs

The Office of International Programs is located in West Hall, 3rd floor, Room 320.
Telephone: +961-1-374374 ext. 3147
Email: oip@aub.edu.lb
Website: www.aub.edu.lb/oip

Passports, Visas, and Residence Permits

International students joining AUB, meaning any student who does not hold a Lebanese passport or Lebanese identity card, must have their foreign passports valid for a period of not less than 13 months from the date of joining the University. All such students should also check with the nearest Lebanese Embassy or consulate in their country as to whether they require an entry visa in order to legally enter Lebanon or are eligible to obtain a one-month entry visa at the airport.

Once registered, all students who do not hold Lebanese passports are required to obtain a residence permit before the expiration of the entry visa stamped in their passports. Students must apply for this permit within one month of arrival in Beirut, and ONLY after registering and paying AUB tuition fees. For this reason, it is strongly advised not to enter Lebanon more than two weeks prior to the beginning of the semester in which you plan to first enroll.

The Office of International Programs, in coordination with the Office of the Registrar, will help to provide the necessary certificates for registered non-Lebanese students to acquire residence permits from the Lebanese authorities. Information about obtaining a residence permit is distributed at International Student Welcome Day at the beginning of each semester or may be obtained in room 322 of West Hall, as well as on the OIP website referenced above.

International Student Services

The Office of International Programs provides support to all international students studying at AUB. During International Student Welcome Day, all international students will be assigned a student mentor, and provided with information about special services and activities, such as:
- Social gatherings, activities, and trips for international students
- Residence permit information and assistance
- Advising about study abroad (for international degree-seekers)
- Advising about adaptation to new cultures and to AUB

Study Abroad and Student Exchange

AUB has several study abroad and exchange programs for undergraduate and graduate students. AUB’s growing number of international partner institutions include but are not limited to:
- American University, USA
- American University of Cairo, Egypt
- Boston University, USA
- Danish School of Media and Journalism, Denmark
- l’Institut d’Études Politiques (“Sciences Po”), France
- Koc University, Turkey
- Lund University, Sweden
- Salzburg Academy on Media and Global Change, Austria
- Universidad Carlos III de Madrid, Spain
- Université de Genève, Switzerland
- Université de Montréal, Canada
- University of California, Berkeley, USA

Undergraduate students are required to complete at least 24 credits at AUB before beginning a period of study abroad, while graduate students are required to complete at least six (6) credits at AUB before studying abroad; additional academic policies and procedures also apply. For a complete list of exchange and other study abroad options at AUB, or to review the guidelines for study abroad, please visit http://www.aub.edu.lb/oip or Room 320 in West Hall.

OIP Resources for Faculty

The Office of International Programs is pleased to provide information to faculty on international standards of practice for credit transfer and grade transfer upon request. In addition, OIP maintains a current listing of all institutions/consortia/universities with which AUB maintains formal agreements for purposes of student exchange and study abroad. Please note that exchange agreements cannot be put into effect at AUB without the approval of the Provost, for whom the Office of International Programs serves as the official record-keeper. Guidelines for the setting up of new international academic exchange agreements and similar linkages are available by request from the Director.
Faculty of Agricultural and Food Sciences (FAFS)
Faculty of Agricultural and Food Sciences (FAFS)

Officers of the Faculty

Peter F. Dorman, President of the University
Ahmad Dallal, Provost, ex-officio
Nahla Hwalla, Dean
Moueen Salameh, Registrar, ex-officio
Salim Kanaan, Director of Admissions, ex-officio
Lokman Meho, University Librarian, ex-officio

Faculty Administrative Support

Tharwat Haddad, Student Record Officer
Laila Houri, Financial Officer
Wafa Khoury, Executive Officer
Maya Nabhan Zeidan, Accreditation and Program Review Officer

Coordinator of Programs

Lara Nasreddine, Coordinator of Undergraduate Studies, Program-NTDT
Mohamad Farran, Coordinator of Undergraduate Studies, Program-AGBU
Imad Toufelli, Coordinator of Graduate Studies Program

Historical Background

The MS graduate program at FAFS was initiated in 1956. The program aims to offer specialized training in a variety of fields in food and agriculture, and to prepare students for further studies in Europe and North America. The first MS degree in Horticulture was granted in 1958, and the first MS in Food Technology in 1959. Since then, FAFS has kept adapting its graduate programs to meet the needs of an evolving regional demand. An MS in Nutrition was introduced in 1963, and the first degree was granted in 1965. An MS in Ecosystem Management, a major of the interfaculty MS in Environmental Sciences, has been offered since 1997. FAFS currently offers MS specialization in animal science, poultry science, agricultural economics, irrigation, soil science, plant protection, plant science, nutrition, food technology and ecosystem management.

Mission

The mission of FAFS is to foster the sustainable enhancement of the health and well being of people and nature throughout Lebanon and the region. To achieve its goals, the Faculty uses basic and applied research as well as student-centered learning to prepare leaders and agents of change to address issues of local and global relevance at the nexus of human nutrition, food security and the sustainable use of resources.

Vision

FAFS is a reference academic center specialized in issues of relevance to the Middle East related to agriculture, food, nutrition and the environment for the enhancement of livelihoods, human health and well being.

Graduate Programs

The faculty offers the MS degree, with or without thesis, in the following majors: agricultural economics, animal sciences, food technology, irrigation, nutrition, plant protection, plant science, and poultry science. The faculty also participates in the interfaculty graduate programs leading to the degrees of MS in Environmental Sciences (major: Ecosystem Management) and MS in Nutrition.

Students following a thesis program are required to take a minimum of 21 graduate level course credits plus a thesis (equivalent to 9 credits). The thesis program may include a maximum of 3 tutorial course credits. Core regular courses should constitute a minimum of 12 credits excluding seminars and tutorials, with graduate elective courses to be determined with the advisor. A student following a non-thesis program is required to take a minimum of 33 graduate level course credits. The program should include a minimum of 3 credits and a maximum of 6 tutorial credits with at least 12 credits being from core courses in the major.

Rules and regulations for graduate programs are given in this catalogue in the Admissions section and include details about the environmental sciences program. Information is also available in the FAFS Graduate Study Manual. Changes made after the publication of this catalogue will be available through the academic advisers.

The Environment and Sustainable Development Unit (ESDU)

ESDU is an interdisciplinary research and development unit specializing in sustainable rural livelihoods. It was established at the Faculty of Agricultural and Food Sciences to promote collaboration on sustainable development initiatives among departments at AUB and with a wide variety of other institutions and organizations undertaking related activities.

ESDU activities, including research, capacity building, and outreach, aim at:

- providing opportunities for faculty and students to work on real-life rural development projects
- fostering partnerships between research, private and public sectors, and local communities in order to develop community-based solutions
- networking with national, regional, and international centers and institutes in the areas of integrated natural resource management and sustainable development

For more information refer to www.esdu-aub.org.
Department of Animal and Veterinary Sciences (AVSC)

Chairperson: Hamadeh, Shady
Professors: Barbour, Elie; Farran, Mohamad; Hamadeh, Shady
Research Professor: Sleiman, Fawwak

Vision
The department of Animal and Veterinary Sciences strives to be recognized as a center of excellence in animal and veterinary sciences education, research and outreach. The Department works to attract and maintain a diversified and highly qualified student body.

Mission
The main function of the Department of Animal and Veterinary Sciences is to produce qualified graduates capable of serving the region in all areas of animal and veterinary sciences: research, services, business, and education. The Department offers two graduate programs of study leading to MS degrees in Animal Science and Poultry Science that prepare students for life-long learning and professional advancement in the field. The Department also serves the animal and veterinary sector in Lebanon and the region by providing extension work, consultations, and diagnostic support.

Graduate Programs
The department offers two graduate programs of study and research leading to MS degrees in animal science and poultry science. The candidates have the choice of selecting a thesis or non-thesis program. The non-thesis candidate is required to take additional credits, and his/her research will be normally more field-oriented, with a research report presented instead of a thesis. The department is especially qualified and equipped for graduate study and research in the following areas:

- nutrition of livestock and poultry
- diseases of livestock and poultry, including preventive immunology and the epizootiology of diseases
- production of milk, meat, and eggs as related to breeding and feeding

Graduate students in the department may become candidates for a degree in the interfaculty program in nutrition by meeting the requirements described on page 465 of this catalogue.

MS in Animal Science*

Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGSC 301</td>
<td>Statistical Methods in Agriculture</td>
<td>2.5</td>
</tr>
</tbody>
</table>

An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AVSC 304  Preventive Immunology and Patterns of Animal Diseases  3.0; 3 cr.
Basic aspects of specific and non-specific body defense mechanisms and the role of vaccination in population protection; study of the patterns of diseases. Prerequisite: BIOL 224 or AVSC 224.

AVSC 306  Diseases of Livestock  3.0; 3 cr.
Etiology, clinical characteristics, identification, and control of some selected infectious and metabolic diseases of economic impact on animal production.

AVSC 330  Advanced Livestock Production  3.0; 3 cr.
Recent advances in livestock production practices as related to interactions between animal and milieu with reference to the specific nutritional and climatic conditions of the Middle East.

AVSC 336  Ruminant Nutrition  3.0; 3 cr.
Recent advances in the nutrition of cattle, sheep and goats with reference to microbial aspects of digestion and its relation to practical feeding.

AVSC 388  Animal Production and Environmental Management  3.0; 3 cr.
Characterizes the impact of extensive and intensive livestock systems on the environmental sustainability of the two systems in terms of technical constraints and feasible corrective environmental management strategies.

AVSC 395  Graduate Seminar in Animal Science  1.0; 1 cr.

AVSC 396  Comprehensive Exam  0 cr.

AVSC 399  MS Thesis  0 cr.

Elective Courses

AVSC 300  Graduate Tutorial  1–3 cr.
Directed Study.

AVSC 305  Poultry Diseases  3.0; 3 cr.
Etiology, clinical characteristics, identification, prevention, and control of the major infectious and metabolic diseases of poultry.

AVSC 307  Poultry Production in Warm Regions  3.0; 3 cr.
Recent advances in poultry production practices under high temperature conditions with special emphasis on physiology of heat stress in birds as related to housing, management, and feeding. Prerequisite: AVSC 226.

1 All graduate students in the POSC and ANSC programs should take at least 12 credits of core courses in the AVSC department in addition to AGSC 301
AVSC 329 Advanced Animal Physiology 2.3; 3 cr.
Comparative physiology of domestic animals with special emphasis on digestion, reproduction, lactation, and thermo-regulation. Prerequisite: AVSC 275 or equivalent.

AVSC 334 Advanced Poultry Nutrition 2.3; 3 cr.
Recent developments in poultry nutrition; design and implementation of poultry nutrition experiments. Prerequisite: AVSC 271.

MS in Poultry Science*

Core Courses

AGSC 301 Statistical Methods in Agriculture 2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AVSC 304 Preventive Immunology and Patterns of Animal Diseases 3.0; 3 cr.
Basic aspects of specific and non-specific body defense mechanisms and the role of vaccination in population protection; study of the patterns of diseases. Prerequisite: BIOL 224 or AVSC 224.

AVSC 305 Poultry Diseases 3.0; 3 cr.
Etiology, clinical characteristics, identification, prevention, and control of the major infectious and metabolic diseases of poultry.

AVSC 307 Poultry Production in Warm Regions 3.0; 3 cr.
Recent advances in poultry production practices under high temperature conditions with special emphasis on physiology of heat stress in birds as related to housing, management, and feeding. Prerequisite: AVSC 226.

AVSC 334 Advanced Poultry Nutrition 2.3; 3 cr.
Recent developments in poultry nutrition; design and implementation of poultry nutrition experiments. Prerequisite: AVSC 271.

AVSC 388 Animal Production and Environmental Management 3.0; 3 cr.
Characterizes the impact of extensive and intensive livestock systems on the environmental sustainability of the two systems in terms of technical constraints and feasible corrective environmental management strategies.

AVSC 395 Graduate Seminar in Animal Science 1.0; 1 cr.

AVSC 396 Comprehensive Exam 0 cr.

AVSC 399 MS Thesis

Elective Courses

AVSC 300 Graduate Tutorial 1–3 cr.
Directed Study.

AVSC 306 Diseases of Livestock 3.0; 3 cr.
Etiology, clinical characteristics, identification, and control of some selected infectious and metabolic diseases of economic impact on animal production.

AVSC 329 Advanced Animal Physiology 2.3; 3 cr.
Comparative physiology of domestic animals with special emphasis on digestion, reproduction, lactation, and thermo-regulation. Prerequisite: AVSC 275 or equivalent.

AVSC 330 Advanced Livestock Production 3.0; 3 cr.
Recent advances in livestock production practices as related to interactions between animal and milieu with reference to the specific nutritional and climatic conditions of the Middle East.

AVSC 336 Ruminant Nutrition 3.0; 3 cr.
Recent advances in the nutrition of cattle, sheep and goats with reference to microbiological aspects of digestion and its relation to practical feeding.

* All graduate students in the POSC and AVSC programs should take at least 12 credits of core courses in the AVSC department in addition to AGSC 301
Department of Agricultural Sciences (AGSC)

Chairperson: Haidar, Mustapha
Professor Emeritus: Kawar, Nasri
Professors: Abou Jawdah, Youssef; Bashour, Isam; Haidar, Mustapha; Saad, Adib
Research Professor: Nimah, Musa
Assistant Professors: Chaaban, Jad; Chalak, Ali; Jaafar, Hadi
Visiting Professor: Kantharajah, Arumugam

Graduate Programs

The graduate study program leading to the MS degree with a Thesis or Non-Thesis option is offered with a specialization in the following areas: Plant Science, Plant Health, Soils, Irrigation, and Agricultural Economics.

The department of Agricultural Sciences offers stimulating graduate programs leading its graduates to successfully contribute to the research, education, and development of sustainable agricultural production and management in the region and preparing them for a productive career in Agricultural Technology, Natural Resources Management and Agribusiness. These students will then be capable of serving mainly in Lebanon, the Middle East and/or other regions in the world.

MS Degree in Agricultural Economics

Core Courses

AGSC 301  Statistical Methods in Agriculture  2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AGSC 325  Production Economics  3.0; 3 cr.
Focuses on the organization of farmers for higher income through improved resource use and competitive position.

AGSC 376  Resource and Environmental Economics  3.0; 3 cr.
Addresses and analyzes resource and environmental problems facing today's society, with an emphasis on providing the student with an intensive introduction to the qualitative theory necessary for an effective analysis of resource problems.

AGSC 384  Rural Social Change, Development and the Environment  3.0; 3 cr.
Provides an understanding of economic development and underdevelopment as it relates to environmental degradation and demographic, social and cultural change; with special application to the economies of the Middle East.

AGSC 389  Research Methods in Applied Economics  3.0; 3cr.
Provides an overview of theoretical and applied research methods for the study of agricultural, resource and development economics issues. Prerequisite: AGSC 301.

AGSC 395  Graduate Seminar in Agricultural Science  1.0; 1 cr.

AGSC 396  Comprehensive Exam  0 cr.

AGSC 399  MS Thesis

MS Degree in Irrigation

Core Courses

AGSC 301  Statistical Methods in Agriculture  2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AGSC 310  Advanced Soil Physics  3.0; 3 cr.
Physical properties of soils in arid, semi-arid, and sub-humid regions; soil-water-plant-atmosphere relationships, plant water extraction, and evapotranspiration; salt and water flow in soils, soil heat flow, and modeling soil water extraction and evaporation.

AGSC 326  Surface Irrigation Engineering  3.0; 3 cr.
Principles of design, operation, and evaluation of surface irrigation systems; irrigation field design and field measurement techniques. Prerequisite: consent of instructor.

AGSC 328  Sprinkler and Micro-Irrigation Engineering  3.0; 3 cr.
Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems; pipeline economics, pump hydraulics, and pumping plant design considerations.

AGSC 395  Graduate Seminar in Agricultural Science  1.0; 1 cr.

AGSC 396  Comprehensive Exam  0 cr.

AGSC 399  MS Thesis

MS Degree in Plant Protection

Core Courses

AGSC 301  Statistical Methods in Agriculture  2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.

AGSC 311  Advanced Principles and Methods in Plant Pathology  3.0; 3 cr.
Serological and molecular diagnostic techniques, nucleic acids hybridization, PCR, marker assisted selection, brief review of physiology of host-pathogen relationships, and current methods of research including cloning and transgenic plants. Prerequisite: AGSC 232 or consent of instructor.
AGSC 322 \textsuperscript{1} Plant Parasitic Fungi and Bacteria 2.3; 3cr.
Morphology, taxonomy, and identification of fungi and bacteria parasitic on plants. \textit{Prerequisite: AGSC 232. Alternate years.}

AGSC 332 Plant-Pest Interactions 3.0; 3cr.
Principles and factors involved in interactions between pests and their host plants; application of perspectives in chemical ecology to agricultural systems; effect of biotic and abiotic factors on the physiology, adaptation, and survival of pest populations in agroecosystems. \textit{Prerequisites: AGSC 221, AGSC 232, and AGSC 284.}

AGSC 388 Integrated Pest Management 3.0; 3cr.
Principles and concepts of integrated pest management; monitoring and forecasting of pest population, tactics, strategies, and implementations of IPM in the agricultural ecosystems; and environmental, economic, and social implications of IPM. \textit{Prerequisites: AGSC 221, AGSC 232, and AGSC 284.}

AGSC 395 Special Topics in Agricultural Science 1.0; 1cr.
AGSC 396 Comprehensive Exam 0 cr.
AGSC 399 MS Thesis

Elective Courses
AGSC 300 Graduate Tutorial 1–3 cr.
Directed Study.

AGSC 307 Advanced Crop Production 3.0; 3cr.
Theories and principles of plant growth, development, and responses to the environment, with an integrated approach to understanding crop productivity. \textit{Prerequisites: AGSC 220 and AGSC 231.}

AGSC 319 Advanced Vegetable Production 3.0; 3cr.
Physiological and genetic control of growth and management of vegetable plants and their products; effects of nutrition, irrigation, and other variables on crop performance and quality of produce; presentation and interpretation of recent research progress in vegetable production.

AGSC 323 Plant Virology 2.3; 3 cr.
Fundamental and practical aspects of plant virology including isolation, characterization, identification replication, and management of plant pathogenic viruses, including gene silencing and transgenic plants. \textit{Prerequisite: AGSC 232. Alternate years.}

MS Degree in Plant Science
Core Courses\textsuperscript{*}
AGSC 301 Statistical Methods in Agriculture 2.3; 3 cr.
An investigation of the statistical techniques needed to design experiments and analyze and interpret agricultural research data. \textit{Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Fall and spring.}

AGSC 307* Advanced Crop Production 3.0; 3 cr.
Theories and principles of plant growth, development, and responses to the environment, with an integrated approach to understanding crop productivity. \textit{Prerequisites: AGSC 220 and AGSC 231.}

AGSC 308* Plant Tissue Culture and Crop Improvement 2.3; 3 cr.
This course introduces students in the Agriculture program a sound understanding of the applied and scientific basis of micro propagation and in-vitro plant breeding.

AGSC 310* Advanced Soil Physics 3.0; 3 cr.
Physical properties of soils in arid, semi-arid, and sub-humid regions; soil-water-plant-atmosphere relationships, plant water extraction, and evapotranspiration; salt and water flow in soils, soil heat flow, and modeling soil water extraction and evaporation.

AGSC 312* Fertilizer Technology and Use 3.0; 3 cr.
Fertilizers in agricultural development, current developments in fertilizer technology, fertigation, and special problems associated with fertilizer use and research methodology in soil fertility. \textit{Prerequisite: AGSC 265.}

AGSC 319* Advanced Vegetable Production 3.0; 3 cr.
Physiological and genetic control of growth and management of vegetable plants and their products; effects of nutrition, irrigation, and other variables on crop performance and quality of produce; presentation and interpretation of recent research progress in vegetable production.

AGSC 324* Methods of Soil and Plant Tissue Analysis 2.3; 3 cr.
Analytical techniques, operation of instruments in plant analysis and in physical, chemical, and mineralogical analysis of soils.

AGSC 395 Special Topics in Agricultural Science 1.0; 1cr.
AGSC 396 Comprehensive Exam 0 cr.
AGSC 399 MS Thesis

Elective Courses
AGSC 300 Graduate Tutorial 1–3 cr.
Directed Study.

AGSC 311 Advanced Principles and Methods in Plant Pathology 2.3; 3 cr.
Serological and molecular diagnostic techniques, nucleic acids hybridization, PCR, marker assisted selection, brief review of physiology of host-pathogen relationships, and current methods of research including cloning and transgenic plants. \textit{Prerequisite: AGSC 232 or consent of instructor.}

AGSC 322 Plant Parasitic Fungi and Bacteria 2.3; 3 cr.
Morphology, taxonomy, and identification of fungi and bacteria parasitic on plants. \textit{Prerequisite: AGSC 232. Alternate years.}

\textsuperscript{* 9 credits out of the marked courses are required core courses}
AGSC 323  Plant Virology  2.3; 3 cr.
Fundamental and practical aspects of plant virology including isolation, characterization, identification replication, and management of plant pathogenic viruses, including gene silencing and transgenic plants. **Prerequisite: AGSC 232. Alternate years.**

AGSC 332  Plant-Pest Interactions  3.0; 3 cr.
Principles and factors involved in interactions between pests and their host plants; application of perspectives in chemical ecology to agricultural systems; effect of biotic and abiotic factors on the physiology, adaptation, and survival of pest populations in agroecosystems. **Prerequisites: AGSC 221, AGSC 232, and AGSC 284.**

AGSC 388  Integrated Pest Management  3.0; 3 cr.
Principles and concepts of integrated pest management (IPM); monitoring and forecasting of pest population, tactics, strategies, and implementations of IPM in the agricultural ecosystems; and environmental, economic, and social implications of IPM. **Prerequisites: AGSC 221, AGSC 232, and AGSC 284.**

All AGSC graduate courses are electives to all majors upon the approval of the adviser.

AGSC 300  Graduate Tutorial  1-3 cr.
Directed Study

AGSC 302  Scientific Communication  1.2; 2 cr.
The course covers the techniques of developing manuscripts, posters, and oral presentations.

AGSC 309  Drainage of Agricultural Lands  3.0; 3 cr.
Soil properties, porous media flow, hydraulic conductivity measurement, soil leaching requirements, drainage investigations, and surface and subsurface drainage system design.

AGSC 316  Ground Water Hydrology  3.0; 3 cr.
Occurrence, storage, distribution, and movement of ground water; confined and unconfined aquifer properties, well-aquifer hydraulics and relationships, and ground water basin management.

AGSC 317  Surface Water Hydrology  3.0; 3 cr.
Relevant statistical concepts and extreme event distributions, rainfall frequency analysis, rainfall-runoff relationships, unit hydrograph theory, overland flow routing, and stochastic processes in hydrology.

AGSC 320  Project Planning and Management  3.0; 3 cr.
Project preparation, evaluation, and management. **Alternate years.**

AGSC 326  Surface Irrigation Engineering  3.0; 3 cr.
Principles of design, operation, and evaluation of surface irrigation systems; irrigation field design and field measurement techniques. **Prerequisite: consent of instructor.**

AGSC 328  Sprinkler and Micro-Irrigation Engineering  3.0; 3 cr.
Fundamentals of design, operation, evaluation, and selection of pressurized irrigation systems; pipeline economics, pump hydraulics, and pumping plant design considerations.

AGSC 376  Resource and Environmental Economics  3.0; 3 cr.
Addresses and analyzes resource and environmental problems facing today's society, with an emphasis on providing the student with an intensive introduction to the qualitative theory necessary for an effective analysis of resource problems.
Graduate Programs

The department of Nutrition and Food Science offers two graduate programs of study leading to the MS degree in either Food Technology or Nutrition. Students can follow either a thesis or a non-thesis program of study.


MS in Nutrition

Core Courses (Thesis)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFSC 301</td>
<td>Statistical Methods for Nutrition and Food Science</td>
<td>2.3; 3 cr.</td>
</tr>
<tr>
<td></td>
<td>This is an intermediate level course of statistics. Topics include introduction to designs in Nutrition and Food Science research; critical appraisal of literature; methods of describing data; statistical inference for means and proportions; linear and logistic regression, and an introduction to multiple regression. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Course offered in fall and spring.</td>
<td></td>
</tr>
<tr>
<td>NFSC 311</td>
<td>Advanced Nutrition: Macronutrients</td>
<td>3.0; 3 cr.</td>
</tr>
<tr>
<td></td>
<td>Advances in carbohydrate, protein, lipid, fiber and energy metabolism. Prerequisite: NFSC 274.</td>
<td></td>
</tr>
<tr>
<td>NFSC 314</td>
<td>Advanced Nutrition: Minerals</td>
<td>3.0; 3 cr.</td>
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<tr>
<td></td>
<td>Advanced nutritional, biochemical, and physiological aspects of macro- and micro-mineral elements, and toxic elements in humans. Prerequisite: NFSC 274.</td>
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<tr>
<td>NFSC 315</td>
<td>Advanced Nutrition: Vitamins</td>
<td>3.0; 3 cr.</td>
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<tr>
<td></td>
<td>Advanced nutritional, biochemical, and physiological aspects of vitamins and vitamin-like substances in humans. Prerequisite: NFSC 274.</td>
<td></td>
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<tr>
<td>NFSC 395</td>
<td>Graduate Seminar in Nutrition and Food Science</td>
<td>1.0; 1 cr.</td>
</tr>
<tr>
<td>NFSC 396</td>
<td>Comprehensive Exam</td>
<td>0 cr.</td>
</tr>
<tr>
<td>NFSC 399</td>
<td>MS Thesis</td>
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</tbody>
</table>
Core Courses (Non-Thesis)

NFSC 301  Statistical Methods for Nutrition and Food Science  2.3; 3 cr.
This is an intermediate level course of statistics. Topics include introduction to designs in Nutrition and Food Science research; critical appraisal of literature; methods of describing data; statistical inference for means and proportions; linear and logistic regression, and an introduction to multiple regression. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Course offered in fall and spring.

NFSC 300  Graduate Tutorial  1-3 cr.
Directed study.

NFSC 311  Advanced Nutrition: Macronutrients  3.0; 3 cr.
Advances in carbohydrate, protein, lipid, fiber and energy metabolism. Prerequisite: NFSC 274.

NFSC 314  Advanced Nutrition: Minerals  3.0; 3 cr.
Advanced nutritional, biochemical, and physiological aspects of macro- and micro-mineral elements, and toxic elements in humans. Prerequisite: NFSC 274.

NFSC 315  Advanced Nutrition: Vitamins  3.0; 3 cr.
Advanced nutritional, biochemical, and physiological aspects of vitamins and vitamin-like substances in humans. Prerequisite: NFSC 274.

NFSC 395  Graduate Seminar in Nutrition and Food Science  1.0; 1 cr.

Elective Courses for the MS Degree in Nutrition

NFSC 300  Graduate Tutorial  1-3 cr.
Directed study.

NFSC 305  Sensory Evaluation of Food  3.0; 3 cr.
Designed to help the food scientist solve typical sensory problems; select appropriate panelists for specific sensory tests and conduct such tests, analyze and interpret the results, and write a report. Prerequisite: STAT 210 or EDUC 227.

NFSC 306  Community Nutrition: Research and Intervention  3.0; 3 cr.
The role of nutrition in improving the health and well-being of communities. Population nutritional status and needs assessment; planning, implementing and evaluating community nutrition and emergency nutrition programs and policies. Identification and assessment of nutritional status in the community, nutritional surveys, program development, nutritional education planning policies, and nutritional ecology. Prerequisites: NFSC 221 and NFSC 222.

NFSC 307  Nutritional Epidemiology  3.0; 3 cr.
This course deals with the design, conduct, analysis, and interpretation of epidemiologic studies related to nutrition, particularly the relationship between nutritional status, diet and disease. Prerequisites: STAT 210 or EDUC 227 and CMPS 209.

NFSC 308  Advanced Therapeutic Nutrition  3.0; 3 cr.
Advances in nutritional care, metabolic changes, and dietary management of nutrition related diseases. Prerequisites: NFSC 292 and NFSC 293.

Core Courses (Thesis)

AGSC 301  Statistical Methods in Agriculture 2.3; 3 cr.
This is an intermediate level course of statistics. Topics include introduction to designs in Nutrition and Food Science research; critical appraisal of literature; methods of describing data; statistical inference for means and proportions; linear and logistic regression, and an introduction to multiple regression. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Course offered in fall and spring.

NFSC 305  Sensory Evaluation of Food  3.0; 3 cr.
Designed to help the food scientist solve typical sensory problems; select appropriate panelists for specific sensory tests and conduct such tests, analyze and interpret the results, and write a report. Prerequisite: STAT 210 or EDUC 227.

NFSC 310  Advanced Food Biochemistry  3.0; 3 cr.
Study of food enzymes, lipid oxidation in foods and biological systems, and genetically modified foods. Prerequisite: NFSC 261.

NFSC 351  Food Safety: Contaminants and Toxins  3.0; 3 cr.
General principles of food toxicology with emphasis on toxic constituents in plant, animal, marine, and fungal origin, contaminants and food processing induced toxins. Risk characterization and laws and regulations of food safety. Prerequisite: NFSC 277.

NFSC 370  Food Product Development  3.0; 3 cr.
To learn the chemical and physical properties of food ingredients. To apply the product development process from idea generation to marketing. Prerequisite: NFSC 287 or NFSC 288.

Any course approved by the Thesis Committee and the Faculty/School Graduate Studies Committee

MS in Food Technology

Core Courses (Thesis)

AGSC 301  Statistical Methods in Agriculture 2.3; 3 cr.
This is an intermediate level course of statistics. Topics include introduction to designs in Nutrition and Food Science research; critical appraisal of literature; methods of describing data; statistical inference for means and proportions; linear and logistic regression, and an introduction to multiple regression. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Course offered in fall and spring.

NFSC 305  Sensory Evaluation of Food  3.0; 3 cr.
Designed to help the food scientist solve typical sensory problems; select appropriate panelists for specific sensory tests and conduct such tests, analyze and interpret the results, and write a report. Prerequisite: STAT 210 or EDUC 227.

NFSC 310  Advanced Food Biochemistry  3.0; 3 cr.
Study of food enzymes, lipid oxidation in foods and biological systems, and genetically modified foods. Prerequisite: NFSC 261.

NFSC 351  Food Safety: Contaminants and Toxins  3.0; 3 cr.
General principles of food toxicology with emphasis on toxic constituents in plant, animal, marine, and fungal origin, contaminants and food processing induced toxins. Risk characterization and laws and regulations of food safety.

NFSC 371  Food Engineering  3.0; 3 cr.
Basic concepts and principles of food engineering and their applications; focus on engineering design and analysis of unit operations common to food processing. Prerequisite: NFSC 291.

NFSC 395  Graduate Seminar in Nutrition and Food Science  1.0; 1 cr.

NFSC 396  Comprehensive Exam  0 cr.

NFSC 399  MS Thesis  

Core Courses (Non-Thesis)

AGSC 301 Statistical Methods in Agriculture 2.3; 3 cr.
This is an intermediate level course of statistics. Topics include introduction to designs in Nutrition and Food Science research; critical appraisal of literature; methods of describing data; statistical inference for means and proportions; linear and logistic regression, and an introduction to multiple regression. Prerequisites: STAT 210 or EDUC 227 and CMPS 209. Course offered in fall and spring.

NFSC 300 Graduate Tutorial 1-3 cr.
Directed study.

NFSC 305 Sensory Evaluation of Food 3.0; 3 cr.
Designed to help the food scientist solve typical sensory problems; select appropriate panelists for specific sensory tests and conduct such tests, analyze and interpret the results, and write a report. Prerequisite: STAT 210 or EDUC 227.

NFSC 310 Advanced Food Biochemistry 3.0; 3 cr.
Study of food enzymes, lipid oxidation in foods and biological systems, and genetically modified foods. Prerequisite: NFSC 261.

NFSC 351 Food Safety: Contaminants and Toxins 3.0; 3 cr.
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NFSC 370 Food Product Development 3.0; 3 cr.
To learn the chemical and physical properties of food ingredients. To apply the product development process from idea generation to marketing. Prerequisite: NFSC 287 or NFSC 288.

NFSC 371 Food Engineering 3.0; 3 cr.
Basic concepts and principles of food engineering and their applications; focus on engineering design and analysis of unit operations common to food processing. Prerequisite: NFSC 291.

NFSC 395 Graduate Seminar in Nutrition and Food Science 1.0; 1 cr.

NFSC 396 Comprehensive Exam 0 cr.

Elective Courses for the MS Degree in Food Technology

NFSC 306 Community Nutrition: Research and Intervention 3.0; 3 cr.
The role of nutrition in improving the health and well-being of communities. Population nutritional status and needs assessment; planning, implementing and evaluating community nutrition and emergency nutrition programs and policies. Identification and assessment of nutritional status in the community, nutritional surveys, program development, nutritional education planning policies, and nutritional ecology. Prerequisites: NFSC 221 and NFSC 222.

NFSC 307 Nutritional Epidemiology 3.0; 3 cr.
This course deals with the design, conduct, analysis, and interpretation of epidemiologic studies related to nutrition, particularly the relationship between nutritional status, diet and disease. Prerequisites: STAT 210 or EDUC 227 and CMPS 209.

NFSC 308 Advanced Therapeutic Nutrition 3.0; 3 cr.
Advances in nutritional care, metabolic changes, and dietary management of diseases. Prerequisite: NFSC 274.

NFSC 312 Sports Nutrition 3.0; 3 cr.
Nutritional needs for the various types of athletic performance, and selected ergogenic and ergolytic supplements as related to physical performance.

NFSC 314 Advanced Nutrition: Minerals 3.0; 3 cr.
Advanced nutritional, biochemical, and physiological aspects of macro- and micro-mineral elements, and toxic elements in humans. Prerequisite: NFSC 274.

NFSC 315 Advanced Nutrition: Vitamins 3.0; 3 cr.
Advanced nutritional, biochemical, and physiological aspects of vitamins and vitamin-like substances in humans. Prerequisite: NFSC 274.

NFSC 377 Food Packaging 3.0; 3cr
This course provides the students with the basic knowledge regarding food packaging materials, machinery and technology. It provides an overview of the elements of packaging science and engineering applied to the presentation, distribution and marketing of various food products. Prerequisite: NFSC 291.

NFSC 391 Laboratory Methods in Nutrition and Food Science 1.6; 3 cr.
Principles of animal experiments, analytical techniques, and instrumentation used in nutrition and food science research studies. Prerequisite: NFSC 267.

Any course approved by the Thesis Committee and the Faculty/School Graduate Studies Committee.
Department of Landscape Design and Ecosystem Management (LDEM)

Chairperson: Talhouk, Salma N.
Professors: Bengs, Christer; Talhouk, Salma N.; Zurayk, Rami
Associate Professor: Farajalla, Nadim
Assistant Professors: Abunnasr, Yaser; Trovato, Maria Gabriella
Lecturer: Al-Akl, Nayla
Associate: Makhzoumi, Jala

Graduate Programs

The graduate study program leading to the MS degree with thesis or non-thesis options is offered with a specialization in Ecosystem Management.

The program educates students in ecosystem science and management by integrating instruction in biophysical and human systems. It provides students with sufficient research experience, and it equips them with the necessary tools for professional practice and/or the pursuit of higher education.

The program crosses traditional boundaries by applying an interdisciplinary approach and multiple resource knowledge to ecosystem studies, while also emphasizing human-nature interactions.

Natural resources management involves not only the understanding of ecosystem structure and function when used for a variety of purposes, but also the incorporation of social, economic and political considerations into decision-making. Consequently, the discipline involves the collection, analysis, interpretation and integration of information not only from the more traditional areas of science but also from the areas of management.

For full details on the admission requirements for this interfaculty program, see the Admissions section of this catalogue and the admission policies for the Interfaculty Graduate Environmental Sciences Program.

Ecosystem Management Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENSC 630</td>
<td>Natural Resource Management</td>
<td>3 cr.</td>
</tr>
<tr>
<td>LDEM 630</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSC 631</td>
<td>Agricultural Pollution and Control</td>
<td>3 cr.</td>
</tr>
<tr>
<td>LDEM 631</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENSC 633</td>
<td>Ecological Landscape Design and Planning</td>
<td>3 cr.</td>
</tr>
<tr>
<td>LDEM 633</td>
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Introduction to the theory and methodology of ecological landscape design and planning, aims to introduce the holistic approach of landscape ecology and its application in sustainable management of natural and cultural landscape sterosystems. Alternate years.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LDEM 300</td>
<td>Directed Study in Ecosystem Management</td>
<td>1-3 cr.</td>
</tr>
<tr>
<td>ENSC 395</td>
<td>Comprehensive Exam</td>
<td>0 cr.</td>
</tr>
<tr>
<td>ENSC 699</td>
<td>MS Thesis</td>
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</tbody>
</table>
Faculty of Arts and Sciences (FAS)
Mission

The Faculty of Arts and Sciences embodies AUB’s core commitment to the liberal arts and sciences. It offers undergraduate and graduate programs in the arts, humanities, and social, natural, and mathematical sciences, and is dedicated to advanced research in all of these domains. Through its freshmen and general education programs, it is the University’s principal gateway to higher studies and professional education. The faculty, through its teaching and research, promotes free inquiry, critical thinking, academic integrity, and respect for diversity and equality.

Vision

Building upon its rich tradition, the Faculty of Arts and Sciences is determined to position itself at the heart of free inquiry in the Middle East. Free and critical thinking is central to the faculty’s teaching, its research, its engagements with the wider community, and its commitment to the thoughtful transformation of all of its activities and structures. The faculty’s enhanced undergraduate programs will graduate innovators with a breadth of vision who can be agents of positive change wherever they live and work. The faculty will strategically expand its graduate offerings, especially in areas where it can make a distinctive contribution, and it will educate graduate students who are themselves producers of knowledge. The faculty will be recognized internationally for the quality of its research and creative activities in the humanities, social sciences, natural sciences, mathematical sciences, and interdisciplinary areas, whether undertaken in response to regional and global needs or to human curiosity and imagination.

The faculty will provide a vital forum for open discussion and engage contemporary issues in ways that resonate far beyond our campus walls.

Graduate Study

Admission to the graduate programs in the Faculty of Arts and Sciences is competitive, based on the applicant’s academic record, achievements and research interests of the applicant. All applicants to graduate study need the recommendation of the academic unit concerned. Academic units may add additional requirements that would assist in their admission recommendations such as a writing sample, GRE (or GMAT, in the case of the Department of Economics) scores, and/or interview. GRE is only required from the following departments: Biology, Economics, History and Archeology, Philosophy, Political Studies and Public Administration, Psychology, as well as the programs of MA in Middle East Studies, MA in Anthropology and MA in Media Studies.

The following includes admissions information specific to the Faculty of Arts and Sciences. Additional requirements are described in the General section on Admissions in this catalogue.

Admission as a Regular Graduate Student

An applicant is considered for admission as a regular student to a graduate program if he/she meets the following minimum admission requirements:

An undergraduate average of at least 80 percent (or standardized equivalent from other institutions of higher learning) in the major field of study and a cumulative average of at least 75 percent (or standardized equivalent) for all work done at the undergraduate level leading to a Bachelor’s degree or its equivalent from AUB or other recognized institutions of higher learning.
Applicants to the Environmental Policy Planning specialization in the Interfaculty Graduate Environmental Sciences Program (IGESP) are required to have an average of at least 80 percent in the last two years of undergraduate study or its equivalent at AUB or other universities as determined by the Faculty Graduate Studies Committee.

Further requirements for admission to graduate work are found in the General section on Admission in this catalogue.

**Admission as a Graduate Student on Probation**

An applicant is considered for admission on probation if he/she meets the following minimum admission requirements:

An undergraduate average of at least 77 percent (or standardized equivalent from other institutions of higher learning) in the major field of study and a cumulative average of at least 75 percent (or standardized equivalent) for all work done at the undergraduate level leading to a Bachelor’s degree or its equivalent from AUB or other recognized institutions of higher learning. Applicants to the Environmental Policy Planning specialization in the Interfaculty Graduate Environmental Sciences Program (IGESP) are required to have an average of 75 percent in the last two years of study or its equivalent at AUB or other universities as determined by the Faculty Graduate Studies Committee.

Further requirements for admission to graduate work are found in the General section on Admissions in this catalogue.

**Admission as a Prospective Graduate Student**

Applicants who hold a Bachelor’s degree in a major field of study other than the one to which they are applying, and who do not have sufficient academic preparation in the field, may be admitted as a prospective graduate student who must complete specified undergraduate course requirements.

To be considered for admission as a prospective graduate student, the applicant must have attained an undergraduate average of 75 percent (or standardized equivalent) in all work done at the undergraduate level leading to a Bachelor’s degree or its equivalent from AUB or another recognized institution of higher learning.

Further requirements for admission to graduate work are found in the General section on Admission in this catalogue: If an average of 77-80 percent is attained, the student may have his/her status changed to graduate student on probation pending department recommendation and approval of the Faculty Graduate Studies Committee. The supplementary courses must be completed within four consecutive semesters.
Department of Arabic and Near Eastern Languages

Chairperson: Khairallah, Assaad I.
Professors: Agha, Saleh S.; Baalbaki, Ramzi M. (Margaret Weyerhaeuser Jewett Professor of Arabic); Jarrar, Maher Z.; Khairallah, Assaad I.; Naimy, Nadeem N.; Tuqan, Fawwaz A.
Associate Professor: Wilmsen, David E.
Assistant Professor: Orfali, Bilal W.
Senior Lecturers: El-Zein, Abdul fattah H.; Kattourah, George B.
Lecturers: Abu-Jawdeh, Siham E.; El Daif, Rachid; Jeha, George E.; Kozah, Mario K.
Instructors: Hajjar, Olga A.; Semaan, Rima; Zein, Ragha

The Department of Arabic and Near Eastern Languages offers graduate programs leading to the MA and PhD degrees. The requirements for both degrees are listed below.

For admission and graduation requirements, refer to the faculty and department web pages.

MA in Arabic Language and Literature

Students registered in the master’s program in the Department of Arabic and Near Eastern Languages are required to take a minimum of 21 graduate credit hours and to present a thesis based on independent research work.

Doctor of Philosophy in Arabic Language and Literature

The Department of Arabic and Near Eastern Languages is steeped in the Arabic philological and literary tradition. Its faculty is also experienced in the use of contemporary western methods of teaching and approaches to language and literature. For this reason, the department is well-positioned to train future leaders in the field.

Academic governance of the department complies with the practices and procedures currently applied by the Faculty of Arts and Sciences. The department seeks to augment its faculty as needed and this mainly through exchange and visiting programs as well as through highly selective and articulately defined recruitment.

Goals and Objectives of the Doctoral Program

The program’s objective is to train men and women to become technically competent in their

* Part time
preferred field of specialization and to train them to play a principal role in enhancing education in the region.

PhD candidates will acquire:

- Critical, interpretive and analytical skills,
- Benchmark methodologies leading to the conduct of advanced research, and
- Deeper, more sophisticated and more nuanced understanding of Arabic language and literature.

Curriculum

The offerings of the department fall within three broadly defined fields:

- Arabic language and related fields (phonetics, morphology, syntax, history of grammar, lexicology, stylistics, etc.);
- Classical and pre-modern Arabic literature and thought (including poetry, prose, belles lettres and other forms of literary expression);
- Modern Arabic literature and thought (including poetry, prose, literary theory, etc.).

Admission

Admission requirements are in line with those set by the Faculty of Arts and Sciences, and may be found in the section entitled Admission to PhD Programs under Admissions. The department requires the following three requirements:

- A Master's degree in Arabic from a recognized university, or an equivalent considered acceptable by the department, plus three recommendations and an interview (when considered necessary by the department). Students of exceptional promise may be admitted after finishing their BA;
- Proven unimpaired Arabic; and
- English proficiency. For the required level of proficiency, see the section entitled English Language Proficiency Requirement under Admissions.

Financial Support

The department offers, on a selective basis, substantial support which fully covers tuition and includes a monthly stipend. In return, PhD students are expected to teach courses and perform other tasks assigned by the department. Students may also apply for support to carry out research in archives and libraries outside of Lebanon and to attend international scholarly conferences.

Requirements for the Completion of the PhD

- Credits: A minimum of 18 credits, beyond the MA. These are comprised of six graduate courses (including a three-credit tutorial) in the following required and optional fields.
- Required fields are:
  - Arabic language and linguistics
  - Classical Arabic literature
  - Modern Arabic literature
- Optional fields are:
  - Arab cultural history (Qur'an, Hadith, kalam, tasawwuf, heresiography etc.)
  - Literary theory (comparative: Arab/Western)
- In addition, the following is required:
  - a three-credit tutorial, conducted by the candidate’s adviser, and leading to the production of the candidate’s doctoral proposal.
  - The distribution of the above requirements over the said fields will be decided by the department in each case on its own merit.
- Language Requirements: A working reading knowledge of a second European language, preferably French or German, must be shown before candidacy status is achieved.
- Residence Requirements: See Residence Requirements, under General University Academic Information.
- Supervision: During the first semester of graduate study, the department will appoint an academic committee to draw up a program of study for the student and to follow up his/her progress. At a later stage, the department, in consultation with the student, will assign an academic adviser for him/her.
- Candidacy Status: See Admission to Candidacy, under General University Academic Information. The student must achieve candidacy status not later than three years from the date of admission, and at least one year before graduation. Achieving candidacy is conditional upon completion of 18 credits, i.e., five courses plus the required tutorial for students with a Master’s degree, or 39 credits and the equivalent of an MA thesis for students with a BA; and satisfying the proposal and the language requirements. To achieve candidacy, a student must sit for a written comprehensive examination (PhD Qualification Exam Part I) comprising at least three different papers. The proto-examining committee, consisting of four AUB faculty members of professorial rank, will be in charge of putting the questions and correcting the answers. Within two weeks from the date of the written comprehensive, the student shall appear before the proto-examining committee to defend his/her answers.
- Doctoral Proposal: A detailed proposal defining the thesis problem, describing the pertinent literature, and suggesting the proposed approach to solving it, must be defended before, and approved by, the thesis examining committee (PhD Qualification Exam Part II). The committee membership must be approved by the Graduate Studies Committee of the Faculty of Arts and Sciences and a copy of the proposal must be sent to the Graduate Council.
- Thesis Examining Committee: for the composition of the committee please refer to the section entitled PhD Thesis Committee under General University Academic Information.
- Thesis Defence: Six copies of the pre-defense final manuscript must be submitted to the adviser at least eight weeks prior to the date of the defense session. This session shall be public. Candidates may, if they so elect, write their theses in English, provided members of the proto-examining committee expressly state their satisfaction with the candidate’s capacity for acquisition of knowledge in Arabic.
- Awarding/Withholding the Degree: The decision of the thesis examining committee may be one of the following four:
  - Award: with or without demanding minor corrections
  - Award: provided certain specific and restricted alterations are implemented within three months, and approved by the proto-committee
  - Suspend: major alterations are required and must be implemented within 6-12 months, after which the whole committee shall reconvene.
  - Withhold without further recourse
Course Descriptions

**ARAB 301** Seminar in Classical Arabic Literature (Poetry or Prose) 3.0; 3 cr.
An overview of the formative elements (geographic, linguistic, ethnic, religious, and cultural) and defining issues (identity, nature, and economic drives), with selective focuses on major trends and figures in Classical Arabic Literature before 1258/657.

**ARAB 303** Graduate Seminar in an Epoch, a Trend or a Book in Classical Arabic Literature 3.0; 3 cr.
Negotiating Classical Arabic Literature through the historical method, the thematic approach, or direct textual engagement, the selective focuses of this course cover a wide spectrum of Arabic literary production before 1258/657.

**ARAB 305** Graduate Seminar in Qur'anic Studies 3.0; 3 cr.
A survey of the different problems in Qur’anic studies, such as compilation of the Qur’an, al-nasikh wal-mansukh, al-muhkam wal-mutashabih, the secret letters, and the different schools of tafsir.

**ARAB 307** Graduate Seminar in European Literary Criticism and Its Influence on Modern Arabic Literary Criticism 3.0; 3 cr.
The course studies the rise of the Arabic Romantic Movement, the modern and post-modern trends, structuralism, intertextuality, deconstruction, as well as postcolonial, feminine and cultural studies.

**ARAB 309** Graduate Seminar in Arabic Sources 3.0; 3 cr.
A systematic survey of the major sources of Arabic literary and linguistic study. The different genres represented by these sources are emphasized.

**ARAB 311** Graduate Seminar in an Epoch, a Trend or a Book in Modern Arab Literature 3.0; 3 cr.
Focusing on a period, a trend, a particular author, or book, this course is an in-depth study using modern, critical and comparative approaches to literature.

**ARAB 313** Graduate Seminar in Folk Literature 3.0; 3 cr.
An analytic study of Arabic folk literature and its development. Study includes the different influences on folk literature and its impact on Arabic literature during later centuries.

**ARAB 315** Graduate Seminar in Comparative Literature 3.0; 3 cr.
This course deals with the theories and methods current in comparative literature in Arabic and worldwide, encouraging research on transcultural aspects of literary production, theory and criticism.

**ARAB 317** Graduate Seminar in Advanced Semitics or Linguistics 3.0; 3 cr.
A study of the Arabic grammatical tradition, with special emphasis on the development of the grammarians’ analytic methods. Alternatively, and according to need, the course could offer a survey of comparative Semitic philology.

**ARAB 351** Special Topics in Arabic Language and Literature 1–3 cr.
A course that varies in content and focuses on selected topics in language and literature.

**ARAB 390** Tutorial in Arabic Language or Literature 1–3 cr.

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*The choice to register for ARAB 482, ARAB 483, or ARAB 484 should be done in consultation with thesis advisor to ensure that total number of PhD thesis credits and PhD course credits are met as per AUB rules and regulations.*
Department of Biology

Chairperson: Knio, Khuzama M.
Professors: Baydoun, Elias H.; Gali-Muhtasib, Hala U.; Knio, Khuzama M.; Kreydiyyeh, Sawsan I.; Talhouk, Rabih S.
Associate Professors: Bariche, Michel J.; Saoud, Imad P.; Smith, Colin A.
Assistant Professors: Ghanem, Noel D.; Jaalouk, Diana E.; Kambris, Zakaria S.; Osta, Mike A.; Sadek, Riyad A.; zu Dohna, Heinrich
Lecturers: Rizkallah, Hind D.; Sinno-Saoud, Nada; Tarraf, Charbel G.
Instructor: Hajjar, Layane A.M.

MS in Biology
The graduate program consists of an MS program in Biology and a PhD program in Cell and Molecular Biology.

The Graduate Record Examination (GRE) is required of all applicants for graduate work. Requirements for an MS degree in biology consist of a minimum of 21 credit hours in biology courses numbered 300 or above and a thesis.

The following courses are core courses and should be taken by all Master's students:
BIOL 310 (3 cr.), BIOL 315 (3 cr.), and BIOL 393 (1 cr.). Unless otherwise stated, only senior undergraduate biology majors with an average of 80 or above can register in biology graduate courses with the consent of instructor.

PhD in Cell and Molecular Biology

Mission Statement
The doctoral program in Cell and Molecular Biology aims to provide the best training to students for their careers as research scientists in Cell and Molecular Biology. It provides students with the opportunity to develop their capacity for scholarly and independent work, critical analytical thinking, and the ability to communicate knowledge and ideas. It is intended to produce scientists who will make significant original contributions to the biological sciences. The program exposes students to theoretical foundations and practical training in current laboratory techniques. It serves the AUB mission by providing qualified researchers for Lebanon and the region, and prepares students for careers in research, teaching, and public service.

Admission Requirements
The PhD program is a five year program. Admission to the program will be on a competitive basis. To be eligible for admission, applicants should have a good academic record, demonstrate genuine interest in Cell and Molecular Biology research, and must:

- hold a Bachelor's (BS) or Master's (MS) degree in Biological Sciences or related fields from a recognized institution;
- present three letters of recommendation from previous tutors or employers;
- submit scores from the general Graduate Record Examination (GRE). This exam is required by both BS and MS holders;
- meet “English Language Proficiency Requirements”, see page 37;
- present a statement of purpose;
- be interviewed by a select group of department faculty members. The faculty members may require the student to give a seminar presentation;
- be recommended for admission by the Biology Department.

Program Requirements
A minimum of 36 credit hours of course work beyond the Bachelor's program, or 18 credit hours of course work beyond the Master's program are required. To fulfill course requirements, six required core courses (18 credits), in addition to elective courses are offered. Beyond the Bachelor's program, each PhD candidate would register for four semesters of course work for an average of nine credit hours per semester. A maximum of 21 credit hours may be transferred from the Master's work if considered within the scope of the program.

Upon admission into the program, each student will be assigned an academic adviser who will design the set of elective courses to meet the student's research interests and career goals, and will advise if undergraduate courses are needed to rectify deficiencies. Each student's course of study will be designed individually, in light of the student's interests and career goals. All the duties of the academic adviser will be transferred to the student's thesis adviser, who must be selected not later than the end of the first year for students entering with MS, and by the second year for students entering with BS.

The program incorporates the existing Master's program and consists of core courses that address basic principles of cell and protein function, gene expression and two courses that introduce the students to basic research techniques and bio-statistics. In addition, elective courses are chosen towards the completion of the course requirements.

Core Courses
The following courses are considered as core courses and are required by all students:
BIOL 310  Quantitative Methods in Biology  3 cr.
BIOL 315  Research Methods in Biology  3 cr.
BIOL 322  Advanced Biochemistry  3 cr.
BIOL 330  Molecular Genetics  3 cr.
BIOL 332  Advanced Cell Biology  3 cr.
BIOL 334  Cellular Biophysics  3 cr.
BIOL 491  CMBL Tutorial (students joining with an MS are exempted)  2 or 3 cr.
BIOL 493  CMBL Seminar  1 cr.
BIOL 494  CMBL Laboratory Rotation  3 cr.

If these courses have already been taken as part of the Master's program, they may be replaced by others with departmental approval.
Elective Courses

Elective courses are taken to meet the credit requirements and to emphasize the student’s research work and field of specialty. These courses may be chosen from the Biology Department MS course offerings, or from course offerings of other departments that fall within the student’s field of interest and the scope of the program.

Laboratory Rotations

During the first year of study, students must take the laboratory rotation course (BIOL 494), conducting research in two different faculty laboratories within the Biology Department or the University. The department considers exposure to different research environments an essential part of training. Students entering with only a BS must also register for an additional 2 or 3 credit laboratory tutorial in their first year.

Seminars

Students are required to attend and participate in seminars and journal clubs on a regular basis. Academic credit (one credit) will be received only in the first semester. Subsequent semesters will not be credited.

PhD Thesis Committee

The thesis committee should be composed of at least five members, one of whom should be from outside the department/program and one from outside the university. The thesis adviser and at least three of the thesis committee members must be of professorial rank. All members of the thesis committee must hold a doctoral degree in a relevant field. The chair of the thesis committee must be a full professor who is not the PhD thesis adviser (requirement of the Lebanese Ministry of Higher Education).

Members of the doctoral thesis committee are recommended by the student’s thesis adviser and approved by the department, the Faculty Graduate Studies Committee, and the Graduate Council. The doctoral thesis committee approves the thesis topic, research plan, conducts the thesis proposal defense (Part II of the Qualifying Exam) and conducts the thesis defense. The thesis proposal and the selection of the thesis committee should be approved at least two semesters before the student defends his/her thesis. The PhD thesis topic, examining committee, and admission to candidacy require Graduate Council approval.

PhD Qualification Exams Part I and Part II

For MS Students, upon completion of a minimum of 30 credits of coursework, the student will sit for a comprehensive exam (PhD Qualification Exam Part I) to determine whether the student has acquired the necessary background to successfully complete the doctoral program. The student is also expected to orally defend (PhD Qualification Exam Part II) the doctoral research proposal and demonstrate the intellectual capacity to pursue and complete an appropriate doctoral research project.

Candidacy and Residency

Refer to General University Academic Information, Requirements for the Degree of Doctor of Philosophy, section that has clearly defined candidacy and residency requirements.

PhD Thesis and Thesis Defense

After qualifying as a PhD candidate, the student will focus on the doctoral research with continued participation in seminars. A doctoral thesis documents independent original research. The doctoral research, once completed, will be presented publicly, and defended immediately after, in front of the thesis committee. Prior to the defense, all major revisions to the thesis shall have been completed. The decision of the committee will be by consensus.

Residence Requirements

For Residence Requirements, see Residence Requirements, page 37.

Graduation Requirements

The following is a list of graduation requirements:

- Completion and successful defense of a thesis;
- Teaching experience (theory or lab) equivalent to a minimum of a three credit course;
- Yearly presentation, during candidacy, of research progress to the department;
- Acceptance or publication of at least two internationally refereed papers or one internationally refereed paper and one internationally refereed abstract or proceeding.

In all other respects the graduation requirements set forth in the catalogue for the PhD program will apply.

Financial Support

The department offers, on a selective basis, substantial support which fully covers tuition and includes a monthly stipend. There are also some funds available to support participation in international conferences; these funds are awarded on a competitive basis. In return, students are expected to help in teaching undergraduate labs, with presentations of introductory courses, and in proctoring and correcting exams.

Course Descriptions

BIOL 310 Quantitative Methods in Biology 2.3; 3 cr.
A course that emphasizes advanced statistical methods for biology; includes use of computers and some software and hardware applications in various fields in biology. Prerequisite: graduate standing.

BIOL 315 Research Methods in Biology 1.5; 3 cr.
A core course that provides practical experience in a variety of techniques currently employed in biological research, providing an understanding of their application and result interpretation. Prerequisite: graduate standing.
BIOL 322  Advanced Biochemistry  3.0; 3 cr.
This course presents the relationship of biomolecular structure to function, enzyme catalysis, regulation, and selected examples of current biochemical research.

BIOL 324  Protein Structure and Function  3.0; 3 cr.
A course that covers the structure-function relationship of proteins, both as model systems and as part of biological systems, with special attention to current issues in protein science. Biophysical approaches, structure determination, protein engineering, protein folding, advanced enzymology, and biological systems with which to study proteins are included.

BIOL 328  Plant Biochemistry  3.0; 3 cr.
A course that provides information in areas of biochemistry unique to plants, including that of the cell wall, photosynthesis, assimilation of mineral nutrients, natural products, and growth substances.

BIOL 330  Molecular Genetics  3.0; 3 cr.
A discussion of recent developments in molecular genetics that provides an understanding of the molecular mechanisms underlying gene regulation and tissue-specific gene expression.

BIOL 331  Nucleic Acid Structure and Function  3.0; 3 cr.
This course covers the principles by which nucleic acid structures regulate gene expression and replication, with special attention to unusual roles and applications. Antiviral drugs, RNA catalysis, mRNA UTR elements, and the origin of life are discussed.

BIOL 332  Advanced Cell Biology  3.0; 3 cr.
A discussion of recent findings in cell biology, emphasizing understanding of the research approaches used to elucidate major processes that regulate the normal function of the cell.

BIOL 333  Signal Transduction  3.0; 3 cr.
A study of the common signal transduction pathways mediating the effect of different first messengers. Prerequisite: graduate standing.

BIOL 334  Cellular Biophysics  3.0; 3 cr.
An application of physical concepts and techniques to the study of cell structure and functions.

BIOL 335  Molecular Biology of Cancer  3.0; 3 cr.
A course that deals with the regulatory mechanisms of neoplastic cell growth and cancer cell metastasis. This course includes a discussion of recent developments in molecular genetics of the intra- and/or inter-cellular mechanisms involved in tumor formation, cellular proliferation, apoptosis, invasion, and metastasis. Prerequisite: graduate standing.

BIOL 336  Mechanisms of Development  3.0; 3 cr.
A course that employs an experimental approach to the study of different developmental events with emphasis on cellular and molecular mechanisms.

BIOL 337  Molecular Biology of Cell Death  3.0; 3 cr.
This course reviews recent developments regarding the signaling and regulation of the different modes of cell death and their particular relevance to multi-step carcinogenesis. It aims at providing a general understanding of the different death processes which will provide a means of manipulating the system for the activation of apoptotic and other modes of cell death in refractory cells. Prerequisites: BIOL 335 or consent of instructor and graduate standing.

BIOL 338  Cancer and Natural Products  3.0; 3 cr.
This course is designed to introduce students to the numerous natural compounds that show promise in the treatment of cancer and the mechanism-based approaches to cancer treatment using these compounds. In addition, the course provides information on the research designs, protocols and assays involving natural compounds.

BIOL 339  Membranes and Membrane Transport  3.0; 3 cr.
An in-depth study of membrane structure and of different biological transport mechanisms covering their kinetics and regulation. The structure and function of the most important channels, pumps and carriers are emphasized together with their importance in regulating the intracellular environment and their implication in health and disease. Common research methods for the assay of transport processes are also discussed.

BIOL 341  Advanced Microbiology  3.0; 3 cr.
A study of energy metabolism of various microbial groups emphasizing degradation of organic compounds under aerobic and anaerobic conditions. This course also deals with applications of microorganisms in industrial, medical, and environmental fields.

BIOL 342  Microbial Genetics  3.0; 3 cr.
A course that trains students to solve problems in bacterial genetics; develop a comprehension of bacterial genetics including the organization and activation of genes; understand and apply a genetic approach to biology’s basic questions: read, understand, and critically evaluate scientific research papers published in leading international journals; identify areas that require further investigation and for which a genetic approach can be designed and pursued; design laboratory experiments in bacterial genetics; write and submit a grant proposal to seek funds for research in this area, and present up-to-date published research findings to a specialized audience.

BIOL 350  Advanced Reproductive Physiology  3.0; 3 cr.
A course that examines the comparative mechanisms of all major aspects of male and female reproductive physiology. Emphasis is given to species variation in regard to reproductive function and to detailed examination of key reproductive events in both sexes.

BIOL 355  Neuroimmunology  3.0; 3 cr.
A course that focuses on the interactions between the nervous, endocrine, and immune systems. The role of the various biologically important molecules that play an important role in the bi-directional communication between those three systems and their physiological and pharmacological actions is studied.

BIOL 361  Advanced Ecology  2.3; 3 cr.
A discussion and analysis of topics of current interest in ecology with emphasis on population and community dynamics; methods of ecological investigation and analysis; includes field work.

BIOL 362  Advanced Reproductive Biology  3.0; 3 cr.
A course that examines the comparative mechanisms of all major aspects of male and female reproductive physiology. Emphasis is given to species variation in regard to reproductive function and to detailed examination of key reproductive events in both sexes.

BIOL 363  Population and Community Ecology  3.0; 3 cr.
A course that introduces the various models and theories of population dynamics and community structure, and their applications in assessing the complex interactions that occur in natural plant-animal systems as a result of long co-evolution, with an emphasis on chemical ecology.

BIOL 364  Conservation and Restoration Ecology  3.0; 3 cr.
A course that introduces various concepts and applications in the field of conservation and landscape ecology. Degradation processes, principles of restoration ecology, and models of conservation biology are discussed. Part of this course concentrates on the use of remote sensing, GIS, and GPS as tools in landscape ecology.
BIOL 390  Special Topics in Biology  1, 2, 3, or 4 cr.
Prerequisites: graduate standing and consent of instructor. May be repeated for credit.

BIOL 391  Tutorial  2 or 3 cr.
Prerequisite: graduate standing.

BIOL 393  Seminar  1 cr.
This course trains students how to present research findings. Prerequisite: graduate standing.

BIOL 395A/395B Comprehensive Exam  0 cr.
Prerequisite: Consent of adviser.

BIOL 399  MS Thesis  9 cr.

BIOL 480  Qualifying Exam Part I: Comprehensive Exam  0 cr.
Every Semester

BIOL 481  Qualifying Exam Part II: Defense of Thesis Proposal  0 cr.
Every Semester

BIOL 482* PhD Thesis  24 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

BIOL 483* PhD Thesis  27 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

BIOL 484* PhD Thesis  30 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

BIOL 491  Tutorial  2 or 3 cr.

BIOL 493  CMBL Seminar  1 cr.
Students enrolled in the CMBL program present research findings. Prerequisite: Enrollment in CMBL program. Academic credit will be received only in the first semester, subsequent semesters will be recorded but not credited.

BIOL 494  CMBL Laboratory Rotation  3 cr.
Students taking this course will be conducting a small research project in any area pertinent to the field of Cell and Molecular Biology. The research has to be conducted in two different laboratories under the supervision of a faculty member from the Biology Department. The supervisor should ensure that the student receives the necessary training in safety and technical issues required for the successful progress of the project and that the work involved meets the ethical criteria set by AUB Human Research Protection Program and Institutional Animal Care and Use Committee (IACUC).

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**Sample Student Programs of Study**

<table>
<thead>
<tr>
<th>BS holder working for MS (21 cr.)</th>
<th>BS holder working for PhD (36 cr.)</th>
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<tbody>
<tr>
<td><strong>First semester</strong></td>
<td><strong>First semester</strong></td>
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<tr>
<td>BIOL 315 3 cr.</td>
<td>BIOL 315 3 cr.</td>
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<tr>
<td>BIOL Elective 3 cr.</td>
<td>BIOL Elective 3 cr.</td>
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<tr>
<td>BIOL 393 1 cr.</td>
<td>BIOL 494 3 cr.</td>
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<tr>
<td>BIOL 391A 2 cr.</td>
<td>BIOL 493 2 cr.</td>
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<td>9 cr.</td>
<td>9 cr.</td>
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<tr>
<td><strong>Second semester</strong></td>
<td><strong>Second semester</strong></td>
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<tr>
<td>BIOL 310 3 cr.</td>
<td>BIOL 310 3 cr.</td>
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<tr>
<td>BIOL Elective 3 cr.</td>
<td>BIOL Elective 3 cr.</td>
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<tr>
<td>BIOL 491A 2 cr.</td>
<td>BIOL 491A 2 cr.</td>
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<td>9 cr.</td>
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<tr>
<td><strong>Third semester</strong></td>
<td><strong>Third semester</strong></td>
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<tr>
<td>BIOL Elective 3 cr.</td>
<td>BIOL 322 3 cr.</td>
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<td>BIOL Elective 3 cr.</td>
<td>BIOL Elective 3 cr.</td>
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<td>3 cr.</td>
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<tr>
<td><strong>Fourth semester</strong></td>
<td><strong>Fourth semester</strong></td>
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<td>BIOL Elective 3 cr.</td>
<td>BIOL Elective 3 cr.</td>
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<td>BIOL Elective 3 cr.</td>
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<td>9 cr.</td>
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<thead>
<tr>
<th>MS holder working for PhD (18 cr.)</th>
<th>MS holder working for PhD (18 cr.)</th>
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<tr>
<td><strong>First semester</strong></td>
<td><strong>First semester</strong></td>
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<tr>
<td>BIOL 330 3 cr.</td>
<td>BIOL 330 3 cr.</td>
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<td>BIOL 322 3 cr.</td>
<td>BIOL 322 3 cr.</td>
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<td>BIOL 494 3 cr.</td>
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<td>9 cr.</td>
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<td><strong>Second semester</strong></td>
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<td>BIOL 332 3 cr.</td>
<td>BIOL 334 3 cr.</td>
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<td>BIOL 334 3 cr.</td>
<td>BIOL 336 3 cr.</td>
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<td>BIOL 493 or ELECTIVE 1 or 3 cr.</td>
<td>BIOL 493 or ELECTIVE 1 or 3 cr.</td>
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<tr>
<td>7 or 9 cr.</td>
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* The choice to register for BIOL 482, 483, or 484 should be done in consultation with thesis advisor to ensure that total number of PhD thesis credits and PhD course credits are met as per AUB rules and regulations.
Department of Chemistry

Chairperson: Al-Ghoul, Mazen H.
Professors: Al-Ghoul, Mazen H.; Haddadin, Makhlouf I.; Halouai, Lara I.; Saliba, Najat L.; Sultan, Rabih F.
Associate Professors: Bouhadir, Kamal I.; El-Rassy, Houssam T.; Ghaddar, Tarek H.; Ghauch, Antoine R.; Hasanyan, Faraj A.; Kaafarani, Bilal R.
Assistant Professors: Karam, Pierre M.; Patra, Digambar G.
Lecturers: *BouBou, Kheir; *Dakdouki, Saada
Instructors: Abi Rafii, Randa R.; Deeb, Hana H.; *El-Batiousi, Hazer; Jaafar, Amer; *Ramadan, Hiba; Sadek, Samar A.
Assistant Instructor: Dakik, Rajaa

MS in Chemistry

The department offers the MS degree in chemistry. Graduate students may specialize in analytical, inorganic, organic, or physical chemistry. Of the minimum 21 graduate course credits required for the MS degree, a minimum of six credits must be graduate courses in the special field of chemistry in which the student concentrates and six credits must be graduate courses in chemistry outside the student’s field of specialization. CHEM 361 is a requirement for all graduate students. A nine-credit thesis, CHEM 399, is required.

The research interests of the chemistry faculty include the following: synthetic heterocyclic chemistry; synthesis of biomaterials for drug delivery; synthesis of carboxylyc DNA analogs; reactive intermediates; cage compounds; coordination and organometallic chemistry; supramolecular chemistry; photocatalysis; photoelectrochemistry of semiconductors; synthesis, assembly, and physical properties of nanostructured materials; surface chemistry; irreversible nonequilibrium thermodynamics and statistical mechanics; nonlinear dynamics in chemistry; generalized hydrodynamics; chemical waves; patterns and fractals in precipitate and metal electrodeposition systems; laboratory and field investigations of atmospheric chemistry processes; design and synthesis of novel photo-active dendrimers; self-assembled mono-layers of bioactive material and poly-peptides on metal surfaces; study of electronic structure processes; design and synthesis of novel photo-active dendrimers; self-assembled mono-layers of bioactive material and poly-peptides on metal surfaces; study of electronic structure of unsaturated transition metal complexes and their reactions; discotic liquid crystals; synthesis of electron-deficient materials for organic electronics and opto-electronics applications; organic light emitting diodes (OLEDs), organic field effect transistors (OFETs), and organic solar cells; molecular recognition; and, solid-state stacking of organic materials; biocatalysis; control of light emitting diodes (OLEDs), organic field effect transistors (OFETs), and organic solar cells; stereochemistry; trans-effect; stabilization of oxidation states; mechanisms of the reactions of coordination compounds; catalysis by coordination compounds. Annually.

CHEM 303 Chemistry of the Coordination Compounds 3.0; 3 cr.
Applications of Orgel and Tanabe-Sugano diagrams; factors affecting stability of coordination compounds; stereochemistry; trans-effect; stabilization of oxidation states; mechanisms of the reactions of coordination compounds; catalysis by coordination compounds. Annually.

CHEM 304 Mechanisms of Inorganic Reactions 3.0; 3 cr.
Mechanisms of substitution reactions in octahedral and square planar metal complexes; mechanisms of oxidation-reduction, metal ion catalysis and photochemistry; application of symmetry rules to inorganic reactions; fluxional molecules. Alternate years.

CHEM 311 Advanced Organic Chemistry 3.0; 3 cr.
Electronic interpretation of organic reactions; correlation of inductive, resonance, and sterio effects with reactivity of molecules; chemistry of carboxcations, carbanions, carbenes, carbenoids, and radicals as intermediates in characteristic organic reaction mechanisms. Annually.

CHEM 313 Physical Organic Chemistry 3.0; 3 cr.
Organic reactions mechanisms, linear free energy relationships, solvent and reagent correlations, isotope effects, catalysis in weak and strong acid and base medium, organic photochemistry and pericyclic reactions. Alternate years.

CHEM 314 Heterocyclic Chemistry 3.0; 3 cr.
A general survey of the synthesis and reactions of selected classes of heterocyclic compounds; spectroscopic properties and structural relationships. Alternate years.

CHEM 315 Chemistry and Technology of High Polymers 3.0; 3 cr.
An introduction to the chemistry of high polymers; types, mechanisms, and kinetics of polymerization; structure, characterization, and properties of macromolecules; preparation, processing, and uses of the more common condensation and addition polymers used in plastics, elastomers, and fibers. Alternate years.

CHEM 316 Chemistry of Synthetic Polymers for Biomedical Applications 3.0, 3 cr.
An introduction to the chemistry of synthetic polymers and their applications in the biomedical field; nomenclature, preparations, reactions, synthesis, mechanisms, characterization, biocompatibility and biodegradability. A general presentation of biomedical applications of synthetic polymers in bones, joints, teeth, artificial organs, synthetic skin, contact lenses, time-release drug delivery, and gene delivery. Alternate years.

CHEM 317 Synthetic Organic Chemistry 3.0, 3 cr.
A survey of new reagents and synthetic procedures used in advanced organic synthesis; oxidation and reduction reagents in organic synthesis; protecting groups; carbon-carbon bond formation; functional groups inter-conversions. Alternate years.

CHEM 321 Quantum Chemistry 3.0, 3 cr.
Wave mechanics, solutions of time-independent Schrödinger equation, particle in a box, harmonic oscillator, angular momentum, H-atom, atomic orbitals, variational theorem, perturbation theory, polyatomic atoms, Slater determinants, term symbols, Hückel MO theory, electronic wave functions, SCF and CI calculations. Alternate years.

Course Descriptions

CHEM 301 Structure of Inorganic Compounds 3.0; 3 cr.
Electronic absorption spectra of complex inorganic molecules; vibrational, NMR, NQR, EPR, and Mössbauer spectroscopy; physical methods of determination of the structure of inorganic molecules. Annually.

CHEM 304 Mechanisms of Inorganic Reactions 3.0; 3 cr.
Mechanisms of substitution reactions in octahedral and square planar metal complexes; mechanisms of oxidation-reduction, metal ion catalysis and photochemistry; application of symmetry rules to inorganic reactions; fluxional molecules. Alternate years.

CHEM 311 Advanced Organic Chemistry 3.0; 3 cr.
Electronic interpretation of organic reactions; correlation of inductive, resonance, and steric effects with reactivity of molecules; chemistry of carboxcations, carbanions, carbenes, carbenoids, and radicals as intermediates in characteristic organic reaction mechanisms. Annually.

CHEM 313 Physical Organic Chemistry 3.0; 3 cr.
Organic reactions mechanisms, linear free energy relationships, solvent and reagent correlations, isotope effects, catalysis in weak and strong acid and base medium, organic photochemistry and pericyclic reactions. Alternate years.

CHEM 314 Heterocyclic Chemistry 3.0; 3 cr.
A general survey of the synthesis and reactions of selected classes of heterocyclic compounds; spectroscopic properties and structural relationships. Alternate years.

CHEM 315 Chemistry and Technology of High Polymers 3.0; 3 cr.
An introduction to the chemistry of high polymers; types, mechanisms, and kinetics of polymerization; structure, characterization, and properties of macromolecules; preparation, processing, and uses of the more common condensation and addition polymers used in plastics, elastomers, and fibers. Alternate years.

CHEM 316 Chemistry of Synthetic Polymers for Biomedical Applications 3.0, 3 cr.
An introduction to the chemistry of synthetic polymers and their applications in the biomedical field; nomenclature, preparations, reactions, synthesis, mechanisms, characterization, biocompatibility and biodegradability. A general presentation of biomedical applications of synthetic polymers in bones, joints, teeth, artificial organs, synthetic skin, contact lenses, time-release drug delivery, and gene delivery. Alternate years.

CHEM 317 Synthetic Organic Chemistry 3.0, 3 cr.
A survey of new reagents and synthetic procedures used in advanced organic synthesis; oxidation and reduction reagents in organic synthesis; protecting groups; carbon-carbon bond formation; functional groups inter-conversions. Alternate years.

CHEM 321 Quantum Chemistry 3.0, 3 cr.
Wave mechanics, solutions of time-independent Schrödinger equation, particle in a box, harmonic oscillator, angular momentum, H-atom, atomic orbitals, variational theorem, perturbation theory, polyatomic atoms, Slater determinants, term symbols, Hückel MO theory, electronic wave functions, SCF and CI calculations. Alternate years.
CHEM 322  Statistical Thermodynamics 3.0; 3 cr.
General statistical mechanics of independent particles; partition functions for atoms and molecules, and simple chemical equilibria; heat capacities of solids, configuration of polymers, ensembles, theory of imperfect gases and of mixtures, lattice statistics, irreversible processes. Alternate years.

CHEM 323  Chemical Kinetics 3.0; 3 cr.
Rate analysis, modern experimental techniques, theories of chemical kinetics, selected topics in gas phase and solution kinetics, characterization of transition states by ab-initio methods. Alternate years.

CHEM 324  Electrochemistry 3.0; 3 cr.
Fundamentals and applications of electrochemistry. Overview of electrode processes, potentials and thermodynamics of cells; kinetics of electrode reactions; Marcus microscopic theory for charge transfer; treatment of mass transfer by migration and diffusion; electrochemical techniques including potential step methods, potential sweep methods, and hydrodynamic methods; electrode reactions with coupled homogeneous chemical reactions; instrumentation. Alternate years.

CHEM 325  Molecular Spectroscopy 3.0, 3 cr.
Review of basic quantum mechanics; fundamental features of spectroscopy and experimental methods; atomic spectra; diatomic molecules; rotational spectroscopy; vibrational spectroscopy; electronic spectroscopy; polyatomic molecules; direct product representations and selection rules; re-emission of energy by excited molecules; fluorescence; fluorescence spectra; molecular beams and lasers. Alternate years.

CHEM 331  Chemical Instrumentation for Environmental Analysis 3.0; 3 cr.
Qualitative and quantitative analytical methods; ultraviolet (UV) and infrared (IR) spectroscopy; atomic absorption (AA) and emission spectroscopy; introduction to chromatographic separations. Designed for the Interfaculty Graduate Environmental Sciences Program (IGESP). Annually.

CHEM 332  Chemical Separations in Environmental Analysis 3.0; 3 cr.
Fundamentals of analytical separations; distribution methods in discrete stages; methods in continuous stages; chromatographic methods: GC, HPLC, SFC; non-chromatographic methods: electrophoresis, field-flow fractionation, size exclusion; recent innovations. Designed for the Interfaculty Graduate Environmental Sciences Program (IGESP). Annually.

CHEM 351  Special Topics 3 cr.
May be repeated for credit with consent of the department.

CHEM 361  Tutorial 3 cr.
A tutorial that should be taken during a student’s second or third semester of graduate studies, but not during a summer session. Students taking CHEM 361 are required to submit written reports to their advisers and to present a seminar to the students and faculty of the department. CHEM 361 is required of all graduate students in the department.

CHEM 395A/395B  Comprehensive Exam 0 cr.
Prerequisite: Consent of adviser.

CHEM 399  MS Thesis 9 cr.
Department of Computer Science

Chairperson: Turkiyyah, George M.
Professors: Nasri, Ahmad H.; Turkiyyah, George M.
Associate Professors: Abu Salem, Fatima K.; Attie, Paul C.; Karam, Marcel R.; Safa, Haidar H.
Assistant Professors: Elbassuoni, Shady; El Choubassi, Maha; El-Hajj, Wassim M.; Jaber, Mohamad.
Senior Lecturer: Jureidini, Wadi’ N.
Instructors: Aoude, Loa; Bdeir, Mahmoud; Hamam, Mustafa; Mukaddam, Wassim G.; Ohannessian Hrag; Sidani-Bohsali, Hayat A.
Assistant Instructors: Assaad Dib, Nisrine; Fawzi, Zahraa.; Haddad, Daniel.; Kahil, Rany.; Moutaweh, Marwa

The Department of Computer Science offers a program leading to the degree of Master of Science (MS) in Computer Science. For more information about the department visit its webpage at http://www.cs.aub.edu.lb/

MS in Computer Science

In addition to the university requirements for graduate study in the Faculty of Arts and Sciences, students must complete 21 credits and a thesis (thesis option), or 27 credits and a project (project option), as detailed below. For both options the student must take 9 credits in Theory (CMPS 356), Systems (CMPS 372 or CMPS 374), and Software (CMPS 363). The remaining credits (12 for the thesis option and 18 for the project option) are normally CMPS courses numbered 300 and above to be taken in coordination with the student’s advisor. For more information about the program, visit http://www.cs.aub.edu.lb/

Course Descriptions

CMPS 350 Discrete Models for Differential Equations 3.1; 3 cr.
A detailed study of methods and tools used in deriving discrete algebraic systems of equations for ordinary and partial differential equations: Finite Difference and Finite Element discretization procedures; generation and decomposition of sparse matrices, finite-precision arithmetic, ill-conditioning and pre-conditioning, Scalar, vector and parallelized versions of the algorithms. The course includes tutorial “immersion” sessions in which students become acquainted with state-of-the-art scientific software tools on standard computational platforms. Prerequisites: linear algebra and the equivalent of MATH/CMPS 251 (which can be taken concurrently) or consent of the instructor. Same as MATH 350. Annually.

Part time
CMPS 351 Optimization and Non-Linear Problems 3.0; 3 cr.

CMPS 354 The Finite Element Method 3.0; 3 cr.
A course that presents the theoretical foundations of the finite element method and some of its applications to partial differential equations. Topics include Sobolev spaces, existence and uniqueness of weak solutions and the Lax-Milgram lemma, regularity of weak solutions and a priori estimates, the Galerkin method, piecewise polynomial approximations, approximating solutions of boundary value problems for elliptic equations, and initial value problems for parabolic and hyperbolic equations. Biennially.

CMPS 356 Design and Analysis of Algorithms 3.0; 3 cr.
A course that studies advanced data structures and algorithms, with an emphasis on the design of algorithms. Topics include advanced graph and search algorithms, dynamic programming, amortized analysis, parallelism, greedy and approximate algorithms, string and pattern matching, computational geometry, and an introduction to the class of NP-complete problems. Annually.

CMPS 358 Introduction to Symbolic Computing 3.0; 3 cr.
Introductory topics in computer algebra and algorithmic number theory that include Fast multiplication of polynomials and integers, Fast Fourier transforms, primality testing, and integers factorization. Applications to cryptography and pseudo-random number generation. Linear algebra and polynomial factorization over finite fields. Applications to error-correcting codes. Introduction to Grobner bases. Same as MATH 351. Annually.

CMPS 360 Special Topics in Computational Science 3.0; 3 cr.
A course on selected topics in computational science, which change according to the interests of visiting faculty, instructors, and students. Selected topics cover state-of-the-art tools and applications in computational science. Prerequisite: Consent of instructor. Same as MATH 360. Annually.

CMPS 363 Advanced Software Engineering 3.0; 3 cr.
A course on state of the art software engineering for large distributed and concurrent systems. Fundamental principles and concepts for specifying, designing, analyzing, implementing, and testing such systems. Concurrent object oriented paradigms. Design patterns. Use of tools. Documentation using both formal and informal descriptions. Students will develop at least one large software system as part of the course. Annually.

CMPS 368 Programming Language Design 3.0; 3 cr.
A course that studies unconventional and modern concepts of programming languages. Topics include concepts of exception handling, higher order functions and recursion, concurrent programming, mutual exclusion and synchronization, message passing, monitors, and support for concurrency control. Annually.

CMPS 372 Advanced Operating Systems 3.0; 3 cr.
A course that discusses advanced topics in OS with an exposure to distributed systems. Topics include virtual memory management, synchronization and communication, protection and security, operating system extension techniques, distributed and parallel systems, and modification of an existing operating system. Annually.

CMPS 373 Parallel Computing 3.0; 3 cr.
A course that discusses the design, analysis, and implementation of algorithms for parallel computers. Topics include selection, merging, sorting, searching, matrix computations, numerical problems, and fast Fourier transforms. Students develop skills in designing parallel algorithms and analyzing their asymptotic running time and memory requirements, and develop medium-sized parallel codes using modern languages and libraries. Annually.

CMPS 374 Compiler Construction 3.0; 3 cr.
Same as CMPS 274. Graduate students taking the course are expected to do extra reading, a term paper and/or an additional project. Annually.

CMPS 377 Internals of Database Management Systems 3.0; 3 cr.
Same as CMPS 288. Graduate students taking the course are assigned extra work in the form of outside reading, a term paper and/or an additional project. Prerequisite: CMPS 277 or graduate standing. Annually.

CMPS 384 Advanced Computer Networks 3.0; 3 cr.
This course examines advanced topics in computer networks such as routing on the Internet, IP multicasting, quality of service, Internet telephony, IPv6, MultiProtocol Label Switching (MPLS), network performance, network security, overlay networks, etc. The course covers also the architectures and main components of wireless local area networks (IEEE 802.11), Mobile IP Networks, Mobile Ad hoc Networks (MANETS), and WiMax networks (as defined in IEEE 802.16 standard). Some other topics may be covered through students' research projects, presentations, and assigned reading. The course starts by presenting a quick overview of the major protocols of TCP/IP stack. Annually.

CMPS 385 Advanced Computer Graphics 3.0; 3 cr.
A course that presents the basic concepts of 3D computer graphics. Topics include 3D object representations and manipulations, 3D transformation and viewing, hidden-surface and hidden-line removal, shading models, rendering, texture mapping, ray-tracing, and animation techniques. Annually.

CMPS 386 Computer-Aided Geometric Design 3.0; 3 cr.
Same as CMPS 286. Graduate students taking the course are assigned extra work in the form of outside reading, a term paper and/or an additional project. Annually.

CMPS 388 Computer Animation 3.0; 3 cr.
A course that introduces the basic techniques and algorithms in Computer Animation. Topics include: history and applications of computer animation, modeling, interpolation, key framing, morphing, deformation, forward and inverse kinematics, particle systems, and rigid body dynamics. Annually.

CMPS 393 Building AI Systems 3.0; 3 cr.
Key algorithms for building AI systems; algorithms for searching, backward and forward chaining, production-rule systems, truth maintenance, reasoning with uncertainty, and constraint satisfaction; application areas including diagnosis, temporal reasoning, and planning. Annually.
CMPS 395A/B  Comprehensive Exam  
*Prerequisite: Consent of adviser.*

CMPS 396  Special Topics in Computer Science  
A course in which topics may vary each semester and are expected to be in areas of active research. Students may register for this course twice (or more) on condition that course content differs. *Prerequisite: Consent of instructor. Annually.*

CMPS 397  Computer Science Tutorial  

CMPS 398  MS Project  
3 cr.

CMPS 399  MS Thesis  
9 cr.
Department of Economics

Chairperson: Salti, Nisreen I.
Professor Emeritus: Makdisi, Samir
Professors: Michelis, Leonidas I.; Neaime, Simon E.
Assistant Professors: Dagher Leila N.; Mabsout, Ramzi R; Martin, Darius D.; Montero Kuscevic Casto, Martin G; Ruble, Isabella H.; Sadaka, Richard; Salti, Nisreen I.
Senior Lecturer: Sirhan, Ghazi A.
Lecturers: El-Khalil, Youssef A.; El-Saghir, Sandra W.; Nasser, Yassar A.; Ramadan, Usamah H.
Instructors: Abboud, Montaha; Alam, Jean-Frederic; Boghossian, Myrna G.; Bou Diab, Sarah M.; Daniel, Sara; Elbaba, Nora; El-Khalil, Iyad A.; Jibai, Rania A.; Kanaan, Maya Z.; Khoury, Nicole M.; Majdalani, Joelle; Makki, Malak, Z.; Mecherkany, Rami R.; Nader, Pamela; Srage, Souraya; Tabsh, Ghina; Tabsh, Hala M.; Wehbe, Layal.

The department offers two master’s degree programs: a Master of Arts in Economics and a Master of Arts in Financial Economics.

Candidates for both master’s degrees should hold a BA in economics. For holders of other bachelor’s degrees (or their equivalent), candidates should complete the following undergraduate courses or their equivalent: ECON 214, ECON 217, ECON 227, MATH 201, and MATH 202. Moreover, all applicants must submit an official GRE or GMAT score with the application.

MA in Economics

Students wishing to obtain a master of arts in economics are required to complete at least 24 credits, all of which should be at the graduate level, including ECON 305, ECON 317, and ECON 327, plus a thesis. Of the remaining 15 graduate credits, at least nine credits should be chosen from the available graduate courses in the department, and up to six credits may be chosen from available graduate courses at the university with the adviser’s approval. In case of deficiencies in the student’s undergraduate record, the department may require additional credits. Students are also required to pass the comprehensive exam.

ECON 301 Graduate Tutorial 3.0; 3 cr. (each)
May not be repeated for credit; offered occasionally.

ECON 303 Graduate Seminar 3.0; 3 cr. (each)
Occasionally.

9 Part time
ECON 305 Econometrics I 3.0; 3 cr.
Parameter estimation and hypothesis testing within the framework of the classical linear regression model. Subjects covered include general least squares and its application (e.g. heteroscedasticity, autocorrelation, multivariate regression), GMM estimation, simultaneous equation models and panel data models. Annually.

ECON 306 Econometrics II 3.0; 3 cr.
Non-linear regression, vector autoregression, simulation and varying parameter models. Prerequisite: ECON 305. Students cannot receive credit for both ECON 306 and ECON 343. Occasionally.

ECON 307 Urban Economics 3.0; 3 cr.
A study of the development and growth of urban areas and analysis of specific urban issues such as pollution, housing, land use, and public transportation. Occasionally.

ECON 308 Price Theory I 3.0; 3 cr.

ECON 309 Price Theory II 3.0; 3 cr.
Income distribution concepts, alternative theories of distribution and capital controversy, general equilibrium analysis, and welfare economics. Occasionally.

ECON 326 Public Finance 3.0; 3 cr.
A study of the theories of governmental taxation and spending, budgetary policies and their effects on the level of economic activity, welfare effects of taxation and expenditure policies. Occasionally.

ECON 327 Macroeconomics 3.0; 3 cr.
A study of macroeconomic theory including the classical, Keynesian and Post-Keynesian macroeconomic systems, a static analysis of the structure of income determination models, theories of consumption and investment, dynamic analysis of business cycles and economic growth, theories of inflation and stabilization policies, macrodynamic models. Annually.

ECON 328 Monetary Economics 3.0; 3 cr.
A survey of the evolution of monetary theory; an examination of alternative formulations of the demand and supply functions of money; selected topics in monetary policy; business cycles; portfolio models. Annually.

ECON 332 Political Economy 3.0; 3 cr.
Determinations of the size and form of distributive programs; the extent and type of public goods provision; the burden of taxation across alternative tax bases. Occasionally.

ECON 333 Energy Economics and Policy 3.0; 3 cr.
A study of the theories related to energy economics, such as economics of natural and energy resources, and the interrelationship between energy, economics and the environment, as well as, some important issues in energy policy. Students cannot receive credits for both ECON 333 and MECH 674 Energy Economics and Policy. Occasionally.

ECON 335 International Trade Theory 3.0; 3 cr.
An intensive examination of the theory of comparative advantage: the classical and Heckscher-Ohlin statements, trade and welfare, tariffs, recent contributions to trade theory. Occasionally.

ECON 336 International Monetary Economics 3.0; 3 cr.
An intensive examination of the theories of balance of payments adjustment; the international monetary system and the position of the developing countries in it. Occasionally.

ECON 337 Economic Development 3.0; 3 cr.
An examination of the major economic and non-economic determinants of development in developing countries, theories and models of development. Occasionally.

ECON 338 Economics of Natural Resources and the Environment 3.0; 3 cr.
An analysis of economic issues regarding the efficient use of natural resources and the management of environmental quality. Occasionally.

ECON 399A/399B Comprehensive Exam 0 cr.
Prerequisite: Consent of adviser.

ECON 399 MA Thesis 6 cr.

MA in Financial Economics
This program comprises 30 credits of course work (10 three-credit courses) plus a project. Eight courses are required and two are electives. Candidates for the master’s degree should hold a BA in economics. For holders of other bachelor's degrees (or their equivalent), candidates should complete the following undergraduate courses or their equivalent: ECON 214, ECON 217 and ECON 237, MATH 201 and MATH 202.

All majors in the program are required to take the following eight three-credit courses as well as the comprehensive exam:

ECON 305 Econometrics I 3.0; 3 cr.
Parameter estimation and hypothesis testing within the framework of the classical linear regression model. Subjects covered include general least squares and its application (e.g. heteroscedasticity, autocorrelation, multivariate regression), GMM estimation, simultaneous equation models and panel data models. Annually.

ECON 317 Price Theory I 3.0; 3 cr.

ECON 327 Macroeconomics 3.0; 3 cr.
A study of macroeconomic theory including the classical, Keynesian and Post-Keynesian macroeconomic systems, a static analysis of the structure of income determination models, theories of consumption and investment, dynamic analysis of business cycles and economic growth, theories of inflation and stabilization policies, macrodynamic models. Annually.
ECON 328 Monetary Economics 3.0; 3 cr.
A survey of the evolution of monetary theory; an examination of alternative formulation of the demand and supply functions of money; selected topics in monetary policy; portfolio models. Annually.

ECON 340 Financial Economics I 3.0; 3 cr.
A review of the major theoretical themes underlying modern financial economics; functions of financial markets and institutions, portfolio selection, the Capital Asset Pricing Model, and financial decision making under uncertainty. Annually.

ECON 341 Financial Economics II 3.0; 3 cr.
An analysis of the theoretical and empirical issues concerning corporate capital structure relevance for firms in developed and less developed capital markets, and a review of the informational efficiency of capital markets. Annually.

ECON 342 Options and Derivatives Instruments 3.0; 3 cr.
An analysis of basic derivative contracts such as forwards, futures, options, and swaps; contract characteristics, payoffs from various strategies, as well as hedging arbitrage, and speculation activities using derivatives are analyzed. Annually.

ECON 343 Econometrics of Financial Markets 3.0; 3 cr.
A course that covers topics in applied financial time-series. The econometric methods used include linear time series models, properties of financial data, and discrete time linear financial models. Prerequisite: ECON 305. Students cannot receive credit for both ECON 343 and ECON 306. Annually.

ECON 395A/395B Comprehensive Exam 0cr.
Prerequisite: Consent of adviser.

Electives (two courses: 6 credits)
Two elective courses are chosen from the following list in consultation with the faculty adviser. Other electives may alternatively be chosen from available graduate courses at the university with the adviser’s approval.

ECON 336 International Monetary Economics 3.0; 3 cr.
An intensive examination of the theories of balance of payments adjustment; the international monetary system and the position of the developing countries in it. Occasionally.

ECON 344 Financial Markets and Institutions 3.0; 3 cr.
An analysis of the institutional features of the international financial markets, instruments and application of financial economic theory, and analytical tools to achieve effective and efficient risk management in international environments. Occasionally.

ECON 345 International and Arab Emerging Financial Markets 3.0; 3 cr.
Case studies and exercises of portfolio selection and management in selected Middle Eastern countries. Occasionally.

ECON 346 Advanced Futures and Options 3.0; 3 cr.
An analysis of pricing in continuous-time of contingent claims securities and a broad category of derivative instruments and investment strategies. Prerequisite: ECON 342. Occasionally.

ECON 347 Economic Forecasting 3.0; 3 cr.
A course that provides training in methods of forecasting used in commercial enterprises. This course also introduces the methods of macroeconomic forecasting. Occasionally.

ECON 348 Advanced Monetary Economics 3.0; 3 cr.
An examination of recent monetary economic developments intended to equip students with the technical details and the working of monetary economic models. Prerequisite: ECON 328. Occasionally.

ECON 349 Advanced Microeconomics 3.0; 3 cr.
A course that provides a solid understanding of microeconomic analysis and its application to monetary and financial issues. Occasionally.

ECON 350 Advanced Macroeconomics 3.0; 3 cr.
An introduction to some important current topics in macroeconomics and the technical tools used in their discussion. Occasionally.

ECON 351 Development Finance 3.0; 3 cr.
A course that provides training in the economic underpinnings of the financial issues that affect developing countries. Occasionally.

ECON 352 Advanced Financial Econometrics 3.0; 3 cr.
Inference in linear time series models, properties of high frequency data, inference in discrete time non-linear models and estimation in the context of empirical densities of stock prices, ARCH models for stock prices, and continuous time derivative pricing models. Occasionally.

ECON 353 Bank Management 3.0; 3 cr.
Discusses key issues in commercial banking activities and management. It provides the analytic tools related to commercial bank management (financial and organizational). Occasionally.

ECON 354 Credit Analysis 3.0; 3 cr.
Analyzes the evolution of credit analysis techniques and tools. Even though international trends are discussed, the Lebanese context remains in focus. Occasionally.

ECON 355 Corporate Finance 3.0; 3 cr.
Focuses on large corporate investment decisions and on designing, analyzing, and managing the elements of a comprehensive financial strategy. It provides a sophisticated theoretical and empirical overview of major topics in corporate finance. Occasionally.

ECON 356 Special Topics in Financial Economics May be repeated for credit. Occasionally.

ECON 357 Special Topics in Monetary Economics May be repeated for credit. Occasionally.

ECON 398 Project 0 cr.
Transfers Between the Two Programs

Students wishing to transfer from one program to another can do so after departmental approval and can be given credit for courses already passed that fall within the requirements of the other program.

Transfers between the two programs are permitted subject to the following:

- Students enrolled in the MAE program who wish to transfer to the MAFE program are given credit for ECON 305, ECON 317, ECON 327 and ECON 328 if completed prior to the transfer. The four courses are required under the MAFE program.

- Credit may be given for two other graduate courses completed under the MAE program, which may be considered as elective courses allowed under the MAFE program.

- With the above courses completed, this leaves 18 credits of additional required course work (plus the project) to be completed to graduate with an MAFE. Any incomplete courses among the above-mentioned need to be completed. The remaining elective course(s) are chosen in consultation with the student adviser.

- Students enrolled in the MAFE program who wish to transfer to the MAE program must complete ECON 317, ECON 327 and ECON 305. If completed prior to the transfer, these classes constitute part of the course requirements toward the MAE. With the completion of these three courses, the transferring student needs to complete an additional 15 credits of course work, plus the thesis.
Department of Education

Chairperson: Ghaith, Ghazi M.
Professors: Bashshur, Munir M.; BouJaoude, Saouma B.; Ghaith, Ghazi M.; Jurdak, Murad E.
Associate Professors: Al-Hroub, Anies M.; Khamis, Vivian E.; Vlaardingerbroek, Barend P.
Assistant Professors: Amin, Tamer J.; Baytiyeh, Hoda M.; El-Mouhayar, Rabih R.; Karami-Akkary, Rima R.; Khishfe, Rola F.
Lecturers: ²Abou Moussa, Richard A.; ²Al-Amine, Adnan M.; ²Bachour, Najia A.; BouZeineddine, Amal R.; ²Deeb, Reem A.; ²Ghussayni, Raouf.; ²Hout, Hanin; Shihab, Mahmud M.
Instructors: ²Awada, Ghada.; ²Baassiri, Loulou N.; ²Bendak, Lama.; ²Istfan-Dabbous, ²Jreidini, Najwa., R; Samira.; ²Osman, Enja H.; ²Shaaban, Therese.; ²Shukri Balaa, Rola; ²Zayyat-Saadeh, Myriam

The Department of Education offers programs at both the undergraduate and graduate levels. The undergraduate level program leads to a Bachelor of Arts degree. The post-BA Diploma Program leads to a Teaching Diploma, Diploma in Special Education, or Diploma in Educational Management and Leadership. The graduate program leads to a Master of Arts degree in education.

MA in Education

The MA in education aims to prepare students for further graduate study as well as to improve their professional practice. The program addresses the needs and interests of beginning and experienced teachers, and other interested persons whose objective is to advance their knowledge of educational practice in schools. The MA program also prepares students for admission to doctoral study in a variety of related fields such as educational psychology, research methodology, administrative and policy studies, and instruction and learning of subject matter in a variety of content areas.

The MA program comprises the following areas of concentration:

- Educational Foundations and Policy Studies (not offered at present);
- Educational Psychology (Tests and Measurement or School Guidance);
- Educational Administration and Policy Studies;
- Elementary Education;
- Mathematics Education;
- Science Education;
- Teaching of English as a Foreign Language (TEFL).

Prerequisites

Students may pursue their studies toward the MA in education in any one of the areas of

⁹ Part time
requirement above provided they meet the department and university requirements for admission to graduate work. The department prerequisites include a teaching diploma or an equivalent professional certification (for Educational Administration and Policy Studies a minimum of one year of relevant professional experience is required). However and at the discretion of the department, students may be exempt from all or part of the teaching diploma requirements based on professional experience and/or previously completed graduate coursework. In case of deficiencies in undergraduate preparation a student may be required to complete other prerequisite courses, such as courses in subject matter, before full admission to the program. For university admission requirements for all graduate students please see the Admissions section in this catalogue.

Requirements
The program includes a minimum of 21 credits and a thesis. A non-thesis option, which includes a minimum of 33 credits, plus a project, is also available. All MA candidates are required to complete the following courses as a core program: EDUC 315, EDUC 321, and one of the following education courses: EDUC 301, EDUC 302, EDUC 303, EDUC 314, EDUC 316, EDUC 326, or EDUC 332. The balance of the program comprises primarily specialized courses related to the student’s chosen area of concentration.

Course Descriptions
EDUC 301 Seminar in the History and Philosophy of Education 3.0; 3 cr.
A course on the development of educational thought and practice through primary sources. Systems of educational theory are examined from the age of Pericles to post-World War II, with special emphasis on contemporary educational practice. Annually.

EDUC 302 Seminar in the History and Philosophy of Arab Education 3.0; 3 cr.
A study of the development of Arab educational thought and practice through primary sources. Selected problems and representative thinkers from various periods are examined, beginning with Islam and ending in the early twentieth century. Alternate years.

EDUC 303 Determinants of Educational Policy 3.0; 3 cr.
An examination of forces underlying policy making in education based on theoretical and case study approach; developing scenarios for improvements. Annually.

EDUC 305 Foundations of Science Education 3.0; 3 cr.
A study of the nature of science and its philosophical and sociological foundations with emphasis on educational implications; psychological bases of concept-learning in science and the contributions of research to science education. Alternate years.

EDUC 306 Recent Developments in Science Education 3.0; 3 cr.
A study of recent developments in science curricula, methods of teaching, utilization of facilities, evaluation, and teacher education and supervision. Alternate years.

EDUC 307 Seminar: Problems and Innovations in Elementary Education 3.0; 3 cr.
A review and analysis of contemporary problems, innovations and trends in elementary education, organizational structures, teaching competencies, classroom logistics, student discipline, and instructional improvement strategies. Alternate years.

EDUC 308 Educational Planning and Policy Studies 3.0; 3 cr.
Planning models at the micro level and applications in various countries; policy formulation, change, and implementation issues as they relate to educational institutions and public and private educational systems. Annually.

EDUC 309 Foundations of Mathematics Education 3.0; 3 cr.
A study of the nature of mathematics and its philosophical, historical, and sociological foundations, with emphasis on educational implications; psychological bases of concept learning in mathematics and the contributions of research mathematics teaching. Alternate years.

EDUC 310 Recent Developments in Mathematics Education 3.0; 3 cr.
A study of recent developments in mathematics curricula, methods of teaching, utilization of instructional media, evaluation techniques, and teacher education and supervision. This course includes tryouts of some of these innovations in actual school situations. Alternate years.

EDUC 311 Seminar in Supervision of Instruction 3.0; 3 cr.
A seminar on the role of the supervisor as s/he works with teachers to improve instruction and an examination of theoretical and practical aspects with special attention given to research in the field. Annually.

EDUC 313 Management and Organization Theories in Education 3.0; 3 cr.
An advanced theoretical study focusing on concepts of leadership, decision making, group dynamics, and organizational behavior and change, with particular emphasis on research in the field. Annually.

EDUC 314 Comparative Education 3.0; 3 cr.
A study of theory and methods of comparative education, with an examination of schooling in a number of leading Western educational systems. This study concerns itself with historical, social, political, and economic forces influencing and underlying these systems. Alternate years.

EDUC 315 Psychology of Education (Advanced) 3.0; 3 cr.
A comprehensive analysis of instructional theory, measurement skills, cognitive development, learning theory, and methods of applying behavior modification in the classroom. Prerequisite: EDUC 215 or equivalent. Annually.

EDUC 316 Comparative Study of Education in Arab Countries 3.0; 3 cr.
A study of Arab educational systems, with a focus on their major problems in light of changing situations. Annually.

EDUC 317 Theory and Methods of Testing 3.0; 3 cr.
A study of theory and practice of test construction and use. The goal of this course is to build a broad background of information and skill for the proper evaluation of psychological tests and the correct interpretation and use of test results. A wide variety of tests are examined, with emphasis on major tests of intelligence and aptitude, achievement, and personality. Alternate years.

EDUC 318 Test Construction in Education 3.0; 3 cr.
Development of testing techniques and skills for appraisal of the cognitive and affective objectives of instruction. Alternate years.
EDUC 321  General Research Methodology in Education  3.0; 3 cr.
A course that aims at the development of a scientific orientation in the solution of educational problems. This course develops students' skills in identifying and developing research problems dealing with a variety of research designs. Basic statistical concepts are included. Prerequisite: EDUC 227 or equivalent. Annually.

EDUC 322  Applied Behavior Analysis  3.0; 3 cr.
An analysis of respondent, instrumental, and social learning theory as well as the application of experimentally derived principles of learning to problems of educational and social significance. Annually.

EDUC 324  Principles and Practices of Teaching  3.0; 3 cr.
Reading and Literature
Models of the reading process, research and pedagogical implications, and issues of comprehension and appreciation of literature. Annually.

EDUC 325  Principles and Practices of Teaching  3.0; 3 cr.
Writing and Composition
A consideration of various current approaches to teaching writing and the relationship of language, logic, rhetoric, and culture. Annually.

EDUC 326  Theory and Design of Curriculum  3.0; 3 cr.
An examination of the organization, scope, and sequence of curricula with special emphasis on various approaches to curriculum development. Annually.

EDUC 328  Seminar in TEFL  3.0; 3 cr.
A seminar on selected topics in linguistics, psychology, or instructional aids and technology and the application to classroom problems of teaching and evaluation. Annually.

EDUC 329  Seminar in Education and Social Change  3.0; 3 cr.
A seminar on the different theories of social change, followed by an examination of the school system and the teacher as an agent of social change. Annually.

EDUC 330  Theories in Guidance and Counseling  3.0; 3 cr.
A survey of various theories and approaches to the study and practice of guidance and counseling. Annually.

EDUC 331  Field Experience in Guidance and Counseling  1.4; 3 cr.
Supervised experience in counseling in the school setting; observing, interviewing, and testing as needed for educational and vocational objectives to meet pupil needs. Prerequisite: EDUC 330 or EDUC 322. Annually.

EDUC 332  Seminar in Educational Planning for Social and Economic Development  3.0; 3 cr.
Theory and practice of educational planning for social and economic development; techniques of assessing manpower needs and translating these into educational strategies and plans. Alternate years.

EDUC 333  Professional Development in Education  2.2; 3 cr.
Survey of major models of professional development used primarily in schools and other educational settings. Students gain experience designing, conducting, and evaluating professional development for education practitioners. Includes a field-based experience and should be taken late in the program. Alternate years.
Department of English

Chairperson: Wrisley, David J.
Professors: Myers, Robert E.; Shaaban, Kassim A.
Associate Professors: Choueiri, Lina G.; Harb, Sirene H.; Hout, Syrine C.; Khalaf, Roseanne S.; Nassar, Christopher S.; Wrisley, David J.; Zenger, Amy A.
Assistant Professors: Arnold, Lisa R.; Currell, David; Dennison, Michael J.; Gonsalves, Joshua D.; Hartwiger, Alexander; Khoury, Nicole; Schwartz, John Pedro; Vermy, Michael; Waterman, Adam J.
Visiting Assistant Professors: Mehmood Ali, Tariq; Sabbagh, Omar

The Department of English offers one writing course, ENGL 300, to all graduate students in the University who did not meet the ELPR.

ENGL 300 Writing in the Disciplines 3.0; 0 cr.
A course that prepares students for graduate-level academic writing, and covers such topics as academic writing in different disciplines, the writing process, argumentation, and working with sources. Prerequisite: 500-549 on the EEE or 573-599 on the TOEFL (230-249 on the CBT or 88-96 on the iBT). Each semester.

The Department of English offers two graduate degree programs: the MA in English literature and the MA in English language.

MA in English

General requirements for graduate study are found in the Admissions section of this catalogue.

The requirements for an MA degree in English consist of 21 credit hours in courses numbered 300 or above, successful completion of a comprehensive examination, and a thesis along with any additional prerequisite courses determined by the department to make up for deficiencies in undergraduate preparation.

Students working for an MA degree in English language must take ENGL 301, 327, 341 or 342, and 345. Education 227 (Statistics in Education), or any other introductory statistics course, must be taken as a non-credit prerequisite for a passing grade. In addition, language graduates must take one of the following three graduate courses in the Department of Education: 324, 325, and 328. Two additional elective English language graduate courses from among those offered in the department must be taken.

Students working for the degree of MA in the Teaching of English as a Foreign Language (TEFL) should refer to the Department of Education catalogue section.

Students working for an MA degree in English Literature must complete English 301 and four other graduate courses in English Literature chosen from among those offered in the department. The two remaining courses may be taken outside the English Literature program and are subject to departmental approval.

ENGL 301 Introduction to Bibliography and Research Methods 3.0; 3 cr.
An introduction to bibliography and research methodologies in the study of language or in literary studies. Annually.

ENGL 302 British Literature Before 1800 3.0; 3 cr.
A course whose topic varies from semester to semester. The topic is always chosen from material written before 1800. Annually.

ENGL 303 British Literature After 1800 3.0; 3 cr.
A course whose topic varies from semester to semester, depending on the interests of the professor and the needs of the students. The topic is always chosen from material written after 1800. Annually.

ENGL 304 American Literature 3.0; 3 cr.
A course whose topic varies from semester to semester but always focuses on some aspect of American literature. Annually.

ENGL 305 Graduate Tutorial in Literature 3.0; 3 cr.
A course offered to students on an individual basis. The topic can include any aspect of British or American literature. Annually.

ENGL 306 Selected Topics in Literature 3.0; 3 cr.
A course that addresses aspects of British or American literature or literary theory that are not typically addressed in other courses offered by the department. Topics may vary from semester to semester. Annually.

ENGL 325 World Literature 3.0; 3 cr.
A course whose topic varies from semester to semester. It deals with aspects of non-English and non-American literature written in English. Annually.

ENGL 326 Advanced Translation Theory and Practice 3.0; 3 cr.
A close examination of major translation theories, both traditional and linguistic, and an application of these theories to the practice of translation, both literary and technical, in Arabic and in English. Annually.

ENGL 327 Sociolinguistics 3.0; 3 cr.
A course intended to provide an in-depth analysis of the issues related to the study of the interaction between language and society. This course covers such topics as geographical and social dialects, multilingualism, language and gender, ethnography of speaking, discourse analysis, language planning, and language attitudes. Annually.

ENGL 329 Grammatical Studies in Old and Middle English Literature 3.0; 3 cr.
A close reading and grammatical examination of selected texts in the original. Exact content to be determined by the instructor. Annually.

ENGL 341 Phonology 3.0; 3 cr.
A survey of theories of phonological description including phonemics, distinctive features, and generative phonology; an application of these theories to actual linguistic data from various languages with concentration by each student on one specific problem. Annually.
ENGL 342  Theoretical Linguistics  3.0; 3 cr.
A study of readings in advanced grammar that have contributed to the formulation of theories of language description; e.g. transformational grammar, stratificational grammar, generative semantics, pragmatics, government, and binding. Annually.

ENGL 344  Graduate Tutorial in Linguistics  3.0; 3 cr.
A tutorial offered to students on an individual basis. The topics can include any aspect of the study of linguistics that both instructor and student agree on. Annually.

ENGL 345  Language Acquisition  3.0; 3 cr.
A survey of studies in first and second language acquisition. Emphasis is placed on stages of acquisition and the strategies used by children in acquiring their native language. Comparisons between first and second language acquisition are drawn with implication for language teaching. Annually.

ENGL 346  Issues in Applied Linguistics  3.0; 3 cr.
A course whose topic varies from semester to semester. The course deals with major topics and issues in language study such as multilingualism and multiculturalism, assessment and evaluation, language and education, and intercultural communication. Annually.

ENGL 395A/B  Comprehensive Exam  0 cr.
Prerequisite: Consent of adviser.

ENGL 399  MA Thesis  9 cr.
Department of Geology

Chairperson: Abdel-Rahman, Abdel-Fattah M.
Professor: Abdel-Rahman, Abdel-Fattah M.
Assistant Professors: Doummar, Joanna J.; Elias, Ata R.; Haidar, Ali T.
Assistant Instructor: pAbdel Massih, Abdo

MS in Geology

Candidates pursuing the Master of Science program in geology must complete seven graduate courses (21 cr.) and a thesis (9 cr.). Students may select courses from the graduate courses offered in the department according to their fields of interest.

Course Descriptions

GEOL 303  Geochemistry 3.0; 3 cr.
An application of chemical concepts to the evolution of the earth, particularly its weathering, magmatic and metamorphic cycles, and the distribution of elements; cosmochemistry, crystal chemistry, and aqueous geo-chemistry. Prerequisite: GEOL 211.

GEOL 304  Geophysics I 3.0; 3 cr.
An introduction to seismic, gravity, and magnetic methods and their interpretation procedures and applications in the exploration for petroleum and other resources.

GEOL 305  Geophysics II 3.0; 3 cr.
A course on electrical, radiometric, and thermal geophysical methods, as well as well logging for general geophysical applications and their methods of interpretation. Pre- or corequisites: GEOL 221 and GEOL 222.

GEOL 306  Economic Minerals Geology 3.0; 3 cr.
A course on the occurrence and classification of mineral ore deposits and theories of their formation; ore forming processes and ore deposit models; advanced techniques to evaluate ore genesis; and mineral exploration techniques. Prerequisite: GEOL 211.

GEOL 307  Advanced Petroleum Geology 3.0; 3 cr.
A course that covers the origin, migration, and accumulation of petroleum; surface and subsurface geological and geophysical exploration methods and production, and development processes; and Middle East hydrocarbon exploration and development.

GEOL 308  Alternate Energy Sources 3.0; 3 cr.
A course on energy and energy use, including a detailed treatment of non-fossil fuel energy options including nuclear, biomass, hydro, wind, solar, and geothermal methods, with practical applications.

* Part time
**GEOL 310**  Global Tectonics  
A course on large-scale processes of rock deformation within the Earth, the theory of plate tectonics, and the origins and modes of deformation of major tectonic features. These include ocean ridges and continental rifts, transform and transcurrent faults, subduction zones, and mountain ranges. **Prerequisite: GEOL 213.**

**GEOL 313**  Photogeology  
A course on the principles of air photo interpretation and remote sensing; the construction of planimetric geological maps, profiles and mosaics from vertical photographs using pocket and mirror stereoscopes; and an introduction to analysis of satellite imagery.

**GEOL 317**  Micropaleontology  
An introduction to the study of the main groups of microfossils and their application, with emphasis on the foraminifera, and techniques in their preparation for examination.

**GEOL 318**  Hydrogeology  
A course on the fundamentals of hydrogeology; groundwater occurrence, movement, development and management; pumping tests; and groundwater chemistry, quality, and contamination.

**GEOL 319**  Geostatistics  
This course deals with the study and application of different statistical techniques of interest to the geological sciences. Topics to be covered include analysis of sequences of data, map analysis, and analysis of multivariate data. **Prerequisite: GEOL 213 or consent of instructor.**

**GEOL 320**  Graduate Seminar  
Seminars given by the department. Graduate students attending the course are required to cover a particular theme on one of the various aspects of the geology of the Middle East, such as earthquakes, tectonism, and stratigraphy of the region, magmatism in the Nubian shield.

**GEOL 321**  Diagenesis I: Advanced Petrography of Sedimentary Rocks  
A course that covers some advanced petrographic techniques used in the study of sedimentary rocks (e.g., conventional and cathodoluminescence microscopy, scanning electron microscopy), major diagenetic processes, and the resultant products in sedimentary environments. **Prerequisites: GEOL 212, GEOL 214, and GEOL 222, or consent of instructor. Bi-annually.**

**GEOL 322**  Diagenesis II: Advanced Techniques in Geochemistry of Sedimentary Rocks  
A course on the various geochemical methods (e.g., trace elements, stable isotopes, radiogenic isotopes, fluid inclusions, and microthermometry) commonly used in the study of diagenesis of both carbonate and clastic reservoirs. **Prerequisites: GEOL 212 and GEOL 222; corequisites: GEOL 214 and GEOL 222 or consent of instructor. Bi-annually.**

**GEOL 323**  Geological Oceanography  
A general introduction to climatic and oceanographic interactions, characteristics of oceans, and a detailed analysis of near shore and coastal environments.

**GEOL 324**  Engineering Geology I  
A course on engineering geology and earth materials that focuses on the interaction between engineering and geology in relation to the geotechnical properties of soil and rock mechanics and site investigations.
Department of History and Archaeology

Chairperson: Sader, Helen S.
Professors: Abu Husayn, Abdul Rahim A; El-Cheikh, Nadia M.; Meloy, John L.; Sader, Helen S.; Seeden, Helga R.; Seikaly, Samir M.
Associate Professor: Du Quenoy, Paul G.; Genz, Hermann P.
Assistant Professors: Newson, Paul G.; Wick, Alexis N.
Visiting Professors: Deringil, Selim (Alfred H. Howell Chair); O’Dell, Emily (Whittlesey Chair)
Lecturers: ‘Kaidbey, Naila A.; Sharif, Malek A.
Instructors: ‘Naoufal, Antoine P.; ‘Nurpetlian, Jack A.

The department offers programs leading to the BA, MA, and PhD in Arab and Middle Eastern History. The department also offers programs leading to the BA and MA in Archaeology. For admission and graduation requirements refer to the faculty and department web pages. In addition, all MA and PhD program applicants must submit an official GRE score with the application.

MA in History

Mission Statement

By means of a broad and diversified curriculum, our graduate program introduces students to the richness and complexity of Arab and Middle Eastern history. That program is intended to develop not only essential knowledge of the past, but also awareness of the methodological and theoretical complexities involved in the study of history as a discipline in the humanities. Students are motivated to be reflexive, to read, research and write critically, analytically, and without prejudice or preconceptions.

Curriculum

Students registered in the master’s program in history are required to take a minimum of 21 graduate credit hours and to present a thesis based on independent research work.

HIST 303/304 Graduate Seminar  3.0; 3 cr. (each)
A collaborative investigation of select topics in Arab and Middle Eastern history viewed from multiple perspectives. Periodic progress reports and the incorporation of findings in an interpretive term paper are required. Students can receive credit for both 303 and 304.

HIST 305/306 Graduate Seminar in European History  3.0; 3 cr. (each)
An in-depth analysis of a selected topic entailing intensive research and the submission of a final analytical term paper. Students can receive credit for both 305 and 306.

Doctor of Philosophy in Arab and Middle Eastern History

Mission Statement

The doctoral program in Arab and Middle Eastern History aims to create top-rank professional historians. Students in this program will acquire critical, interpretive and research skills which will enable them to achieve excellence in their chosen field of specialization.

Learning Outcomes

Upon receiving their degree, graduates of the program will be equipped with the methodological, language and research skills that will qualify them to serve as academicians or professional researchers in local, regional and international universities or in other advanced centers of higher learning in their fields of specialization or in related cultural and inter-disciplinary studies. Their training will enable them to become eligible for administrative, journalistic, diplomatic and non governmental posts as well.

HIST 321/322 The Arab Historians, I and II  3.0; 3 cr. (each)
A systematic analysis of a select Arab historian in the context of his time, employing primary sources and recent secondary literature on the subject. Students can receive credit for both 321 and 322.

HIST 323/324 Advanced Documentation and Research, I and II  3.0; 3 cr. (each)
An applied training course in the identification, critical evaluation, and utilization of primary and secondary sources, the techniques for their retrieval and modes of incorporation into a historical account. Students can receive credit for either 323 or 324.

HIST 325/326 Social and Intellectual History of the Arabs, I and II  3.0; 3 cr. (each)
A systematic study of social and intellectual trends in Arab history. Primary sources and recent theories and interpretations are emphasized. Students can receive credit for both 325 and 326.

HIST 327/328 Social and Economic History of the Middle East, I and II  3.0; 3 cr. (each)
A detailed analysis of socio-economic transformations in the modern Middle East based on primary sources, considered in view of recent theories of development and modernization. Students can receive credit for both 327 and 328.

HIST 330 Advanced Historical Interpretation  3.0; 3 cr.
A systematic examination of select modern interpretations of history and their impact upon historical methodology and historiography.

HIST 331 Tutorial Topics in Arab and Modern Middle Eastern History  3.0; 3 cr. (each)
A directed individual examination of a selected topic entailing an intensive reading program, research, and the submission of a model term paper. May not be repeated for credit.

HIST 395A/395B Comprehensive Exam 0 cr.
Prerequisite: Consent of adviser.

HIST 399 MA Thesis 9 cr.
Admission Requirements

Admission to the doctoral program is competitive and selective, and is dependent upon the recommendation of the Department of History and Archaeology and the approval of the University Board of Graduate Studies. Applicants normally hold an MA and have demonstrated outstanding academic ability (minimum average grade of 80 or its equivalent) and the potential to conduct scholarly research. In certain cases, BA holders whose academic performance is superior (minimum average grade of 85 or its equivalent) will be considered for admission to the program. Depending on their point of entry, the completion of the program will extend between 3 to 5 years.

Financial Assistance

The University will cover the cost of tuition and will provide stipends to PhD candidates in the form of Graduate Assistantship support on a merit or need basis. In addition to a housing subsidy, it will also assist in covering the cost of language education and research should this be sought outside the AUB campus. Student participation in scholarly conferences, which lead to publications, is encouraged and will be supported financially.

Study and Course Requirements

Eighteen credits of graduate level courses are required for MA holders. Thirty-six credits of graduate level courses are required for BA holders admitted directly to the program. The department may require students to take additional graduate or undergraduate courses if necessary. The language of instruction is English. Arabic, however, may be substituted for English depending on the area of specialization. Additionally, all students are required to attain working knowledge of either French or German and any other language required by their field of specialization. All students must submit a thesis.

Admission to Candidacy

See section entitled Admission to Candidacy on page 64.

Curriculum

The history graduate curriculum is subject to periodic departmental review. Overall it is a flexible and individually-driven program, designed to build up a critical mass of knowledge based on the historical literature relating to the area of specialization. The curriculum adopts a problem-solving approach to historical research and writing, with a view to enabling graduates to think critically, to work independently and to take conscious ownership of their learning activity and align it with their own educational, academic and career aspirations. Following is a list of existing graduate courses on offer by the department:

HIST 303/304 Graduate Seminar in Arab and Middle Eastern History 3.0; 3 cr. (each)
A collaborative investigation of select topics in Arab and Middle Eastern History viewed from multiple perspectives. Periodic progress reports and the incorporation of findings in an interpretive term paper are required. Students can receive credit for both 303 and 304.

HIST 305/306 Graduate Seminar in European History 3.0; 3 cr. (each)
In-depth analysis of selected topics entailing extensive research and the submission of a final analytical term paper. Students can receive credit for both 305 and 306.

HIST 321/322 The Arab Historians, I and II 3.0; 3 cr. (each)
A systematic analysis of a select Arab historian in the context of his time, employing primary sources and recent secondary literature on the subject. Students can receive credit for both 321 and 322.

HIST 323/324 Advanced Documentation and Research, I and II 3.0; 3 cr. (each)
An applied training course in the identification, critical evaluation, and utilization of primary and secondary sources, the techniques for their retrieval and modes of incorporation into a historical account. Students can receive credit for either 323 or 324.

HIST 325/326 Social and Intellectual History of the Arabs I and II 3.0; 3 cr. (each)
A systematic study of social and intellectual trends in Arab history. Primary sources and recent theories and interpretations are emphasized. Students can receive credit for both 325 and 326.

HIST 327/328 Social and Economic History of the Modern Middle East, I and II 3.0; 3 cr. (each)
A detailed analysis of socio-economic transformations in the modern Middle East based upon primary sources, considered in view of recent theories of development, modernization and globalization. Students can receive credit for both 327 and 328.

HIST 330 Advanced Historical Interpretation 3.0; 3 cr.
A systematic examination of key modern interpretations of history and their impact upon historical methodology and historiography.

HIST 331 Tutorial Topics in Arab and Middle Eastern History 3.0; 3 cr. (each)
A directed individual examination of a selected topic entailing an intensive reading program, research, and the submission of a model term paper. Students can receive credit for both 331 and 334.

HIST 480 Qualifying Exam Part I: Comprehensive Exam 0 cr.
Every Semester

HIST 481 Qualifying Exam Part II: Defense of Thesis Proposal 0 cr.
Every Semester

HIST 482* PhD Thesis 24 cr.
Every semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

HIST 483* PhD Thesis 27 cr.
Every semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

HIST 484* PhD Thesis 30 cr.
Every semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

*The choice to register for HIST 482, 483, or 484 should be done in consultation with thesis advisor to ensure that total number of PhD thesis credits and PhD course credits are met as per AUB rules and regulations.
MA in Archaeology

Mission Statement

The graduate program in Archaeology provides students with advanced working knowledge and critical understanding of the methodological and theoretical principles of archaeological investigation and fieldwork. In addition to developing essential knowledge about the material and cultural roots of past societies, the program enhances student awareness about the value and relevance of Lebanon’s and the region’s archaeological heritage.

Students registered in the master’s program in archaeology are required to take a minimum of 21 graduate credit hours and to present a thesis based on independent research work.

AROL 301/302  Graduate Seminar in Current Approaches to  Archaeology  3.0; 3 cr. (each)
A seminar on current key theories and debates in archaeology, such as center/periphery, economics and world systems analysis, power and hierarchy, cognitive archaeology, critiques of ideology or the politics of interpretation and presentation of the past, native peoples, and gender issues. May be repeated for credit. Students can receive credit for both 301 and 302.

AROL 303/304  Readings in Ancient Texts  3.0; 3 cr. (each)
An introduction to ancient Semitic epigraphy in general, and to one of the ancient East or West Semitic languages in particular. Alternately, Akkadian, Phoenician, or Aramaic texts are studied. Students can receive credit for both 303 and 304.

AROL 305/306  Artifact Technology and Representation  3.0; 3 cr. (each)
A technical analysis and representation of archaeological artifacts, including composition, production technique, description, and drawing for publication of ceramic, metal, stone, and bone artifacts. Students can receive credit for both 305 and 306.

AROL 321  Graduate Tutorial in Near Eastern Archaeology  3.0; 3 cr. (each)
A study of particular sites and materials to train students in archaeological research and analysis. May not be repeated for credit.

AROL 323/324  Advanced Fieldwork and Data Collection  3.0; 3 cr. (each)
A course of advanced training in archaeological surveys, excavations, artifact recording or ethnographic data collection related to archaeological fieldwork. Students can receive credit for both 323 and 324.

AROL 325/326  Advanced Archaeological Research  3.0; 3 cr. (each)
An analytical investigation of published and unpublished material, as in post-excavation analysis of archaeological data and information, for the purpose of presenting archaeological results to the scientific and general public. Students can receive credit for both 325 and 326.

AROL 395A/395B  Comprehensive Exam 0 cr.
Prerequisite: Consent of adviser.

AROL 399  MA Thesis 9 cr.
Department of Mathematics

Chairperson: Abu-Khuzam, Hazar M.
Professors Emeriti: Muwafi, Amin; Yff, Peter
Assistant Professors: Alhakim, Abbas M.; Azar, Monique E.; Bright, Martin P.; Egeileh, Michel Y.; El Khoury, Sabine S.; Kuffner, Todd G.; Raji, Wissam V.; Tlas, Tamer M.
Lecturers: Fayyad, Dolly J.; Kobeissi, Mohammad A.; Makhoul, Ola S.; Yamani, Hossam A.

The Department of Mathematics offers programs leading to the degree of Master of Science (MS) and Master of Arts (MA) in Mathematics and Statistics.

MA or MS in Mathematics

Students must complete the university requirements for graduate study in the Faculty of Arts and Sciences, and at least 24 credits at the graduate level and a thesis. These 24 credits must include MATH 303, MATH 304, MATH 314, and MATH 341.

MA or MS in Statistics

Students must complete the university requirements for graduate study in the Faculty of Arts and Sciences, and at least 24 credits at the graduate level and a thesis. At least 18 of the 24 credits must be taken in the department, and must include MATH 303, STAT 331, STAT 332, STAT 333, and STAT 334. Students interested in taking courses outside the department may do so after obtaining approval from the department. The graduate program in statistics is currently frozen. It is expected to be available in the near future.

Part time
Course Descriptions

Mathematics

MATH 301 Graduate Tutorial Courses 1–3 cr.
Prerequisite: graduate standing or consent of instructor.

MATH 303 Measure and Integration 3.0; 3 cr.
Prerequisite: MATH 242. Offered Occasionally.
A first course in measure theory, including general properties of measures, construction of Lebesgue measure in R^n, Lebesgue integration and convergence theorems, Lp-spaces, Hardy-Littlewood maximal function, Fubini's theorem, and convolutions. Prerequisite: MATH 223 or graduate standing. Annually.

MATH 304 Complex Analysis 3.0; 3 cr.
Prerequisite: MATH 241 or graduate standing. Annually.
A second course in complex analysis, covering the homotopy version of Cauchy's theorem, the open mapping theorem, maximum principle, Schwarz's lemma, harmonic functions, normal families, Riemann mapping theorem, Riemannian metrics, method of negative curvature, Picard's theorem, analytic continuation, monodromy, and modular function. Prerequisite: MATH 227 or graduate standing. Annually.

MATH 305 Functional Analysis 3.0; 3 cr.
Prerequisite: MATH 227 or graduate standing. Annually.
A first course in measure theory, including general properties of measures, construction of Lebesgue measure in R^n, Lebesgue integration and convergence theorems, Lp-spaces, Hardy-Littlewood maximal function, Fubini's theorem, and convolutions. Prerequisite: MATH 223 or graduate standing. Annually.

MATH 306 Calculus on Manifolds 3.0; 3 cr.
Prerequisite: MATH 223 or graduate standing. Offered Occasionally.

MATH 307 Topics in Analysis 3.0; 3 cr.

MATH 314 Algebraic Topology I 3.0; 3 cr.
Prerequisites: MATH 214 and MATH 241 or graduate standing. Annually.
Closed surfaces, categories and functors, homotopy, the fundamental group functor, and covering spaces. Prerequisites: MATH 214 and MATH 241 or graduate standing. Annually.

MATH 315 Algebraic Topology II 3.0; 3 cr.
Prerequisites: MATH 214 and MATH 241 or graduate standing. Annually.
Singualar homology with applications to Euclidean spaces and an introduction to cohomology theory. Prerequisite: MATH 314. Offered Occasionally.

MATH 316 Topics in Topology 3.0; 3 cr.

MATH 341 Modules and Rings 3.0; 3 cr.
Prerequisite: MATH 241 or graduate standing. Annually.
Fundamental concepts of modules and rings, projective and injective modules, modules over a PID, Artinian and Noetherian modules and rings, semi-simplicity, and tensor products. Prerequisite: MATH 241 or graduate standing. Annually.

MATH 342 Modules and Rings II 3.0; 3 cr.
Prerequisite: MATH 242. Offered Occasionally.
A course covering more advanced topics in modules and rings. Prerequisite: MATH 341. Annually.

MATH 343 Field Theory 3.0; 3 cr.
Prerequisite: MATH 242. Offered Occasionally.

MATH 344 Commutative Algebra 3.0; 3 cr.
Prerequisites: MATH 242 and MATH 341. Offered Occasionally.

MATH 345 Topics in Algebra 3.0; 3 cr.
Offered Occasionally.

MATH 350 Discrete Models for Differential Equations 3.1; 3 cr.
A detailed study of methods and tools used in deriving discrete algebraic systems of equations for ordinary and partial differential equations: finite difference and finite element discretization procedures; generation and decomposition of sparse matrices, finite-precision arithmetic, ill-conditioning and pre-conditioning, scalar, vector, and parallelized versions of the algorithms. The course includes tutorial immersion sessions in which students become acquainted with state-of-the-art scientific software tools on standard computational platforms. Prerequisites: Linear algebra and the equivalent of MATH/CMPS 251 (which can be taken concurrently) or consent of instructor. Same as CMPS 350. Annually.

MATH 351 Optimization and Non-Linear Problems 3.1; 3 cr.
A study of practical methods for formulating and solving numerical optimization problems that arise in science, engineering, and business applications. Newton's method for nonlinear equations and unconstrained optimization. Sequential Quadratic Programming. Emphasis is on algorithmic description and analysis. The course includes an implementation component where students develop software and use state-of-the-art numerical libraries. Prerequisite: Graduate standing. Same as CMPS 351. Annually.

MATH 352 Introduction to Symbolic Computing 3.0; 3 cr.
Introductory topics in computer algebra and algorithmic number theory that includes fast multiplication of polynomials and integers, fast Fourier transforms, primality testing and integers factorization. Applications to cryptography and pseudo-random number generation. Linear algebra and polynomial factorization over finite fields. Applications to error-correcting codes. Introduction to Grobner bases. Prerequisite: Good background in programming, linear algebra, discrete mathematics or consent of instructor. Same as CMPS 352. Annually.

MATH 360 Special Topics in Computational Science 3.0; 3 cr.
A course on selected topics in computational science that changes according to the interests of visiting faculty, instructors, and students. Selected topics cover state-of-the-art tools and applications in computational science. Prerequisite: Consent of instructor. Same as CMPS 360. Annually.

MATH 399 MA or MS Thesis 6 cr.
Prerequisite: Consent of adviser.

Statistics

The graduate program in statistics is currently frozen. It is expected to be available in the near future.

STAT 331 Advanced Probability Theory 3.0; 3 cr.
Characteristic functions, types of convergence, limiting properties of distribution and characteristic functions, limit theorems, and multivariate functions. Prerequisites: MATH 227, STAT 238, and MATH 303. Annually.
STAT 332  Advanced Mathematical Statistics  3.0; 3 cr.
Distribution theory, decision theory, and advanced topics in estimation and inference.
Prerequisites: STAT 235 and STAT 238. Annually.

STAT 333  Multivariate Analysis  3.0; 3 cr.
Multivariate distributions, correlation coefficients, classification and discrimination,
Hotelling's T2, tests of hypotheses for multivariate distributions, and canonical variables.
Prerequisite: STAT 238. Annually.

STAT 334  Advanced Topics in Statistics  3.0; 3 cr.
Annually.

STAT 335  Special Topics from Probability and Statistics  3.0; 3 cr.
May be repeated for credit. Annually.

STAT 395A/395B  Comprehensive Exam  0 cr.
Prerequisite: Consent of adviser.

STAT 399  MA or MS Thesis  6 cr.
Department of Philosophy

Chairperson: Brassier, Ray
Professor Emeritus: Fakhry, Majid
Professor: Haydar, Bashshar H.
Associate Professors: Brassier, Ray; Muller, Hans D.; Nasr, Waddah N.
Assistant Professors: Bashour, Bana M.; Johns, Christopher; Lewtas, Patrick K.
Lecturers: Agha, Saleh J.; Jraissati, Yasmina; McWherter, Dustin; Spohr, Paul M.
Instructors: Chalabi, Fares; Dib, Nelly; Hassan, Hani; Khamis, Deanna; Soghom, Vahik; Wahab, Karam

MA in Philosophy

General requirements for graduate study are found in the Admissions section of this catalogue. Moreover, applicants must submit an official GRE score with their application. The requirements for an MA in philosophy consist of 21 credit hours in philosophy courses numbered 300 or above and a thesis, together with any additional prerequisite courses required by the department to make up for deficiencies in undergraduate preparation.

PHIL 300 Special Topics in Logic  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 301 Special Topics in Ethics  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 302 Special Topics in Political Philosophy  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 303 Special Topics in Aesthetics  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 304 Special Topics in Metaphysics  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 305 Special Topics in Epistemology  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 306 Special Topics in the Philosophy of Science  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 307 Special Topics in the Philosophy of Language  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.

PHIL 308 Special Topics in the Philosophy of Mind  3.0; 3 cr.
Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PHIL 310</td>
<td>Special Topics in the History of Philosophy</td>
<td>3.0; 3 cr.</td>
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<td>Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.</td>
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<tr>
<td>PHIL 312</td>
<td>Special Topics in Contemporary Philosophy</td>
<td>3.0; 3 cr.</td>
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<td></td>
<td>Prerequisite: Consent of instructor. May be repeated for credit. Offered occasionally.</td>
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<tr>
<td>PHIL 320</td>
<td>Graduate Tutorials</td>
<td>3.0; 3 cr.</td>
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<tr>
<td></td>
<td>Prerequisite: Consent of instructor. Offered occasionally.</td>
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<tr>
<td>PHIL 395A/395B</td>
<td>Comprehensive Exam</td>
<td>0 cr.</td>
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<tr>
<td></td>
<td>Prerequisite: Consent of adviser.</td>
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<tr>
<td>PHIL 399</td>
<td>MA Thesis</td>
<td>9 cr.</td>
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</table>
Department of Physics

Chairperson: Isber, Samih T.
Professor Emeritus: Mavromatis, Harry A.
Professors: Bitar, Khalil M.; Chamseddine, Ali H.; El Eid, Mounib F.; Isber, Samih T.; Klushin, Leonid I.; Sabra, Wafic A.; Tabbal, Malek D.; *Touma, Jihad R.
Associate Professors: Antar, Ghassan Y.; Christidis, Theodore C.
Assistant Professor: Kazan, Michel J.
Lecturers: °Bodakian, Berjouhi H.; °Ghamlouche, Hassan J.; °Roumieh, Mohammad A.; °Said, Aurore J.

The department provides facilities for graduate work leading to the MS and PhD degrees. The research activities of the department include material science, condensed and soft matter physics, plasma physics, paramagnetic resonance, non-linear dynamics, astrophysics, high energy physics, superstring theory, and quantum gravity.

MS in Physics

The MS program requires the completion of 21 credits of courses and a thesis. The courses consist of four core courses: PHYS 301, PHYS 302, PHYS 303, and PHYS 305, and nine credits of physics graduate electives. After completion of the four core courses, the student must pass a Master's Comprehensive exam. The student must then select a thesis adviser who will present the thesis proposal to the department chair for approval. The MS degree is granted after the student defends his/her thesis successfully.

PHYS 301 Classical Mechanics 3.0; 3 cr.
D’Alembert’s principle, variational principles and Euler Lagrange’s equations, rigid bodies and small oscillations, Hamilton’s mechanics, canonical transformations and Hamilton-Jacobi theory, stability, integrable systems, and chaotic motion. Annually.

PHYS 302 Statistical Mechanics 3.0; 3 cr.
Boltzmann distribution, density matrix, statistical ensembles, Fermi-Dirac and Bose-Einstein statistics and applications, phase transitions, mean-field theory, and applications. Annually.

PHYS 303 Electromagnetic Theory 3.0; 3 cr.
Boundary-value problems in electrostatics, multipoles, dielectrics, magnetostatics, time-varying fields and Maxwell’s equations, and electromagnetic waves. Annually.

PHYS 305 Quantum Mechanics 3.0; 3 cr.
Hilbert space formulation of quantum mechanics, theory of angular momentum, Euler rotation, addition of angular momenta; symmetries and conservation laws: time reversal, parity, discrete symmetry; path integral formulation of quantum mechanics; approximation methods; identical particles; elementary scattering theory; introduction to relativistic quantum mechanics. Annually.

* On leave, Spring 2012–13 and Fall 2013–14
° Part time
Doctor of Philosophy in Theoretical Physics

Mission Statement

The PhD program in the Department of Physics is intended to produce competent independent researchers who are able to make original contributions to physical sciences. The program prepares students for careers in research, teaching, or industry and thus provides qualified scientists for Lebanon and the region. It serves the AUB mission of promoting research and participating in the advancement of knowledge.

Admission

Admission to the PhD program is on a competitive basis. To be eligible for admission, applicants must have an excellent academic record, and demonstrate exceptional motivation and ability to pursue research in physics. The following items are required for an application:

- For the Regular Track*: A Master's (MS) degree in Physics or related fields from an institution recognized by AUB;
- For the Accelerated Track*: A bachelor's (BS) degree in Physics or related fields from an institution recognized by AUB;
- Three letters of recommendation;
- GRE is not required;
- Refer to English Language Proficiency Requirements (ELPR) page 37;
- A statement of purpose; and
- A recommendation for admission by the AUB Department of Physics. A departmental committee may require an interview with the applicant before giving a recommendation.

Governance

The PhD program is proposed as a full-time 5 year program, with a maximum of 7 years permitted for its completion. The governance of the program commences with the application process. Upon admission into the program, a graduate student is assigned an academic adviser who evaluates his/her academic background, designs a curriculum to meet the student’s research interests and career goals, and advises if undergraduate courses are needed to rectify deficiencies. All of the duties of the academic adviser will be transferred to the thesis adviser chosen by the student and approved by the department. The thesis adviser must be chosen within 3 semesters from the admission to the program.

Supervision of PhD Thesis

Academic Adviser guides and helps the student plan a course of study and recognize a thesis adviser. The thesis adviser must be a full-time professorial rank faculty member. The PhD thesis proposal and the committee should be formed at least two semesters before the thesis defense. The thesis committee should be conforming to the AUB policy and the requirement of the Lebanese Ministry of Higher Education as described in details under the PhD Thesis Committee section of the General University Academic Information.

Course Work

The PhD program requires the completion of at least 39 credits hours of course work for students admitted on the accelerated track (BS holders) and a minimum of 18 credit hours of course work for students admitted on the regular track (MS holders). The required courses for students admitted on the accelerated track are: PHYS 301, 302, 303, 305, 306 and 307 (18 credits), and at least 21 credits beyond the core program, out of which one course must be in the concentration area, while the others can be taken as electives. Students may take relevant courses outside the department provided they secure departmental approval. The required courses for students admitted on the regular track are: PHYS 306 and 307 (6 credits), and at least 12 credits beyond the core program, out of which one course must be in the concentration area, while the others can be taken as electives. Students may take relevant courses outside the department provided they secure departmental approval.

PhD Qualification Exam Part I and Part II

Upon completion of a minimum of 15 credits of graduate course work including the four core courses: PHYS 301, 302, 303, and 305 with a cumulative average of 85 or above in the core courses, the student may sit for PhD Qualification Exam Part I (written comprehensive examination) to determine a written comprehensive examination to determine whether he/she has acquired the background necessary to continue in the PhD program. After choosing a thesis adviser, the student should pass the PhD Qualification Exam Part II; the student must formulate, submit and defend a thesis research proposal to demonstrate a capacity to pursue and complete a doctoral research project.

Candidacy

Refer to the Admission to Candidacy section under “General University Academic Information” on page 64.
PhD Thesis and Thesis Defense
After qualifying as a PhD candidate, the student will focus on the doctoral research. The PhD thesis is based on independent original research. The doctoral research, once completed, will be presented publicly and defended in front of the thesis committee. The thesis committee will consist of four members, all of professorial rank, with at least one member from outside AUB.

Residence Requirements
See Residence Requirements section under "General University Academic Information" on page 63.

Graduation Requirements
A student is granted the PhD degree upon approval of his/her PhD thesis by the thesis committee in a public session. In addition to the general graduation guidelines specified by the University, the Physics Department also requires that part of the PhD thesis work be published or accepted for publication in a refereed journal by the time of graduation.

Timetable
A student is expected to abide by the following time table:
- Finish the graduate course work (a minimum of 39 credits after the BS) within 8 semesters of starting the graduate study program;
- Pass the qualifying exam upon completion of 15 credits, within 3 semesters of starting the graduate study program;
- Choose a thesis adviser within 3 semesters of starting the graduate study program;
- Defend the PhD thesis proposal within 6 semesters and advance to candidacy within 7 semesters of starting the graduate study program; and
- Present his/her research work by submitting his/her thesis to the thesis committee and defending it in a public session. The total length of the PhD should not exceed 7 years.

Financial Support
The department offers, on a selective basis, substantial support which fully covers tuition and includes a monthly stipend. There are also some funds available to support participation in international conferences; these funds are awarded on a competitive basis. In return, students help in teaching undergraduate labs and recitations of introductory courses. Their duties also include help in proctoring and correcting exams.

Course Descriptions

**PHYS 301  Classical Mechanics** 3.0; 3 cr.
D'Alembert's principle, variational principles and Euler Lagrange's equations, rigid bodies and small oscillations, Hamilton's mechanics, canonical transformations and Hamilton-Jacobi theory, stability, integrable systems and chaotic motion.

**PHYS 302  Statistical Mechanics** 3.0; 3 cr.
Statistical ensembles, Boltzmann distribution, density matrix, Fermi-Dirac and Bose-Einstein statistics and applications, phase transitions, mean-field theory and applications.

**PHYS 303 Electromagnetic Theory** 3.0; 3 cr.
Boundary-value problems in electrostatics, multipoles, dielectrics, magnetostatics, time-varying fields and Maxwell's equations, electromagnetic waves.

**PHYS 305 Quantum Mechanics** 3.0; 3 cr.
Hilbert space formulation of quantum mechanics, theory of angular momentum, Euler rotation, addition of angular momenta; symmetries and conservation laws: time reversal, parity, discrete symmetry, path-integral formulation of quantum mechanics, approximation methods, identical particles, elementary scattering theory.

**PHYS 306 Introduction to Quantum Field Theory** 3.0; 3 cr.
Unifying quantum theory and relativity, Relativistic quantum mechanics: Klein-Gordon equation, scalar field, second quantization, Dirac's equation and Dirac's field. Interaction Fields and Feynman Diagrams, Quantization of the electromagnetic field. Prerequisite: PHYS 305.

**PHYS 307 Mathematical Methods of Physics** 3.0; 3 cr.
Complex Analysis: contour integration, conformal representation, Tensor analysis, Partial differential equations: heat equation, hypergeometric functions.

**PHYS 311 Astrophysics I** 3.0; 3 cr.

**PHYS 312 Astrophysics II** 3.0; 3 cr.

**PHYS 313 Differential Geometry and General Relativity** 3.0; 3 cr.

**PHYS 314 Non-equilibrium Statistical Mechanics** 3.0; 3 cr.
PHYS 315  Particle Cosmology  3.0; 3 cr.

PHYS 316  Physics of Soft Matter  3.0; 3 cr.

PHYS 317  Group Theory and Symmetry in Physics  3.0; 3cr.

PHYS 318  Standard Model of Particle Physics  3.0; 3 cr.

PHYS 319  String Theory  3.0; 3 cr.

PHYS 322  Thin Films Physics  3.0; 3 cr.
Introduction to surface and thin films physics: definitions; importance in basic research; impact on technology and society. Ultra High Vacuum Techniques and Processes: Kinetic theory concepts; Surface preparation procedures; Surface chemical composition: XPS, AES, SIMS, GIXRD. Thin film deposition: Evaporation; Plasma, laser and ion beam processing; Physical and Chemical Vapor Deposition techniques. Surface morphology and physical structure: Surface energy; reconstruction; 2-D lattices; Nucleation and growth of thin films; Microscopy techniques. Theory of surface scattering; Inelastic scattering and dielectric theory; Electron-based techniques: LEED and RHEED; RBS, Epitaxy; atomistic models and rate equations; steps, ripening and interdiffusion; HRXRD. Conduction and Magnetism in thin films; Superconductivity; Optical and mechanical properties. Pre- or corequisite: PHYS 302.

PHYS 323  Plasma Physics  3.0; 3 cr.
The motion of a single particle (electron or ion) subject to electromagnetic forces; fluid equations for electrons and ions; guiding center description; collisional phenomena occurring in plasmas and the resultant diffusion; propagation of high and low frequency electromagnetic waves in plasmas; description of the plasma as a single fluid; the magneto-hydromagnetic (MHD) equations; MHD instabilities and their effects on the plasma; Applications of plasma physics. Pre- or corequisite: PHYS 303.

PHYS 324  Electron Paramagnetic Resonance  3.0; 3 cr.
The electronic Zeeman interaction and the resonance phenomenon, Group theory-the rotation group, the spin-Hamiltonian and the spectrum, the Lanthanide 4f Group, the actinide 5f, Ions of the 3d group in intermediate Ligand Fields and some Experimental aspects of EPR. Pre- or corequisite: PHYS 305.

PHYS 480  Qualifying Exam Part I: Comprehensive Exam  0 cr.
Every Semester

PHYS 481  Qualifying Exam Part II: Defense of Thesis Proposal  0 cr.
Every Semester

PHYS 482*  PhD Thesis  24 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

PHYS 483*  PhD Thesis  27 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

PHYS 484*  PhD Thesis  30 cr.
Every Semester. Taken at first thesis registration, then registered for every subsequent semester with sequential letter annotations (a-l; 0 credits) until completion of thesis work.

* The choice to register for PHYS 482, 483, or 484 should be done in consultation with thesis advisor to ensure that total number of PhD thesis credits and PhD course credits are met as per AUB rules and regulations.
Department of Political Studies and Public Administration

Chairperson: Haase, Thomas W.
Professors: ʻEl-Khazen, Farid E.; Khashan, Hilal A.; Moussalli, Ahmad S.; Waterbury, John
Visiting Professors: Goodfield, Eric; Hanf, Theodor
Associate Professors: Hazbun, Waled; Majdisi, Karim S.; Meho, Lokman I.
Assistant Professors: Barder, Alexander; Frangie, Samer; Haase, Thomas; Khodr, Hiba; Pison Hindawi, Coralie; Reiche, Danyel
Lecturers: Antoun, Randa D.; Gebara, Khalil; Geukjian, Ohannes; Haddad, Tania; Hatjian, Berj; Jurdj, Nidal; Krayem, Hassan H.; Kreidie, Lina; Masri, Shafic H.; Nakib, Khalil A.; Nasser, Khaled; Nizameddin, Talal; Saade, Bechir
Instructors: Abou Daya, Marwa; Bitar-Ghanem, George N.; Geha, Carmen; Haydar, Mahmoud; Hankir, Samer; Hanna, Elias; Khel, Wael N.; Zaazaa, Nadim

MA in Political Studies

MA in Public Administration

The Department of Political Studies and Public Administration (PSPA) offers two graduate programs: one leading to the degree of Master of Arts in Political Studies, and one leading to the degree of Master of Arts in Public Administration.

All MA applicants must submit an official GRE score with the application.

Graduate students in PSPA are required to complete 24 credit hours of courses (of which no more than six credit hours can be taken outside of the major), and defend a thesis (worth six credits) in front of a thesis committee.

Students majoring in Political Studies are required to take two core courses, which must include PSPA 300 and either PSPA 301, PSPA 310, or PSPA 320. Students are encouraged to complete all core courses by the end of their second semester. Other major courses can be taken from the following subfields: Political Theory: PSPA 301 to 309; International Politics: PSPA 310 to 319; Comparative Politics: PSPA 320 to 329; and Environmental Politics PSPA 341 to 346. The remaining two elective courses can be taken within the major or any other relevant field (including a foreign language).

Students majoring in Public Administration are required to take the following core courses: PSPA 300, PSPA 350, PSPA 351, and PSPA 352. Students are encouraged to complete all core courses by the end of their second semester. Three additional graduate courses are required from one of the following sub-disciplines: Public Management: PSPA 363, PSPA 370, PSPA 371, courses by the end of their second semester. Three additional graduate courses are required from one of the following sub-disciplines: Public Management: PSPA 363, PSPA 370, PSPA 371, and Public Policy: PSPA 360, PSPA 361, PSPA 362, and PSPA 363. The remaining elective can be taken within or outside the major after consultation with the student’s advisor.

Course Descriptions

PSPA 300 Methodology and Research Design 3.0; 3 cr.
An introduction to the philosophy of science and how it influences the choice of research design. The emphasis is on developing skills that are useful for any method (survey, research, comparative historical analysis, game theory). The objective is to provide students with the practical tools they need to successfully complete original research. Core course. Annually.

PSPA 301 Political Theory 3.0; 3 cr.
A course that provides a critical examination and analysis of the theoretical bases and perennial issues of political theory and ideologies. Core course. Annually.

PSPA 302 The Modern Project 3.0; 3 cr.
The aim of this course is to explore the various intellectual, academic and political debates around the notion of modernity. Topics covered in this seminar include: modernity, modernization and the modern project, reason and rationalization, religion and secularity, knowledge, post-colonialism and post-modernism, and related topics. Occasionally.

PSPA 303 Islamic Political Thought 3.0; 3 cr.
An in-depth course on modern Islamic political thought. This course focuses on the historical and intellectual developments that have fueled both revolutionary and conservative trends in Islamic political movements and states. Discussions cover issues such as the relationships between religion and politics, political philosophy and ideology, and political action and revolution. Occasionally.

PSPA 304 Theories of Political Economy 3.0; 3 cr.
A course that surveys various theories and theorists such as Marxism, Polyani, rational choice, and the new institutionalism. It introduces students to the study of how the political system and the economy interact. Occasionally.

PSPA 305 Political Theory in the Arab World 3.0; 3 cr.
The aim of this course is to explore various intellectual and political debates in the modern Arab world. The course will provide an overview of the development of modern Arab political thought and will present some of the main intellectual and academic debates in this domain. Topics covered in this seminar include: modernity and tradition, orientalism and the West, nationalism, Marxism, liberalism, and other related topics. Alternate years.

PSPA 306 Research Methods and Techniques 3.0; 3 cr.
A course that deals with various methods of data collection and analysis. Specific research methods include both quantitative and qualitative techniques such as experimental, survey, field observation, content analysis, historical/comparative, and evaluation. Occasionally.

PSPA 307 Knowledge and Power 3.0; 3 cr.
The course explores different aspects of the relationship between knowledge and power. It draws on different philosophical and sociological traditions in political theory to shed light on core cognitive, social, and ethical aspects and dilemmas that concern social scientists both as knowledge-producers who reflect on power as a conceptual and empirical reality, and as social agents who are themselves inscribed in structures and relations of power. Occasionally.
PSPA 309  
**Special Topics in Political Theory**  
3.0; 3 cr.  
*May be repeated for credit. Occasionally.*

PSPA 310  
**International Politics**  
3.0; 3 cr.  
This seminar provides a survey of the discipline of international politics and contemporary research in the field. In addition to covering central theoretical perspectives in international relations theory, the course will introduce students to contemporary debates in international politics and policy with an emphasis on topics and themes relating to the Middle East. Students will develop critical thinking and analytical writing skills through close reading of key texts and writing exercises. *Core course. Annually.*

PSPA 311  
**International Politics and the Middle East**  
3.0; 3 cr.  
This seminar deals with issues and themes relevant to contemporary Middle East politics within the context of international relations. It explores how the politics of the Middle East, US policy in the Middle East, and the Middle East as a regional system have been understood and represented through the lens of international relations theory and scholarship. Topics include: the evolution of the Middle East state system, Arab Nationalism and the Cold War, the Arab-Israeli conflict and US policy towards Israel and the Palestinians, the geopolitics of oil and the Gulf, the Iraq War and its regional consequences, Iran's role in the Arab world, the question of empire and the future of US grand strategy, and Lebanon's position in regional politics. *Annually.*

PSPA 312  
**Public International Law**  
3.0; 3 cr.  
A course that aims to provide an understanding of the principles underlying public international law that facilitates relations among states, resolves disputes, protects human rights, allocates resources, and restricts conduct during wartime. Emphasis is placed on subfields of international law most closely connected to international politics such as the legal consequences of very serious violations of international law, the role played by the United Nations or the legal regulation of the use of force. Reflecting upon the kind of role international law plays in the conduct of international relations, this course includes many recent case studies and tackles some of the major debates in the field. *Annually.*

PSPA 313  
**International Security**  
3.0; 3 cr.  
Security motives play an essential role in international politics, particularly in the conduct of international relations. This course deals with major issues in international security that may include arms control, disarmament, as well as new types of threats, such as terrorism, or environmental degradation. It covers traditional and less traditional perspectives on the field. *Occasionally.*

PSPA 314  
**The UN and International Politics**  
3.0; 3 cr.  
This seminar examines the role of the United Nations (UN) within the context of international politics, security, and development. It focuses on the UN role in the Global South, particularly the Arab region. The course explores theoretical perspectives on the role of the UN in world politics and traces the evolution of UN institutions, and in particular UN peacekeeping, from the Cold War to post-Cold War period including the war on terror. It then considers a series of case studies in depth. The course will include, when possible, guest presentations from UN officials and a field trip to better appreciate the conditions within which UN operations work. *Occasionally.*

PSPA 315  
**Arab-Israeli Conflict**  
3.0; 3 cr.  
This seminar examines whether a solution between Palestinians and Jewish Israelis is possible in the historic land of Palestine, and if so how. The course takes a historical approach to trace the root causes of the conflict and understand the main narratives that drive the Palestinian and Jewish national movements, as well as to understand the larger context and structure within which these narratives take place. It also tracks the long history of peace initiatives put forward by the great powers – starting with the UN partition plan and ending with the post Cold War, US-sponsored peace process – and how the shifting international rules and norms that underlie these initiatives have both shaped and reflected the realities on the ground in terms of both power and resistance. *Annually.*

PSPA 316/ENSC 650  
**International Environmental Policy**  
3.0; 3 cr.  
A course that seeks to provide a broad overview of the key concepts, actors, and issues related to global environmental policy. This course outlines the evolution of environmental policy in facing global environmental challenges and how such policies have become inherently intertwined with government policy, business practice, and international trade. *Annually.*

PSPA 317  
**International Political Economy**  
3.0; 3 cr.  
This course provides a critical examination of the politics of international economic relations, global economic development, and transnational economic activity with a special emphasis on the position and experiences of the Middle East states in the global political economy. The course offers a survey of theoretical approaches to international political economy and addresses themes critical to the experience of the Middle East such as state-led industrialization, trade and regionalism, finance, oil, labor migration, MNCs, transnational movements, globalization, neo liberalism, and the politics of development and global governance. *Occasionally.*

PSPA 318  
**Theories of International Relations**  
3.0; 3 cr.  
The seminar offers a critical study of readings drawn from the major theoretical traditions (realism, liberalism, constructivism) in international relations theory as well as critical approaches and trends. *Occasionally.*

PSPA 319  
**Special Topics in International Politics**  
3.0; 3 cr.  
*May be repeated for credit. Occasionally.*

PSPA 320  
**Theories of Comparative Politics**  
3.0; 3 cr.  
A survey of various paradigms in comparative politics, focusing on behavioralist, institutional, development, and radical approaches. Themes such as structure of power, state-society relations, political development, political culture, and political economy are emphasized. *Core course. Annually.*

PSPA 321  
**Contemporary Politics in Middle Eastern States**  
3.0; 3 cr.  
A course that analyzes contemporary politics in selected Middle Eastern states. This course emphasizes the problems of political participation, effective governance, and socio-economic development. *Occasionally.*

PSPA 322  
**Contemporary Politics in Non-Middle Eastern States**  
3.0; 3 cr.  
A course that examines political institutions, processes, and problems facing governments in selected countries outside the Middle East. This course focuses on topics such as authoritarian systems, relations between the public and private sector, and politics of collective identity. *Occasionally.*
PSPA 323  Communalism in the Middle East  3.0; 3 cr.
This course deals with the emergence of ethnic and religious issues in the Middle East, with emphasis on post World War I developments. This course addresses the situation of minority groups, the nature of their demands, and their prospects of achieving them. In addition, this course assesses the impact of localism on the nation-state in the region.  Annually.

PSPA 324  Government and Politics in Lebanon  3.0; 3 cr.
A course that examines the evolution of the political system and the different approaches to the study of government institutions in Lebanon. This course focuses on patterns of change involving state and society from the founding of the state in the early 1920s to the present. Occasionally.

PSPA 325  Political Trends in the Middle East  3.0; 3 cr.
This course examines the genesis and evolution of major political trends that have been impacting the Middle East and North Africa since the latter part of the nineteenth century, especially colonialism, nationalism and nation-building, transnational political conflict, religious extremism, the politics of oil and security issues. Occasionally.

PSPA 329  Special Topics in Comparative Politics  3.0; 3 cr.
May be repeated for credit. Annually.

PSPA 330  Graduate Tutorial in Political Science  3.0; 3 cr.
A graduate seminar in which selected topics are arranged on an individual basis where existing courses do not offer the required subject matter. May be repeated for credit. Annually.

PSPA 341/ ENSC 657  Environmental Regulation and Legislation  3.0; 3 cr.
An introduction to contemporary legislative approaches to environmental protection, the rationales for their embodiment in policies, and their effectiveness in achieving prescribed goals and alleviating environmental degradation. This course also examines the emergence of environmental initiatives in developing countries with a focus on the latest developments in Lebanon. Occasionally.

PSPA 343/ ENSC 658  Environmental Conflict Resolution  3.0; 3 cr.
An introduction to contemporary approaches to global environmental negotiation and conflict resolution, including the efforts of international organizations at risk communication, mediation, and facilitation. This course focuses on procedures to manage negotiations of environmental conflicts and disputes between governments, corporations, ecologists, the media, and the general population. Information is also provided on environmental dispute cases successfully resolved. Alternate years.

PSPA 345  Special Topics in Environmental Policy and Politics  3.0; 3 cr.
May be repeated for credit. Occasionally.

PSPA 346  Special Topics in Natural Resource Policy and Politics  3.0; 3 cr.
May be repeated for credit. Occasionally.

PSPA 350  Foundations of Organization Theory  3.0; 3 cr.
This seminar is an advanced study and analysis of the development of organization theory, from its foundations and origins up to the present. It takes an interdisciplinary approach that reviews the key critical readings and debates, with their different levels of abstraction and analysis, as well as their lasting contributions. It also discusses the contemporary research activities and findings in the field of organization theory. Core course.  Annually.

PSPA 351  Foundations of Public Administration  3.0; 3 cr.
This seminar is an advanced study and analysis of the field of public administration, from its foundations and origins up to the present. It covers topics such as: historical public administration, the traditional model of public administration, new public management, and collaborative public administration. The course will also review contemporary research activities and findings related to public administration. Core course.  Annually.

PSPA 352  Foundations of Public Policy  3.0; 3 cr.
This seminar covers topics related to the substance, methods and frameworks of public policy in a variety of disciplines including: welfare economics, political science, political economy, and organization theory. Emphasizing the role of theory in empirical policy research, the course illuminates the various policies and policy challenges in the following substantive areas: economics; education; the environment; national security; and immigration. Core course. Annually.

PSPA 353  Foundations of Public Policy  3.0; 3 cr.
This seminar provides an introduction to policy analysis typologies, policy tools, and the factors that shape the utilization of policy analysis. It is designed to give students the theoretical and practical exposure to the process of the analysis of public policy as well as to its relevant qualitative, survey, and mixed method approaches and techniques. Annually.

PSPA 360  Public Policy Research and Analysis  3.0; 3 cr.
This seminar covers topics related to the substance, methods and frameworks of public policy in a variety of disciplines including: welfare economics, political science, political economy, and organization theory. Emphasizing the role of theory in empirical policy research, the course illuminates the various policies and policy challenges in the following substantive areas: economics; education; the environment; national security; and immigration. Core course. Annually.

PSPA 361  Public and Non-Profit Program Evaluation  3.0; 3 cr.
This seminar introduces students to the theoretical and practical foundations underlying the use of program evaluation in the public and non-profit sectors. Based in large part of the logic-model process of program evaluation, it reviews the quantitative and qualitative techniques used by managers to analyze program processes, outputs, and outcomes. It also considers issues such as client management, data collection, data presentation, and research ethics. Annually.

PSPA 362  Public Policy and Administration  3.0; 3 cr.
This seminar covers topics and frameworks related to the substance and approaches of public policy as they relate to public administration. Students will engage in a serious analysis of the economic, social, and cultural assumptions that underpin government and its relationship to the polity. The course is also designed to give students an organized opportunity to investigate their own interests within a specific key policy area. Annually.

PSPA 363  Public Financial Management  3.0; 3 cr.
This seminar examines the theory, practice, concepts and problems related to the administrative and political management of public financial resources and public sector budgeting. It reviews how economic, political, social and institutional factors, and resources are transformed into budgetary policy. It analyzes the organizational, structural, managerial, and legal aspects of the public budget, as well as the most important problems in the phases of the public budget cycle. Annually.
PSPA 370  Human Resource Management and Development  3.0; 3 cr.
This seminar explores theories and models of human resource management, including the policies and processes that relate to governmental personnel. It acquaints students with the authority, responsibility, functions, and problems of the human resource management in areas such as staffing, human resource development, performance appraisal, teamwork, and compensation. The seminar examines personal and professional issues related to modern Human Resource Management (HRM) from recruitment to termination. The emphasis is on developing familiarity with the real world applications required of employers and managers. *Annually.*

PSPA 371  Public Management  3.0; 3 cr.
This seminar investigates the conceptual and practical boundaries of public management reform initiatives with a comparative perspective. Moving beyond the foundations of traditional public administration, topics covered include performance and personnel management, privatization, e-government, and accountability. The limits of public management will also be considered. *Annually.*

PSPA 372  Leadership and Management of Public Organizations  3.0; 3 cr.
This seminar examines the distinction between leadership and management, from theoretical and applied perspectives. It also analyzes the major theories of leadership and assesses their impact on group and individual behavior in light of personality differences and cross-cultural management. *Alternate years.*

PSPA 373  The Ethics of Public Administration  3.0; 3 cr.
This seminar covers contemporary perspectives on ethics and ethical behavior in government. It focuses on the interactions between government and society and analyzes the political, legal, economic, and social environments of societal organizations. Some of the contemporary issues addressed are: transparency, accountability and responsiveness, corruptive practices in public administration, administrative discretion, and social justice. *Alternate years.*

PSPA 374  Non-Profit Management  3.0; 3 cr.
A course that examines the development and characteristics of non-profit management systems, managerial challenges, and the application of theories and mechanisms relevant to non-profit management. This course covers topics such as organizational structure, financial management, board-executive relations, and public-private cooperation. *Alternate years.*

PSPA 380  Special Topics in Public Administration  3.0; 3 cr.
*May be repeated for credit. Occasionally.*

PSPA 381  Special Topics in Public Policy  3.0; 3 cr.
*May be repeated for credit. Occasionally.*

PSPA 382  Graduate Tutorial in Public Administration  3.0; 3 cr.
A tutorial in which selected topics are arranged on an individual basis where existing courses do not offer the required subject matter. *May not be repeated for credit. Annually.*

PSPA 383  Graduate Tutorial in Public Policy  3.0; 3 cr.
A tutorial in which selected topics are arranged on an individual basis where existing courses do not offer the required subject matter. *May not be repeated for credit. Annually.*

PSPA 395A/395B  Comprehensive Exam  0 cr.
*Prerequisite: Consent of adviser.*

PSPA 399  MA Thesis  6 cr.
Department of Psychology

Chairperson: Harb, Charles W.
Professors: Dietrich, Arne; Kazarian, Shahe S.
Associate Professor: Harb, Charles W.
Assistant Professors: Al-Jamil, Tima M.; Najjar Daou, Nidal K.; Saab, Reem; Slobodenyuk, Nadia
Lecturer: Pawaida, May A.K.
Instructors: Bawab, Suha; Boyadjian, Maral; El Yashruti, Reigna; Fayad, Yasmine; Najjar, Laian; Nasr, Nour; Rechdan, Joanne; Younes, Dania

The Department of Psychology offers a Master’s Program in General Psychology and a Master’s Program in Clinical Psychology

MA in General Psychology

Mission Statement

The overall mission of the graduate program in General Psychology is to provide students with a strong foundation in psychological science. The program is characterized by both an emphasis on advanced research and statistical training as well as a strong commitment to critical thinking. The faculty possesses expertise in social, cultural and political psychology, and in areas of learning, cognition, and neuroscience. In realizing its mission, the Master’s Program in General Psychology is committed to the following goals and objectives: to provide education and training in the use of the scientific method in psychological research; to provide education and training in ethical practices in psychology; and to provide supervision of an empirical research study of publishable quality.

A candidate for the MA degree in General Psychology is required to complete 21 graduate credit hours in addition to nine thesis hours. The student must complete PSYC 301 and PSYC 302 and five additional graduate-level courses in psychology. One of these courses can be chosen from other graduate-level courses outside the department, according to the student’s interest and with the consent of the adviser.

General MA students will follow the following stream of courses:

General Psychology Stream

PSYC 301, PSYC 302 and five of the following: PSYC 305, PSYC310, PSYC 312, PSYC 314, PSYC 316, PSYC 318, PSYC 320, PSYC 350, PSYC 352, in addition to the Comprehensive Exam, PSYC 395 and Thesis, GPSY 399.

\textsuperscript{P} Part time
MA in Clinical Psychology
Mission Statement
The mission of the Master’s Program in Clinical Psychology is to educate and train graduate students in the science and the practice of clinical psychology. Following the scientist-practitioner model, students will be prepared for doctoral study in clinical psychology or competent, ethical, and socially responsible professional practice. In realizing its mission, the Master’s Program in Clinical Psychology is committed to the following goals and objectives: to provide education and training in the scientific and professional foundations of the field of clinical psychology; to provide education and training for consideration of cultural diversity in the science and practice of clinical psychology; and to provide education and training in the ethics of research and professional practice.

A candidate for the MA degree in Clinical Psychology is required to complete 27 graduate credit hours in coursework, in addition to six credit hours of Clinical Practicum and six credit hours of Thesis, for a total of 39 credits.

Clinical MA students will follow the following stream of courses:

Clinical Psychology Stream

Course Descriptions
PSYC 301 Research Design in Psychology 3.0; 3 cr.
This course is the first part of the core research requirements for graduate students in psychology. It provides students with a solid foundation in the basic quantitative research methods and design, addresses ethical issues in psychological research, and introduces students to statistical analyses that will be needed for PSYC 302 and the master's thesis. Annually

PSYC 302 Statistical Analyses in Psychology 3.0; 3 cr.
An advanced course in statistical analyses for the social sciences. The course explores bivariate, multivariate and structural statistical analysis using SPSS, the course combines both lecture and lab based sessions. Prerequisite PSYC 301. Annually.

PSYC 305 Ethics and Community-Based Learning in Psychology 3.0; 3 cr.
An in-depth-exploration of the ethical and professional issues in scientific and applied psychology, with a special focus on the role psychology plays in civic engagement and community-based learning. Topics include confidentiality, informed consent, competence, integrity, and social responsibility. Optional opportunities to engage in community-based learning are available to students registered in this course. Annually.

PSYC 310 Advanced Social Psychology 3.0; 3 cr.
A critical survey of social-psychological theory and research, with special emphasis on cross-cultural variations, the course covers topics in social cognition and group processes. Alternate years.

PSYC 312 Systems Neuroscience 3.0; 3 cr.
An advanced course on the underlying neural mechanisms of human mental processes. Using primary and secondary literature, topics are approached from a systems level and include, but are not limited to, decision-making, social cognition, control of action, creativity, language, cultural evolution, attention, memory, consciousness, and brain-computer interfaces. Alternate years.

PSYC 314 Cognitive Methods 3.0; 3 cr.
This course provides students with an in-depth review of the information processing paradigm with a particular emphasis on cognitive experimental techniques and procedures. Alternate years.

PSYC 316 Experimental Analysis of Behavior 3.0; 3 cr.
An advanced course in the psychology of learning and behavior analysis concerned with the theories of associative learning and operant conditioning. It explores the classical and operant conditioning paradigms from an experimental perspective. Alternate years.

PSYC 318 Special Topics in Psychology 3.0; 3 cr.
The topic varies from semester to semester. May be repeated for credit. Prerequisite: Consent of instructor.

PSYC 320 Graduate Tutorial in Psychology 3.0; 3 cr.
May be repeated for credit. Prerequisites: graduate standing and consent of instructor. Annually.

PSYC 350 Advanced Psychopathology I 3.0; 3 cr.
A critical examination of the symptomatology, etiology and treatment of adult psychological disorders including but not limited to mood and anxiety, psychotic, personality, eating and substance-related disorders. Annually.

PSYC 352 Advanced Psychopathology II 3.0; 3 cr.
A course on the critical examination of childhood disorders including the disruptive behavioral disorders, the various anxiety and mood disorders, and the pervasive development disorders. Focus is placed on diagnosis and etiology including environmental and neurobiological influences of childhood psychopathology. Annually.

PSYC 354 Psychological Assessment 3.0; 3 cr.
The objective of this course is to provide students with the knowledge base and skills required to conduct a psychological assessment of a variety of mental health and neurological disorders. The course covers both psychometric and behavioral approaches to psychological assessment. Annually.

PSYC 356 Clinical Interventions I 3.0; 3 cr.
A critical examination of the theories and practices of individual psychotherapy. Students will be exposed to the various evidence based approaches to psychotherapy including, but not limited to, the cognitive, behavioral and short-term psychodynamic therapies. Annually.

PSYC 358 Clinical Interventions II 3.0; 3 cr.
A course on theories and practice of psychotherapy with families, couples and children. Students will gain a broad theoretical understanding of the various approaches to conducting family and couples therapy, including family systems, structural, strategic, solution-focused, behavioral and emotion-focused approaches. Annually.
PSYC 360  Psychopharmacology  3.0; 3 cr.
A course on the principles of neuropharmacology, neurochemical systems, and the current medications used to treat psychological disorders, including psychotic disorders, mood disorders, anxiety disorders, eating disorders, drug addictions, conduct disorders, and attention deficit hyperactivity disorder. Annually.

PSYC 362  Clinical Practicum  3.12; 3 cr.
Clinical training at a designated clinical site with the primary focus on the observation of clinical cases at the diagnosis and assessment stages. Students will be trained in case formulations and treatment planning. Annually.

PSYC 364  Advanced Clinical Practicum  3.12; 3 cr.
At a designated clinical site, students will be assigned their own individual cases under the direct supervision of a qualified clinical psychologist. Students will be trained to diagnose and administer evidence-based psychotherapy. Annually.

PSYC 366  Graduate Tutorial in Clinical Psychology  3.0; 3 cr.
May not be repeated for credit. Prerequisites: graduate standing and consent of instructor. Annually.

PSYC 395A/B Comprehensive Exam  0.0; 0 cr.
Prerequisite: Consent of adviser.

GPSY 399  General MA Thesis  9.0; 9 cr.
Annually.

CPSY 399  Clinical MA Thesis  6.0; 6 cr.
Annually.
Department of Sociology, Anthropology, and Media Studies

Chairperson: Hanafi, Sari
Director of Media Studies: Melki, Jad
Professors: Dajani, Nabil; Hanafi, Sari; Khalaf, Samir; Saumarez-Smith, Richard
Associate Professors: Kiwan, Dina; Scheid, Kirsten
Assistant Professors: Farah, May; Melki, Jad; Perdigon, Sylvain; Wick, Livia
Lecturers: Fathallah, Zeina; Nasser, Khaled; Saber, Dima; Tarabey, Lubna;
Instructors: Agha, Dina; Boustany, Nora; Bibi, Karma M.; Daou, Mark; Khouri, Rami; Osman, Zeina; Mallat, Sarah; Sabban, Sarah; Yeghiayan, Heghnar

MA in Anthropology

The anthropology MA program offers students general training in socio-cultural anthropology with scholars recognized for their innovative approaches to a field that is regaining prominence in the Arab world. AUB’s program is distinguished by offering students the opportunity to develop a strong foundation in classical anthropological paradigms and to relate them to emerging concerns of modern Arab societies, especially with regard to its faculty's expertise in creative expression and arts production, mental health and well-being, cultural ethics, refugees, medical, legal and historical anthropology. Students will have the opportunity to study the development of the discipline, especially as it pertains to Arab cultures, while exploring theories and contributing to the literature by conducting original fieldwork or doing research on secondary sources. The program is designed to sensitize students to their responsibilities as anthropologists, give them a taste of fieldwork, help them acquire an understanding of anthropological theory and history, and inspire experimentation with the medium and form of ethnographic writing.

MA in Sociology

The sociology MA program offers students the opportunity to study sociology with nationally and internationally recognized faculty in the department’s areas of research expertise, including contemporary sociological theory, comparative sociology, economic and political sociology, and research methodology. Other substantive issues include citizenship and civil society, cities and urbanism, education, ethnicity, religion, transnationalism, migration, refugees, sexuality, gender, and deviance. The program provides students with the opportunity to develop their knowledge and understanding of key theoretical approaches in sociology. Students will develop

Part time
their intellectual skills in the critical examination of contemporary social issues, especially as it pertains to the Arab world, and will get a strong grounding in research methodology and training in both qualitative and quantitative research inquiry. Foremost students will conduct original empirical research through a thesis project. In addition, the program encourages students to critically consider the relationship between theory, research, policy and practice, and to reflect on ethical considerations in doing social research.

Graduate Studies in Anthropology and Sociology

Students pursuing either an MA in Anthropology or Sociology are encouraged to work with faculty from other humanities and social sciences departments, in particular, anthropology, media studies, political science, and the Center for Arab and Middle Eastern Studies. A Master’s degree in either field has a very wide application. Graduates in Anthropology will be qualified to pursue doctoral level studies in the field. Alternatively, they will have acquired the research methods, the exposure to anthropological scholarship, and the intercultural skills they need to work effectively in multicultural settings such as non-governmental and governmental organizations, policy centers and possibly businesses. Graduates in Sociology will be qualified to pursue studies in sociology at the doctoral level. Alternatively, they will have acquired the skills for research careers in government, non-governmental and international organizations, as well as having acquired expertise applicable in such domains as business, education, law, and public policy.

Requirements

Applicants for MA in anthropology are required to submit an official GRE score with their application.

A candidate for the MA degree in sociology or anthropology is required to complete 21 graduate credit hours in addition to a thesis. Sociology students must complete SOAN 300 and SOAN 312, and anthropology students must complete SOAN 304 and SOAN 310. Sociology students choosing a concentration in communication are also required to complete SOAN 313. The remainder of the requirements may be selected from other offerings in the department or in the FAS and other schools and faculties on campus, with the consent of the adviser and according to the interest of the graduate student.

Course Descriptions

SOAN 300  Graduate Research Methods  3.0; 3 cr.
An advanced course in the formulation of research problems, research designs, and techniques of data collection including quantitative and qualitative methods and micro versus macro approaches to social reality. Students participate in actual research projects and apply various techniques of data collection and analysis to interpret research findings. Annually.

SOAN 301  The Ethnographer’s Craft  3.0; 3 cr.
Anthropology or any socio-cultural research is not simply the gathering of data. The course will expose students to the classic and cutting-edge texts in anthropology today. Readings include the works of Mauss, Evans-Pritchard, Malinowski and the texts that have had the most impact in the field in the last decade. Close attention to the crafting of ethnographies will teach an analytical method of reading that will help students understand the choices of theory, methodology, and style that have been made to create classic anthropological knowledge. Thus, this course will enable students to conceive, devise, and write-up their own ethnographic research.

SOAN 302  Culture and Mental Health  3.0; 3 cr.
This graduate seminar explores anthropological approaches to the study of mental health and illness. It will introduce students to theoretical traditions in medical and psychological anthropology. Addressing ethnographies from different settings, the course treats works on subjective experiences, becoming cultural beings as well as mental health as scientific practice and as object of knowledge and intervention. Occasionally.

SOAN 303  Art, Aesthetics, and Social Change  3.0; 3 cr.
This course combines cultural anthropology, art studies, urban studies, and history to look at the role of sensuality and aesthetics in social movements that involve envisioning a different future. Focusing on case studies from the Arab world, the US, and the former Soviet Union, the course will expose students to the most recent literature in affect theory, critical art theory, and Middle East studies, as well as the classic texts on power, social hierarchy, and structuralism.

SOAN 304  Anthropological Research Methods  3.0; 3 cr.
This course is about the various methods of enquiry and interpretation used in anthropological research. Though ethnographic methods are shaped by each research situation and its particular historical and cultural circumstances, they are also guided by broad theoretical questions. This course takes the perspective that research is comprised of three inter-related domains: creative theoretical speculation, methodological ‘operationalization’ of theoretical questions, and concrete research practices. The trick (or ‘magic’) of ethnographic research is to relate empirical and observational data in many forms to the theories that motivate their collection. We explore the politics and ethics of research, kinds of observation, effective interviewing strategies, note-taking, conducting surveys, examining archives, ways of “coding” or indexing information, data analysis, and approaches to writing. Annually.

SOAN 310  Seminar in Anthropological Theory  3.0; 3 cr.
An in-depth survey of the major theoretical developments in socio-cultural anthropology. The seminar focuses on both chronological treatment of issues and theories as well as the contributions of leading theorists. Prerequisite: graduate standing or consent of instructor. Annually.

SOAN 312  Seminar in Sociological Theory  3.0; 3 cr.
The seminar explores some of the enduring controversies and major developments in sociological theory critically. An effort is first made to elucidate the origins, strategies, and ideological antecedents and components of sociological theory. A special focus is placed on the reformulations of the classic tradition and recent post-modern and other promising directions. Alternate years.

SOAN 313/ MCOM 301  Seminar in Communication Theory and Research  3.0; 3 cr.
The seminar introduces the student to trends in mass communication research and theoretical approaches to the communication process and communication context (small group communication, media processing and effects, media and society, culture and communication). Focus is placed on contemporary communication theories that have emerged in the discipline since the 1950s. Annually.

SOAN 315  Seminar in Middle Eastern Culture and Society  3.0; 3 cr.
A seminar on special aspects of research with emphasis on the cultural mechanisms and processes of change in pastoral, rural, or urban communities. This course includes presentation and analysis of field data on the Middle East. Occasionally.
SOAN 317/ MCOM 302  
**Seminar in Arab Media and Society**  
3.0; 3 cr.  
A seminar on the political, social, and economic effects of the new communication technologies on modern Arab society. Special attention is given to the effects of current deviance in the media on children and to the effects of the communication media on social and cultural change. Alternate years.

SOAN 318  
**Human Migration**  
3.0; 3 cr.  
A comparative study of the causes and effects of human migration worldwide. This course covers issues concerned with voluntary and forced migration as well as temporary labor migration and voluntary migration and resettlement, with an emphasis on the Lebanese experience. Alternate years.

SOAN 320  
**Graduate Tutorial in Anthropology**  
3.0; 3 cr.  
This, like other graduate tutorials in sociology and communication, is open to graduate students preferentially during the second semester of the first year in their program of study. Tutorials provide opportunities for students to pursue directed readings and preliminary grounded research of relevance to their envisaged fields of concentration. May not be repeated for credit. Occasionally.

SOAN 321  
**Graduate Tutorial in Sociology**  
3.0; 3 cr.  
May not be repeated for credit. Occasionally.

SOAN 323  
**Special Topics in Anthropology**  
3.0; 3 cr.  
This, like other special topics in sociology and communication, is devoted normally to SOAN faculty or visiting professors and recognized scholars to explore topics of current interest. May be repeated for credit. Occasionally.

SOAN 324  
**Special Topics in Sociology**  
3.0; 3 cr.  
May be repeated for credit. Occasionally.

SOAN 395A/B  
**Comprehensive Exam**  
0 cr.  
Prerequisite: Consent of advisor.

SOAN 399  
**Thesis**  
9 cr.

**MA in Media Studies**

**Mission Statement**

The AUB MA in Media Studies offers students a broad-based multidisciplinary liberal arts curriculum grounded in the social sciences that teaches students media theory, research and practice, and focuses on critical thinking and on the role of media in society. The program offers a regional and global scope and stresses a liberal arts approach that emphasizes theory, research, teaching, and critical skills, but also includes some basic practical media skills. In addition to exploring media theories, students learn scientific research methods and systematic and critical inquiry into the nature, processes and consequences of traditional and new media. Students also develop solid digital media skills that prepare them for "an information technology-driven age"—a goal prominently iterated in the mission of the Faculty of Arts and Science. The program brings forth issues and principles of freedom of the press, multicultural communication, and media ethics and social responsibility. It stresses the university's commitment "to creative and critical thinking and civic responsibility" by emphasizing media literacy principles that aim to produce graduates who can effectively and critically access, analyze, utilize, evaluate and create media messages, in addition to developing media policies and strategies.

**Admission**

Requirements for admission into the MA program are consistent with those of the Faculty of Arts of Sciences. Applicants are required to submit the following: two letters of recommendation, a statement of goals/research interests and experiences, and official GRE scores. Each student will also be interviewed upon application to determine his/her professional background and qualification. Prospective graduate students with no background in media studies will be required to take at least the following prerequisite undergraduate courses: MCOM 202, MCOM 203, and MCOM 220, and a course in research methods. Some or all of these prerequisite courses may be waived on a case-by-case basis for equivalent courses or for relevant, extensive, and verifiable professional experience. The supplementary courses must be completed within four consecutive semesters.

**Requirements**

The MA in Media Studies follows a liberal curriculum grounded in the social sciences. Its curriculum is intended for returning professionals, and AUB and non-AUB graduates who aim to build fundamental knowledge in the theories, research methods, and critical and practical skills of the field.

The MA program offers two tracks. Students may choose either a thesis option or a project option. Both options require 30 credits. Students must decide which track they want to pursue by the time they successfully complete the comprehensive exam, which is normally at the end of the second semester for full-time students. Based on their comprehensive exam performance, students will be advised to pursue one track or the other.

- The thesis option requires seven courses (21 credits), the comprehensive exam (0 credits), and a 9-credit thesis (MCOM 399).
- The project option requires nine courses (27 credits), the comprehensive exam (0 credits), and a 3-credit project (MCOM 398).

All candidates for the MA in Media Studies must complete MCOM 300, 301, 302, and 395 (comprehensive exam) and at least two courses from the list of department electives. The remainder of the courses may be selected from the department electives, the approved general electives, or other unlisted graduate courses, after the advisor's consent.

**Core Courses:** MCOM 300, MCOM 301, and MCOM 302.

**Department Electives:** MCOM 310, MCOM 311, MCOM 312, MCOM 313, MCOM 380, MCOM 381, MCOM 390, MCOM 391, SOAN 310, SOAN 312, SOAN 315.

**Approved General Elective Courses**

- Political communication: PSPA 321, PSPA 380, PSPA 381, PSPA 382.
- Health communication: HPCN 310, HPCN 332, HPCN 333, HPCN 334, HMPD 300, EPHD 331, EPHD 332.
- Visual Literacy: GRDS 032, GRDS 036, GRDS 020.

Graduate Catalogue 2013–14
MCOM 300 Graduate Research Methods in Media Studies 2.2; 3 cr.
This course teaches students how to critically read, design, and implement scientific research and use quantitative, qualitative, and mixed methods and data analysis techniques to address research questions and hypotheses common in the field of media studies. Students participate in actual research projects and apply various techniques of data collection, analysis, and interpretation. Annually.

MCOM 301/ SOAN 313 Seminar in Communication Theory and Research 3.0; 3 cr.
The seminar introduces the student to trends in media studies research and theoretical approaches to the media and communication process. Focus is placed on contemporary media and communication theories. Annually.

MCOM 302/ SOAN 317 Seminar in Arab Media and Society 3.0; 3 cr.
A seminar on the political, social, and economic effects of the new communication technologies on modern Arab society. Special attention is given to the effects of cultural deviance in the media on children and the effects of the communication media on social and cultural change. Annually.

MCOM 310 Digital Media Literacy and Education 2.2; 3 cr.
Explores media education and digital media literacy, or the ability to effectively access, analyze, evaluate and create digital media. Examines how media messages shape politics, culture and society, and explores new media production skills, including blogs, podcasts, photo and video manipulation. Alternative years.

MCOM 311 Media Law and Ethics 3.0; 3 cr.
A survey of Lebanese, Arab and International media laws and regulations, and their application within the realms of journalism, public relations, advertising, digital media, and entertainment, with an exploration of ethical guidelines, moral values, and social responsibilities of media scholars, practitioners and educators. Alternative years.

MCOM 312 Seminar in Persuasion Theory and Practice 3.0; 3 cr.
The seminar deals with how individuals exercise influence through communication. It examines the appropriate boundaries of persuasion research, the impact of persuasive practices, and the dynamic nature of persuasion inquiry. The seminar conducts an interdisciplinary examination of research in a wide range of areas related to persuasion of interest to mass communication students, psychologists, and public health practitioners. Occasionally.

MCOM 313 Seminar in Communication and Development 3.0; 3 cr.
A seminar on the role of communication in developing societies, with a focus on the media as modernizing agent, and on questions that are relevant for the understanding of the socioeconomic developmental process in less developed cultures. Occasionally.

MCOM 380 Global Media Literacy 3.0; 3 cr.
This course explores how distinctive global media shape views of politics, culture and society within nations, across regions and internationally. It analyzes information, values and underlying messages conveyed via various forms of media. It will develop research methods, designs and instruments that examine the accuracy of various media messages. The research designs will be later implemented in the afternoon course (MCOM 381). Note: this course is part of a study abroad program. Students need to apply to the office of International Programs to enroll. Every Summer. Corequisite: MCOM 381.

MCOM 381 Global Change, Global Cooperation, Global News 3.0; 3 cr.
A summer abroad course built around global problems of contemporary importance. The class will be broken into cooperative teams that will apply analytic frameworks, research tools and concepts derived from the morning course (MCOM 380) to examine a global event, issue or problem as it is represented regionally. Note: this course is part of a study abroad program. Students need to apply to the office of International Programs to enroll. Every Summer. Corequisite: MCOM 380.

MCOM 390: Special Topics in Media Studies 3.0; 3 cr.
This course is devoted normally to MCOM faculty or visiting professors and recognized scholars to explore topics of current interest. May be repeated for credit. Occasionally.

MCOM 391 Graduate Tutorial in Media Studies 3.0; 3 cr.
This course is open to graduate students preferably during the second semester of the first year in their program of study. Tutorials provide opportunities for students to pursue directed readings and preliminary grounded research of relevance to their envisaged fields of concentration. May not be repeated for credit.

MCOM 395 Comprehensive Exam 0 cr.
Prerequisite: Consent of adviser.

MCOM 397 MA Project 3 cr.

MCOM 399 MA Thesis 9 cr.
The Anis Makdisi Program in Literature (AMPL)

Director: El-Bizri, Nader
Advisory Committee: Dallal, Ahmad (Provost); Harb, Sirene; Khairallah, Assaad; Makdisi, Saree (UCLA)

The Anis Makdisi Program in Literature (AMPL) was inaugurated in October 2002.

Objectives
The AMPL promotes and supports interdisciplinary dialogue and different approaches in the study of literature following the tradition initiated by Anis K. Makdisi. The aim of this program is to encourage and develop scholarly interest in the humanities in general and in literature in particular, and to foster intellectual exchange among members of different departments, students, and visiting scholars.

Activities
Program activities include:

• an annual Anis K. Makdisi memorial lecture by a leading scholar in literature or a noted author of poetry or prose. All lectures are published by the program.

• a series of seminars on various issues and topics in literature and cultural studies offered by local, regional, and international scholars, novelists, and artists. The primary aim of the seminars is to enrich the study and the teaching of literature at AUB by providing wide discussion forums.

• informal gatherings (lectures, discussions, colloquia) as a venue for scholarly debate for the academic community in Beirut.

Scholarships
The Program offers two scholarships every year:

• The Anis K. Makdisi Graduate Fellowship to support graduate studies in literature at AUB
• The Anis K. Makdisi Scholarship in Literature for undergraduate studies

Website: http://www.aub.edu.lb/fas/ampl/Pages/index.aspx
Center for Arab and Middle Eastern Studies (CAMES)

Director: Hazbun, Waleed
Assistant Director: Saidi, Aliya R.
Professor: Khalidi, Tarif A. (Sheikh Zayid Bin Sultan Professor of Islamic and Arab Studies)
Visiting Professor: Traboulsi, Fawwaz
Visiting Assistant Professor: Tell, Tariq
Lecturer: Kozah, Mario
Visiting Lecturer: Sayigh, Rosemary
Instructors: Labaki, Marie-Therese; Kanawati, Rima

The Center for Arab and Middle Eastern Studies (CAMES) offers an interdisciplinary MA degree in Middle East studies. CAMES’ goal is to enhance the understanding of the Middle East and Islamic civilization and to encourage informed scholarship in all academic disciplines. The MA program aims to assist students in acquiring a sound grounding in one or more aspects of the study of the Middle East and in the Arabic language. The Center offers seminars in Middle East and Islamic studies as well as a full range of Arabic language courses for non-native speakers. CAMES is an interdepartmental, interdisciplinary unit and the MA program draws on other departments to provide coursework and thesis advising for its students. To complement students’ course work and to promote scholarship about the Middle East at AUB, the Center also sponsors visiting lectures and conferences and holds occasional events such as film screenings and readings.

CAMES focuses on current methodologies and approaches in the fields of Middle East and Islamic studies. Students structure their own course of study in such areas as Middle East and Islamic history, contemporary politics, international relations, archaeology, anthropology, sociology, media studies, and Arabic language and literature. The courses and the thesis and project requirements encourage students’ critical and independent thinking and the undertaking of analytical in-depth research.

CAMES is committed to the study of the Arabic language and offers courses at all levels in coordination with the Department of Arabic and Near Eastern Languages, as well as a seven-week intensive Arabic language course in the summer.

The CAMES MA program offers a thesis option and a project option.

Requirements

All MA applicants must submit an official GRE score with the application.

The CAMES MA program offers a thesis option and a project option.
**Thesis Option**

Students following the thesis option are required to complete a minimum of 21 credit hours in courses numbered 300 and above, in addition to a nine-credit thesis. They are also required to take the core course, MEST 301 Introduction to Middle Eastern Studies. Non-native speakers of Arabic are required to complete a minimum of six credits of Arabic language study, and may take up to nine credits of Arabic. Students may take their remaining courses at CAMES or in topics related to Middle Eastern Studies at departments other than CAMES.

**Project Option**

Students following the project option are required to complete a minimum of 27 credit hours in courses numbered 300 and above, in addition to a three-credit project. They are also required to take the core course, MEST 301 Introduction to Middle Eastern Studies. Non-native speakers of Arabic are required to complete a minimum of six credits of Arabic language study, and may take up to 12 credits of Arabic.

**Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEST 301</td>
<td>Introduction to Middle Eastern Studies</td>
<td>3.0; 3 cr.</td>
<td></td>
</tr>
<tr>
<td>MEST 303</td>
<td>Graduate Tutorial</td>
<td>3 cr.</td>
<td></td>
</tr>
<tr>
<td>MEST 305</td>
<td>Graduate Tutorial</td>
<td>3 cr.</td>
<td></td>
</tr>
<tr>
<td>MEST 310</td>
<td>Seminar in Early Islamic History</td>
<td>3.0; 3 cr.</td>
<td></td>
</tr>
<tr>
<td>MEST 311</td>
<td>Special Topics in Medieval Islamic Cultural History</td>
<td>3.0; 3 cr.</td>
<td>Consent of instructor required. Annually.</td>
</tr>
<tr>
<td>MEST 315</td>
<td>Special Topics in Modern Middle Eastern Social and Political History</td>
<td>3.0; 3 cr.</td>
<td>Consent of instructor required. Biennially.</td>
</tr>
<tr>
<td>MEST 316</td>
<td>Special Topics in Modern Arabic Cultural and Intellectual History</td>
<td>3.0; 3 cr.</td>
<td>Consent of instructor required. Biennially.</td>
</tr>
<tr>
<td>MEST 317</td>
<td>Special Topics in Contemporary Middle Eastern Politics</td>
<td>3.0; 3 cr.</td>
<td>Consent of instructor required. Biennially.</td>
</tr>
<tr>
<td>MEST 318</td>
<td>Special Topics in Contemporary Middle Eastern Society</td>
<td>3.0; 3 cr.</td>
<td>Consent of instructor required. Biennially.</td>
</tr>
<tr>
<td>MEST 302</td>
<td>Graduate Tutorial</td>
<td>3.0; 3 cr.</td>
<td></td>
</tr>
<tr>
<td>MEST 321/322</td>
<td>Arabic as a Foreign Language I and II</td>
<td>5.0; 3 cr. (each)</td>
<td>A thorough course in basic literary Arabic, with emphasis on the vocabulary of modern literature, the press, and current affairs. This course teaches grammar and structure enabling students to read, understand, and translate from and into Arabic within a tightly controlled syntactical milieu. Consent of instructor required. Each semester.</td>
</tr>
<tr>
<td>MEST 323/324</td>
<td>Arabic as a Foreign Language III and IV</td>
<td>5.0; 3 cr. (each)</td>
<td>A continuation of the carefully graded approach begun in MEST 321 and MEST 322, and culminating with the exposition of the derivation system. This course empowers students to use lexica and to read, understand and translate, unhampere by any loopholes in their knowledge of basic Arabic syntax and morphology. Consent of instructor required. Each semester. Prerequisites: MEST 321 and MEST 322 or placement based on a placement examination.</td>
</tr>
<tr>
<td>MEST 325/326</td>
<td>Arabic as a Foreign Language V and VI</td>
<td>3.0; 3 cr. (each)</td>
<td>The main goal for this level is to reach a superior level of proficiency. Reading texts containing opinions, hypotheses, and intellectual discussions, in addition to selections from classical Arabic literature. Grammar consists largely of details, such as the full conjugation of irregular verb classes and fine points of complex sentence structure. Instruction is totally in Arabic. Consent of instructor required. Prerequisites: MEST 323 and MEST 324 or placement based on a placement examination. Each semester.</td>
</tr>
<tr>
<td>MEST 327/328</td>
<td>Arabic as a Foreign Language VII and VIII</td>
<td>3.0; 3 cr. (each)</td>
<td>The main goal for this level is to move from a superior level of proficiency towards fluency. The student who completes these two courses will be able to register for ARAB 201A or B. This level consists of a mixture of readings from a variety of literary and non-literary genres, writing long commentaries on select passages, discussions, presentations and questions on particular grammatical points specifically related to comprehension and composition skills. Instruction is totally in Arabic. Prerequisites: MEST 325/326 or placement based on a placement examination. Consent of instructor required. Each semester.</td>
</tr>
<tr>
<td>MEST 329</td>
<td>Special Topics in Arabic Language and Literature</td>
<td>3.0; 3 cr.</td>
<td>Occasionally.</td>
</tr>
<tr>
<td>MEST 330</td>
<td>Introductory Syriac</td>
<td>3.0; 3 cr.</td>
<td>The course provides students with a working knowledge of Syriac language and grammar. With the help of a lexicon, students are expected to read and translate simple Syriac texts. Occasionally.</td>
</tr>
<tr>
<td>MEST 331</td>
<td>Introduction to Syriac Literature</td>
<td>3.0; 3 cr.</td>
<td>The aim of this introductory course is to provide the student with an overview of Syriac literature from its origins to the present day. Prerequisite: ARAB 215/MEST 330, or consent of instructor. Occasionally.</td>
</tr>
<tr>
<td>MEST 340</td>
<td>Introduction to Lebanese Arabic</td>
<td>5.0; 3 cr.</td>
<td>This course is for foreign speakers of Arabic only. The course builds proficiency in Lebanese Arabic through the introduction of the grammatical features of the Lebanese dialect and the practice of interactive functional skills, including listening comprehension, conversation tasks, and vocabulary building. For undergraduate and graduate students. Consent of instructor required. Each semester.</td>
</tr>
</tbody>
</table>
MEST 341  Intermediate Lebanese Arabic  5.0; 3 cr.
This course is for foreign speakers of Arabic only. Intermediate Lebanese Arabic is a continuation of MEST 240/340 Introduction to Lebanese Arabic. The course emphasizes the further development of conversational skills in Lebanese Arabic, and therefore targets primarily speaking and listening skills. Knowledge of the Arabic alphabet is required to join MEST 241/341. This course concentrates on increasing vocabulary and command of syntax enabling students to reach a higher level of fluency. *For undergraduate and graduate students. Consent of instructor required. Prerequisite: MEST 240/340 or placement based on a placement interview. Each semester.*

MEST 342  Advanced Lebanese Arabic  3.0; 3 cr.
This course is the continuation of the sequence begun in MEST 241/341 Intermediate Lebanese Arabic and MEST 240/340 Introduction to Lebanese Arabic. Like the preceding courses, it focuses on spoken rather than written Arabic, and will therefore target primarily the oral/aural skills; speaking and listening. Knowledge of the Arabic alphabet is required to join MEST 242/342. The course is designed to meet the needs and expectations of non-native young adults and adults who are seeking to develop a comfortable level of proficiency in a variety of complicated communicative tasks and social situations. *For undergraduate and graduate students. Consent of instructor required. Prerequisite: MEST 241/341 or placement based on a placement interview. Each semester.*

MEST 398  MA Project  3 cr.
MEST 399  MA Thesis  9 cr.
MEST 395A  Comprehensive Exam  0 cr.
The Prince Alwaleed Bin Talal Bin Abdulaziz Alsaud Center for American Studies and Research (CASAR)

Director: Lubin, Alex

The Center for American Studies and Research offers a Master of Arts in Transnational American Studies. We conceive of Transnational American Studies in terms of the cultural, political, and social relations between, among, and across the United States and the Middle East/North Africa region. CASAR's goals are to increase understanding of the interdependencies between the United States and the MENA region, as well as to understand how American culture and U.S. geopolitical power circulate beyond the borders of the U.S. The MA program aims to assist students in acquiring an academic grounding in the theories and methods of the discipline of American Studies, as well as to foster transnational scholarship at the intersections of interdisciplinary U.S. and MENA Studies. The Center offers some of its own seminars in transnational American Studies. CASAR is an interdisciplinary unit and the MA program draws on other departments to provide elective course work and thesis advising for its students. To complement students' course work and to promote scholarship related to transnational American Studies at AUB, the Center sponsors visiting lectures and conferences and holds occasional events such as film screenings and readings.

Students structure their own course of study in such areas as Arab and Middle East Studies, contemporary politics, international relations, history, anthropology, sociology, fine arts, media studies, and literary studies. The courses and the thesis and project requirements encourage students' critical and independent thinking and the undertaking of analytical in-depth research.

The CASAR MA program offers a thesis option and a project option. Students are strongly encouraged to select the project option.

Project Option

Students following the project option are required to complete a minimum of 27 credit hours in courses numbered 300 and above, in addition to a three-credit project. In addition to the nine credits of CASAR MA courses and a three-credit final project, students will select electives in consultation with the director of CASAR. No more than three credits of the program of study can be in Arabic language study, unless the student petitions to include in their program of study additional Arabic credits.
Thesis Option

Students following the thesis option are required to complete a minimum of 21 credit hours in courses numbered 300 and above, in addition to a nine-credit thesis. In addition to the nine credits of CASAR MA courses and a nine-credit thesis, students will select electives in consultation with the director of CASAR. No more than three credits can be in Arabic, unless the student petitions to include in their program of study additional Arabic credits.

All CASAR students are required to take the three Transnational American Studies core courses, AMST 300, AMST 301, and AMST 302.

Offered

AMST 300  Introduction to Transnational American Studies  3.0; 3 cr.
This graduate seminar introduces students (1) to current theories and methods in the field, (2) to the history of American Studies nationally and transnationally, and (3) to the participating faculty in the program. It is the required introductory seminar for all Transnational American Studies graduate students and is open only to those who have been accepted into the MA program. During the course of the term, other affiliated American Studies participating faculty members will visit the seminar to introduce themselves and their fields of specialization.

AMST 301  America in the Middle East  3.0; 3 cr.
Although the United States’ encounter with the Middle East may appear to be a relatively recent phenomenon, this course illustrates that America has imagined the Middle East ever since the beginning of North American colonization. Moreover, America has been in the Middle East for a period that extends long before U.S. military and diplomatic presence in the region. In addition to documenting various moments of encounter between America and the Middle East, this course also problematizes the very terms “America” and “Middle East” by introducing each region as a geographic imaginary. In this way, the course first asks what are the borders and limits of “America” and “the Middle East” and how and when are these borders and limits produced?

AMST 302  Theories and Methods of Transnational American Studies  3.0; 3 cr.
This seminar introduces students to interdisciplinary approaches to the study of transnational American culture and social history. During the semester, we will examine the history of American Studies, as well as focus on contemporary scholarship in the field. This course explores the political and social meanings of cultural conflict, national identity, and transnational culture and politics through close analysis and classroom discussion of various research methodologies that employ primary source material such as historical documents, literature, ethnography, and visual and popular culture. We will focus on how ideas about race, gender, sexuality, class, region, and nation have shaped contests over the meaning of citizenship and belonging. The seminar will be framed around the following questions: What is distinct about interdisciplinary scholarship? What kinds of questions do American Studies scholars ask and why? What does a comparative and transnational framework require and offer in terms of methodology?

AMST 375  Special Topics in Transnational American Studies  3.0; 3 cr.
AMST 397  American Studies Graduate Tutorial  3.0; 3 cr.
AMST 398  Final Project in Transnational American Studies  3 cr.
AMST 399  MA Thesis in Transnational American Studies  9 cr.
Center for Behavioral Research (CBR)

Director: Khalaf, Samir G.
Executive Committee: Dietrich, Arne; El-Cheikh, Nadia; Jarrar, Maher

The center encourages, coordinates, and sponsors interdisciplinary research in the behavioral and social sciences and the humanities. It also promotes dissemination of research findings through special workshops, seminars, and publications.

Programs and activities of the CBR include international lecture series, bi-weekly discussions, and visiting fellowships to facilitate contacts with innovative and regional world scholars. The center also sponsors collaborative research and symposia with other universities and foundations, and provides stipends to graduate students.
Center for English Language Research and Teaching (CELRT)

Director: Shaaban, Kassim A.
Professors: Ghaith, Ghazi M.; Shaaban, Kassim A.
Associate Professors: Choueiri, Lina G.; Zenger, Amy A.
Assistant Professor: Arnold, Lisa

The Center has five main functions:

- In cooperation with the Departments of English and Education, it sponsors a program leading to an MA degree in the Teaching of English as a Foreign Language (TEFL).
- It maintains a computer-assisted language learning facility and a Materials Center comprising a collection of reference books, textbooks, journals, MA theses, reports, and visual aids.
- In cooperation with the Office of the Vice President for Regional and External Programs (REP), it offers consultation services and assistance in Lebanon and the region in all aspects of English language teaching, including program evaluation, curriculum design, materials development, developing and administering assessment tools, and teacher training.
- It engages in research in theoretical and applied linguistics and in language teaching and language learning.
- In cooperation with the Department of Education, it conducts TEFL workshops for elementary and secondary school teachers.
Kamal A. Shair Central Research Science Laboratory (KAS CRSL)

Director: Mouneimne, Youssef
Laboratory Assistant: Shatila, Rania

The Central Research Science Laboratory (CRSL) at the American University of Beirut provides access to state of the art instrumentation, which is essential for a thriving university research program. The CRSL includes instruments such as an NMR spectrometer, x-ray diffractometer, flow cytometer with sorter, fluorescence imaging microscope, pulsed laser deposition system, Quantitative PCR, and other equipment. This research facility compliments other specialized departmental and faculty research laboratories, and as such aims at promoting individual as well as joint and multidisciplinary co-operative research.

The CRSL is designed primarily to serve AUB faculty members, their graduate students, and their research collaborators both from industry and from other universities within Lebanon, the Middle East region, or internationally. Furthermore the CRSL contributes to excellence in undergraduate teaching by providing students with hands-on learning experience on advanced instrumentations, and a head start in scientific research.

The CRSL serves research in most disciplines, including the basic sciences (biology, chemistry, geology, and physics), medicine, health sciences, agricultural and food sciences, and engineering. Growth, upgrading, and the addition of new instruments to the CRSL are controlled by research needs and trends.

The CRSL is a testimony to AUB’s commitment to provide a most needed research environment for Lebanese and Middle Eastern researchers. It also represents the backbone of PhD programs at AUB, as it provides our students with hands on experience and advanced research training similar to that offered at prestigious international universities. Its mission is to give our researchers the edge to compete with international researchers.
Graduate Program in Computational Science (GPCS)

Director: Al-Ghoul, Mazen (Chemistry, FAS)
Executive Committee Members: Abu Salem, Fatima (Computer Science, FAS)
Darwish, Marwan (Mechanical Engineering, FEA)
Kazan, Michel (Physics, FAS)
Tamim, Hani (Internal Medicine, FM)
Turkiyyah, George (Computer Science, FAS)
Zaraket, Fadi (Electrical and Computer Engineering, FEA)

The practice of computational science combines domain expertise in mathematical modeling and computing disciplines as vital tools in solving fundamental and challenging application areas problems in science, engineering, finance, economics and recently new disciplines in health and medical sciences. The scope of the program curriculum includes fundamental material from computer science (sequential and parallel algorithms, networks), numerical and symbolic computing, discrete and continuous mathematics (logic, number theory, graphs, differential equations and Fourier analysis, optimization, statistics and data analysis), scientific software environments (UNIX, C, MATLAB, MPI and OpenMP, statistical packages). It also requires sufficient knowledge in at least one application area selected from the sciences (natural, social, engineering, health medical, management and finance).

The mission of the inter-disciplinary Master's program in computational science is to provide a sufficiently broad educational environment that qualifies its holders to design and implement computational models in at least one application area. The program offers two tracks: a Research Master's degree for students who intend to join a PhD program after their graduation and a Professional Master's degree.

Admission Requirements

Admission to the Master's program in computational science follows basic AUB regulations. Regular students should be either:

- Holders of a Bachelor's degree in biology, business, computer science, economics, engineering, chemistry, mathematics, physics and have successfully completed the equivalent of CMPS 200, MATH 201, MATH 202, MATH 218 or 219, sufficient maturity in discrete mathematics (at the level of MATH/CMPS 211), MATH/CMPS 251, STAT 230(233) or
- Holders of a Bachelor's degree having completed the equivalent of MATH 202, STAT 230 and the FAS core courses requirements for a minor in computational science.

Some candidates may be admitted as prospective students until full completion of the required undergraduate courses. The supplementary courses must be completed within four consecutive semesters.

Graduate assistantships are available for some applicants to the program based on qualifications.

Graduation Requirements

- 9 credits of computational science courses: MATH/CMPS 350 (Discrete Models of Differential Equations), MATH/CMPS 351 (Optimization and Non-linear Problems), MATH/CMPS 358 (Introduction to Symbolic Computing)
- 12 credits, approved by the program director, from a list of well-specified courses in computer science (CMPS), computational science (MATH/CMPS), engineering science (CIVE, MECH), mathematics (MATH), natural sciences (PHYS, CHEM, BIOL), decision sciences (STAT, ECON, ENMG)
- A 9 credit thesis (CMTS 399) in which "candidates demonstrate ability of using computational science tools to design a computational model for a specific problem emanating from one application area."

Core Courses Offered in Computational Science

All computational science courses are cross-listed under mathematics and computer science departments (MATH/CMPS).

CMPS 350/ MATH 350: Computational Methods for Differential Equations 3.1; 3 cr.
A detailed study of methods and tools used in deriving discrete algebraic systems of equations for ordinary and partial differential equations: finite difference and finite element discretization procedures; generation and decomposition of sparse matrices, finite-precision arithmetic, ill-conditioning and pre-conditioning, Scalar, vector and parallelized versions of the algorithms. The course includes tutorial "immersion" sessions in which students become acquainted with state-of-the-art scientific software tools on standard computational platforms. Prerequisite: Equivalent of MATH 218 and STAT 230. Corequisite: MATH/CMPS 251 or consent of the instructor. Annually.

CMPS 351/ MATH 351: Optimization and Non-Linear Problems 3.1; 3 cr.
A study of practical methods for formulating and solving numerical optimization problems that arise in science, engineering, and business applications. Newton's method for nonlinear equations and unconstrained optimization. Simplex and interior-point methods for linear programming. Equality and inequality-constrained optimization. Sequential Quadratic Programming. Emphasis is on algorithmic description and analysis. The course includes an implementation component where students develop software and use state-of-the-art numerical libraries. Prerequisite: MATH/CMPS 350 or consent of the instructor. Annually.

MATH 358/ CMPS 358: Introduction to Symbolic Computing 3.0; 3 cr.
Introductory topics in computer algebra and algorithmic number theory that includes Fast multiplication of polynomials and integers, Fast Fourier transforms, primality testing and integers factorization. Applications to cryptography and pseudo-random number generation. Linear algebra and polynomial factorization over finite fields. Applications to error-correcting codes. Introduction to Grobner bases. Prerequisite: consent of the instructor. Annually.

CMPS 360/ MATH 360: Special Topics in Computational Science 3.0; 3 cr.
A course on selected topics in computational science, which change according to the interests of visiting faculty, instructors and students. Selected topics will cover state-of-the-art tools and applications in computational science. May be repeated for credit. Prerequisite: consent of the instructor. Annually.

CMTS 399 Thesis 9 cr.
Institute of Financial Economics (IFE)

Director: Neaime, Simon E.
Senior Fellow: Makdisi, Samir A.
Fellows: Michelis, Leonidas I., Neaime, Simon, E.

Advisory Committee:
Elbadawi, Ibrahim, A., Director, Dubai Economic Council
Esfahani, Hadi, S., Professor of Economics, University of Illinois at Urbana-Champaign
Makdisi, Samir, A., Senior Fellow, Institute of Financial Economics
Neaime, Simon, E., Director and Research Fellow, Institute of Financial Economics
Safadi, Raed, Deputy Director, Organization of Economic Cooperation and Development (OECD) Paris

Effective October 2001 the Institute of Money and Banking, founded in 1984, at the initiative of Samir Makdisi, was restructured as the Institute of Financial Economics, to be engaged in research work, seminars, and workshops primarily in the areas of financial, monetary, international and political economics.

Research Program
In tandem with the ongoing process of globalization, there has been a growing emphasis on the fields of financial, monetary, and international economics. A major objective of the Institute is to promote research and other academic activities in these fields and thereby to build it up into a major research center particularly as concerns Arab and other developing economies. In recent years the Institute’s research scope has been widened to include questions of political economy of relevance to developing countries. The Institute encourages collaborative work with appropriate national, regional, and international organizations, and research centers.

The principal goals of the Institute may be briefly outlined as follows:
• To conduct, organize, and sponsor high-level research work related in particular (but not exclusively) to financial, monetary, and international economics as well as political economy. Emphasis will be placed on policy-oriented empirical work pertaining to the Arab and other developing areas and collaborative team work will be promoted. Such research will prove beneficial to governments and organizations concerned with the design of economic and financial policies, especially in the Arab region.
• To hold seminars, workshops, and lectures on various topics related to the above areas. The first two types of activities will, among other things, bring together academicians, financial managers and experts, and policy makers to analyze issues of relevance at the policy level.

Lecture and Working Paper Series: The Institute publishes this series as part of its role in making available ongoing research, within and outside the University, related to economics issues of special concern to developing countries, with a focus on financial, monetary, international, and political economy issues. The lectures are normally by invited scholars and experts and, except for minor editorial changes, are circulated as presented. The working papers incorporate preliminary findings of ongoing research work being undertaken at the Institute and elsewhere.

Administration and Faculty
The Institute is an independent academic entity within the Faculty of Arts and Sciences with its own endowment fund. It is managed by a director and staffed with fellows who normally are faculty members in the Department of Economics, visiting scholars, research associates, graduate research assistants, and an assistant to the director. Fellows may be relieved of teaching loads to carry out research work reserved for projects at the Institute. Visiting scholars may be appointed for a limited period of time without being regular full-time members of the faculty at the University. Research associates may be appointed for a period of up to two years. Graduate research assistants are normally appointed from candidates in the master’s program in financial economics.

1 The Master of Money and Banking previously offered by the IMB was restructured as Master of Arts in Financial Economics to be offered by the Department of Economics
2 The papers are available on the Institute website: www.staff.edu.lb/~webifeco
Science and Mathematics Education Center (SMEC)

Director: Amin, Tamer
Professors: BouJaoude, Saouma; Jurdak, Murad
Associate Professor: Vlaardingerbroek, Barend
Assistant Professors: Amin, Tamer; El-Mouhayar, Rabih; Khishfe, Rola

The overall mission of the Science and Mathematics Education Center is four-fold:

• to conduct and support quality research on the teaching and learning of science and mathematics at the pre-school, elementary, and secondary levels;

• to contribute to the development of quality science and mathematics teaching and research professionals;

• to design and provide ongoing professional development for science and mathematics teachers in Lebanon and abroad;

• to effect a positive influence on the quality and status of school science and mathematics education locally, regionally, and internationally.

The center currently accomplishes its mission through the performance of a variety of functions including, but not limited to:

• designing and teaching science and mathematics education courses for pre-service teachers and master’s level graduate students in cooperation with the Department of Education

• designing and conducting research on teaching, learning, and teacher professional development in science and mathematics

• designing and developing instructional materials in science and mathematics for students and teachers

• maintaining a current science and mathematics curriculum library for use by pre-service and in-service teaching professionals

• providing outreach consultation in science and mathematics education for schools, institutions, and governments regarding curriculum design, the design of instructional environments, methods of evaluation, and professional development for teachers

• providing in-service professional development for teachers and subject-matter coordinators through special courses, workshops, institutes, conferences, or through participation in professional development initiatives sponsored by AUB or other institutions and organizations.
University Preparatory Program (UPP)

Director: Harkous-Rihan, Samar
Lecturer: Harkous-Rihan, Samar
Instructors: Harake, Rima; Ghaith, Nadin

The University Preparatory Program (UPP) is a unit within the Faculty of Arts and Sciences. Its main objective is to address the specific English language needs of students who have completed high school with strong academic records but are unprepared to function in all-English curricula at the university level.

The UPP also offers an Intensive English Summer Course for newly admitted graduate students coming from outside AUB who have not fulfilled the English Language Requirement. This course aims at enabling these students to function effectively in all-English curricula.

**UPGR 001 Intensive English Summer Course for Graduate Students** 0 cr.
This course is a graduate level intensive English course (10 contact hours) designed to equip participants independent of their disciplines with the requisite English language skills and competencies for success in their graduate studies at AUB. **Pre-requisites:** 475-499 on the EEE, or 550-572 on the paper-based TOEFL (or 213-229 on the computer-based TOEFL or 81-87 on the internet-based TOEFL), or 6.0-6.5 on the IELTS.
The Writing Center

Director: Zenger, Amy A.

The Writing Center aims to enhance writing at AUB by conducting research and by supporting student writers and teachers of writing. The center promotes the many uses of writing: as a tool for thinking, as a way to demonstrate learning and as a means of expression. It seeks to maintain professional affiliations with writing centers in this region and internationally.

The Writing Center works with administrators, faculty members, and students to support writing in courses in each of the majors, in accordance with General Education guidelines.

The Writing Center also offers free, one-hour writing consultations to members of the AUB community. All undergraduate and graduate students, faculty, and staff are welcome to discuss their writing with a tutor.

The main Writing Center office is located in Ada Dodge Hall, room 214. Tutoring is also offered 9 am to 5 pm, Monday through Friday in West Hall, room 336, and in Jafet Library, second floor reading room. Schedule appointments online at www.rich75.com/aub. Contact the center by phone at AUB extension 4077 or 3157 or by e-mail at az07@aub.edu.lb.
The Zaki Nassif Program for Music (ZNPM)

Chairperson
Nassif, Nabil

Academic Committee:
Jarrar, Maher; Jureidini, Wadi; Kim Thomas; Kurani, David; Sabra, Ramzi

The Zaki Nassif Program for Music was inaugurated in December 2004.

Objectives
The Program aims to preserve and promote the musical heritage of Zaki Nassif and to foster excellence in the teaching of music by contributing to its advancement through a variety of activities that include:

• Reinstating and sustaining musical studies programs and music curricula at AUB.
• Recruiting scholars and new faculty members to initiate music courses and programs at the department of Fine Arts and Arts History in AUB Faculty of Arts and Sciences.
• Organizing competitions, concerts, conferences and seminars.
• Inviting professional musicians and academics to the University.
• Awarding prizes, scholarships, and fellowships to students in the name of Zaki Nassif.
Suliman S. Olayan
School of Business (OSB)
Suliman S. Olayan School of Business (OSB)

Officers of the School

Peter F. Dorman President of the University
Ahmad Dallal Provost, ex-officio
Salim Chahine Acting Dean
Dima Jamali Associate Dean
Moueen Salameh Registrar, ex-officio
Salim Kanaan Director of Admissions, ex-officio
Lokman Meho University Librarian, ex-officio

Professional Administrators

Carla Sayegh Hilton OSB Executive Director
Fida Kanaan Director of Executive Education
Rula Karam EMBA Officer
Elia Khater Chief Solutions Officer
Nada Khalidy Kouzi Executive Officer
Maya El Helou Shiaf Senior Graduate Program Officer

Program Directors

Salim Chahine Director of the MBA Program
Wassim Dbouk Director of the Master's Program In Finance
Riad Dimechkie Director of the Executive MBA Program
Dima Jamali Director for MHRM Program
Antoine Sabbagh Director of the Undergraduate Program

Center Director

Bijan Azad Director, Center for Innovation Management and Entrepreneurship

International Board of Overseers

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Gabriel Hawawini Former Dean, INSEAD/Fontainebleau, France
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Erik Hoffmeyer Former Governor, National Bank of Denmark/Copenhagen, Denmark

Abdallah Jumah Former CEO and President, Saudi Arabian Oil Company/ Dhahran, Saudi Arabia
HE Najib Mikati Trustee, Prime Minister of Lebanon
Jacques Nasser Managing Director, Equity One Partners/New York, USA
Khaled Olayan CEO, The Olayan Group/Al Khobar, Saudi Arabia
Sir Geoffrey Owen Former Editor, Financial Times, Lecturer, LSE/London, UK
Richard Schmalensee Howard W. Johnson Professor of Management, Sloan School of Management, MIT/Cambridge, Massachusetts, USA
Peter Wodtke Businessman/Washington Connecticut, USA

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Said Darwazah CEO, Hijma Pharmaceuticals/Amman, Jordan
Fawzi Farah CEO, Corporate Finance House/Beirut, Lebanon
Nehmat Frem General Manager, INDECO/Beirut, Lebanon
Fadi Ghandour Chief Solutions Officer
Abdel Hamid Hallab Special Adviser to the President, AUB/Beirut, Lebanon
Marwan Kheirveddine General Manager, Al-Mawarid Bank/Beirut, Lebanon
Usama Mikdashi Central Bank/Beirut, Lebanon
Murad A. Murad Chairman of the Board, Bank of Bahrain and Kuwait/Manama, Bahrain
Hisham Abdelrazzaq Al Razouki Managing Director, AUB/Beirut, Lebanon
Nahme Sabbagh CEO, Corporate Finance House/Beirut, Lebanon
Constantin Salameh Head of Regional Expansion, Audi-Saradar Group/Beirut, Lebanon
Elia Samaha General Manager/Head of Regional Expansion, Audi-Saradar Group/Beirut, Lebanon
Talal Shair Chairman/CEO, Dar Al Handasah/Shair and Partners/Amman, Jordan
Antoine Wakim Chairman/CEO, Dar Al Handasah/Shair and Partners/Amman, Jordan

The Finance, Accounting, and Managerial Economics Track

Convener: Khalil, Samer
Professors: Chahine, Salim; Safieddine, Assem
Associate Professor: Khalil, Samer

Graduate Catalogue 2013–14
Assistant Professors: Dbouk, Wassim; Ghanem, Abdel Jalil; Jamali, Ibrahim; Mazboudi, Mohamad; McNamara, Steven; Rkein, Ali; Saade, Sameer; Safar, Walid; Termos, Ali
Instructors: El-Hajj, Sana; Hout, Bassima; Tannir-Fawaz, Lina; Uwaydah-Mardini, Rania

The Management, Marketing, and Entrepreneurship Track
Convener: Sidani, Yusuf
Professors: Jamali, Dima; Vanhonacker, W
Associate Professors: Rebeiz, Karim; Sidani, Yusuf
Assistant Professors: Al-Horr, Hadi; Afifi, Fida; Apaydin, Marina; Bastian, Bettina; Daouk, Lina; El Jurdi, Hounaida; Kameel, Yehia; Karam, Charlotte; Khakhkar, Priyan; Khoury, Haitham; Leigh, Laurence; Yehia, Nadine; Zeidan, Mohamad-Jamal
Senior Lecturers: Abdallah, Hanin; Dimechkie, Riad; Kettaneh, Tarek
Lecturer: Thornberry, Jon
Instructors: Kfouri, Michael; Khaul-Hanna, Leila; Lanteri, Alessandro; Panossian, Hagop

The Business Information and Decision Systems Track
Convener: Fleszar, Krzysztof
Professors: Hindi, Khalil1; Osman, Ibrahim H.
Associate Professors: Azad, Bijan; Fleszar, Krzysztof
Assistant Professors: Anouze, Abdel Latif; Araki, Reina; Aramant, Victor; Bou Hamad, Imad; Feghal, Antoine; King, Nelson; Moussawi, Lama; Nasir, Walid; Yorke-Smith, Neil
Lecturer: Majdalani, Elias
Instructors: Geutcherian, Rita; Salamoun Sioufi, Randa

History and Overview
Business education at AUB started in 1900 and was provided either by a department or by a semi-autonomous school under the university’s Faculty of Arts and Sciences for approximately one hundred years. In celebration of the hundred-year anniversary of offering business programs, AUB established an independent School of Business (later named the Suliman S. Olayan School of Business, OSB) in September 2000, as the sixth faculty of the University.

To date, AUB has graduated over 6,500 students from its undergraduate business programs and over 1,300 from its graduate business programs. Since its formal establishment as a distinct school, OSB has grown its full-time faculty complement from 13 in the academic year 2000-01 to 56 today. It now graduates approximately 350 students from its undergraduate program and 60 students from its graduate programs every year.

OSB currently offers five degree programs: an Executive Master of Business Administration (herein referred to as the Executive MBA), a Master of Business Administration (herein referred to as the MBA), a Masters in Finance1 (herein referred to as the MF), a Masters in Human Resource Management (herein referred to as the MHRM) and a Bachelor of Business Administration (herein referred to as the BBA).

The First AUB Faculty to Be Named
In June 2003, the AUB School of Business was named the Suliman S. Olayan School of Business (herein referred to as OSB) in honor of the late international Saudi businessman and AUB trustee whose family has always been a major supporter of AUB.
This watershed event triggered a series of major developments intended to broaden and deepen the delivery of quality undergraduate and graduate business programs at AUB. An entirely new curriculum was introduced for the BBA and MBA degrees in the Fall of 2001. Both degrees were redesigned to follow leading trends in international business education. In the Spring of 2004, OSB launched the Executive MBA program in response to the professional development needs of senior corporate leaders in the region. In 2012, OSB introduced a Specialized Masters in Finance1 and a Specialized Master of Science in Human Resource Management to its suite of graduate degree program offerings as part of its strategy to better serve the region, increase its graduate enrollment and further enhance AUB’s global brand as the regional business education leader.

Accreditation
The degree programs of OSB are accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Requiring rigorous quality audits and adherence to best academic practices, AACSB accreditation, which is attained by fewer than 5 percent of business schools worldwide, is the international quality assurance standard for business education programs.

Our Vision
To become globally recognized as the leading business school in the MENA area in terms of academic research, teaching excellence and business impact.

Our Mission
Building on over a century of prominence in business education, the Suliman S. Olayan School of Business (OSB) is committed to providing quality undergraduate and graduate programs aimed at developing business leaders in, for or from the Middle East region and beyond. The School’s undergraduate program (BBA) accentuates a liberal arts-based operational focus whereas the Executive MBA has a distinct leadership and strategy orientation. The MBA program imparts globally current, regionally relevant general management competencies to the next generation of business leaders and the specialized Masters programs are designed in response to the needs of the region.

1 Pending Final Approval of New York Board of Education
to graduate expert practitioners. OSB’s role in knowledge dissemination and service is reinforced by the School’s contribution to knowledge generation through basic and applied research. OSB upholds and promotes the highest ethical standards and a continuous improvement ethos in all its activities.

Ethics and Integrity at OSB
OSB is committed to the highest standards of academic integrity and expects its faculty and students to exhibit exemplary behavior in this regard. All business students are responsible for familiarizing themselves with and always abiding by the AUB policies, rules and regulations that define standards for academic integrity.

Organization and Governance
The school is run by the dean and guided by two independent boards: an International Board of Overseers (IBO) comprising international leaders in business and education and a Middle East Advisory Board (MEAB) composed of accomplished regional thought leaders and trendsetters in business. The IBO and MEAB advise the dean and the dean’s Advisory Committee on major strategic initiatives and act as a preliminary screening authority prior to the approval of the university provost, the university president and the university Board of Trustees (BOT). The dean’s Advisory Committee is an elected body as per AUB’s faculty bylaws.

The school is organized into the functional equivalent of multi-disciplinary departments, referred to as “tracks.” While each track has its distinct identity and designated faculty members, a track is markedly different from a department; it allows for multiple faculty membership, offers fertile soil for cross-disciplinary synergy and facilitates faculty cooperation.

The school has three tracks, each encompassing a cluster of distinct academic business disciplines and headed by a track convener (a highly-qualified OSB faculty member). The tracks are:

- Finance, Accounting and Managerial Economics (FAME)
- Management, Marketing and Entrepreneurship (MM&E)
- Business Information and Decision Systems (BIDS)

Track conveners report directly to the dean of the school. The school is managed by the dean, the two associate deans, the track conveners, the program directors, the administrative officers of the school, and ten standing committees, and it operates under a set of school bylaws available at the following web address: www.aub.edu.lb/provost/Documents/Faculty_Bylaws-Nov-18-2011-BOT%20approved.pdf

Graduate Programs
OSB currently offers four graduate degree programs: the Executive MBA, the Corporate Executive MBA, the MBA, the Masters in Finance and the Master of Science in Human Resource Management.

The Executive MBA Program
Philosophy
The OSB Executive MBA program is intended for senior regional executives with proven managerial track records who wish to consolidate and expand their expertise. With its distinct strategy orientation, the integrated curriculum of the program is specifically designed to provide participants with a state-of-the-art global leadership toolkit, while emphasizing the importance of effective implementation.

The distinctiveness of the program lies in the premium it places on relevance to the development needs of Middle East executives and the organizations they lead. However, effectiveness of regional leaders is contingent upon their ability to manage the global forces that shape their external environment. Hence, the content of the program is continuously benchmarked against leading international best-practices for currency and thought leadership, while customizing learning to the present and emerging forces shaping business practice in the region.

The program emphasizes actionable knowledge through:

- problem-based learning, including case studies
- effective integration of the real-life experiences of the participants
- application of knowledge to the participants’ organizations

Admission to the Program
Normally, there are two admission deadlines a year: in February, for enrollment in the fall semester; and in November, for enrollment the following spring. For more detail, please refer to the Admissions section of the AUB graduate catalogue, under Application Procedures.

Criteria for Admission
To be eligible for admission, an applicant must hold a senior management position. Admitted candidates come from a variety of industries and business backgrounds, have demonstrated leadership potential, and possess a strong desire for professional development.

Applicants must hold a university degree recognized by AUB and have an average acceptable to the OSB EMBA Oversight Committee. Applicants must also meet an English Language Proficiency Requirement (ELPR).

The OSB EMBA Oversight Committee shall decide on admission of all applicants. For additional information on graduate admissions, refer to the Admissions section of this catalogue.

The Application Process
- To apply for admission, all of the following must be submitted:
  - An application form
  - Two letters of recommendation
  - An official transcripts for all undergraduate and graduate course work
  - Refer to English Language Proficiency Requirements (ELPR) page 37
  - An application fee
Program Outline

The Program consists of 35 courses in 4 business themes and requires the completion of 50 credit hours, 15 of which are for foundation courses.

The Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation</td>
<td>6.25</td>
</tr>
<tr>
<td>Business Context (Strategy)</td>
<td>0.5</td>
</tr>
<tr>
<td>Applied Behavioral Skills for Executives</td>
<td>2</td>
</tr>
<tr>
<td>Judgment in Decision Making</td>
<td>1.5</td>
</tr>
<tr>
<td>Team-Building</td>
<td>0.5</td>
</tr>
<tr>
<td>Financial Accounting</td>
<td>1.75</td>
</tr>
<tr>
<td>Presentation Skills Workshop</td>
<td>0</td>
</tr>
<tr>
<td><strong>Theme I: Fundamentals and Analytics</strong></td>
<td><strong>9.25</strong></td>
</tr>
<tr>
<td>Organizational Behavior</td>
<td>1.25</td>
</tr>
<tr>
<td>Organizational Design</td>
<td>1</td>
</tr>
<tr>
<td>Management Accounting</td>
<td>2</td>
</tr>
<tr>
<td>Statistical Analysis for Management</td>
<td>1.75</td>
</tr>
<tr>
<td>Executive Communication Skills Workshop</td>
<td>1</td>
</tr>
<tr>
<td>Basic Decision Making Tools</td>
<td>0.5</td>
</tr>
<tr>
<td>Economic Analysis</td>
<td>1.75</td>
</tr>
<tr>
<td>Corporate Legal Environment</td>
<td>0</td>
</tr>
<tr>
<td>Taxation</td>
<td>0</td>
</tr>
<tr>
<td><strong>Theme II: Operational Management</strong></td>
<td><strong>16.5</strong></td>
</tr>
<tr>
<td>Financial Management</td>
<td>3.25</td>
</tr>
<tr>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>Information, Process and Technology Management</td>
<td>3</td>
</tr>
<tr>
<td>Strategic Human Resources Management</td>
<td>1.25</td>
</tr>
<tr>
<td>Competitive Advantage from Operations</td>
<td>2.5</td>
</tr>
<tr>
<td>Decision Models</td>
<td>2</td>
</tr>
<tr>
<td>Supply Chain Management</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Theme III: Strategy and Implementation</strong></td>
<td><strong>18</strong></td>
</tr>
<tr>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>Strategic Financial Management</td>
<td>3.5</td>
</tr>
<tr>
<td>Corporate Social Responsibility</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Program Delivery

The Executive MBA program is delivered in a highly interactive modular format and takes approximately 20 months to complete. Courses are offered once every three weeks throughout the year. Normally, classes are offered on Thursdays and Fridays and Saturdays, with some variation during the summer term and during national and regional holidays. Each class day consists of eight class hours of instruction.

Each credit hour consists of 12.5 hours of class instruction.

Credit hours map to teaching days as follows:

<table>
<thead>
<tr>
<th>Credit Hours (per course)</th>
<th>Exact Teaching Day Equivalence (based on a 7-hour day)</th>
<th>Actual Teaching Days Scheduled (approximate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.5</td>
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<tr>
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<td>2</td>
<td>3.6</td>
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<td>2.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>3.0</td>
<td>5.4</td>
<td>5</td>
</tr>
</tbody>
</table>

Thus the program will take approximately 85.5 days in class to complete:

- Orientation: Ten and a half (10.5) days
- Theme I: Nineteen and a half (20) days
- Theme II: Twenty-nine (29.0) days
- Theme III: Fifteen (15.5) days
- Theme IV: Eleven and a half (10.5) days

Academic Policies

University Academic Rules and Regulations apply. The minimum passing grade in a course is 70. A participant who fails a course must retake it. Moreover, an average of at least 80 must be attained in every Theme. Failure to do so will result in the participant being placed on academic probation, which can be lifted only upon completion of a timed development plan, mutually agreed upon with the Executive MBA Director. The OSB EMBA Oversight Committee may discontinue the participant from the Executive MBA program if the participant fails to remove the probation within the time period specified in the plan.

* Foundation course.
Executive MBA Courses

Orientation  
6.25 cr.

Business Context (Strategy)  
0.5 cr.
A key leadership skill is the ability to understand the internal and external context in which the organization operates. Decision makers need to leverage the capabilities of their organizations and respond appropriately to the external threats and opportunities in their environment. Leaders are also called upon to provide the context for decision making by defining the vision, mission, goals, values and strategies; by reinforcing the culture and ethical principles; and by settling the agenda and clarifying priorities. This course provides the frameworks and analytical tools to help executives understand, respond to and shape their environment. Foundation Course.

Applied Behavioral Skills for Executives  
2 cr.
An interactive foundation course that is designed to instruct beyond management theory. The course presents a structured opportunity for introspection as well as personal and interpersonal growth through simulations, feedback interviews, SWOT analysis, personality profiling, skills testing, and many other techniques borrowed from a long history of organizational psychology, organizational behavior, and management studies. An essential component of this course is a project in which executives explore their own personal, interpersonal, and leadership characteristics in order to develop a current depiction of their self in terms of their strengths, values, interests and future aspirations. Ultimately, in the project, executives are asked to craft a strategy (action plan) for personal development that strategically balances their work life with their personal life. Foundation Course.

Judgment in Decision-Making  
1.5 cr.
Most of us are not rational - even though we all think we are. In fact, we are predictably irrational. Often, we are willing to forgo the “best” possible solution and “satisfice” with good enough answers - given the constraints of money, time, and imagination. We tend to believe that we have a better understanding of our history (ability to explain the past), of our surroundings, of the choices we have and of the reasons for our actions than we actually have. We make many non-rational decisions due to: limits to our logic, external influences, self-serving motives and limited willpower and ethics. This course helps participants identify systematic biases which may lead to errors in judgment by ourselves and others and suggest strategies for overcoming them.

Team-Building  
0.5 cr.
This is an interactive course that involves several team activities. Combining the latest theories, tools and techniques, the course introduces participating executives to concepts and skills involved in team work and team leadership and is designed to help participants make a positive contribution towards establishing, leading or participating in teams.

Financial Accounting  
1.75 cr.
An introduction to financial accounting that includes an overview of financial statements and a detailed discussion of the underlying principles, assumptions, and constraints. The course builds on the concepts, standards and practices of financial reporting to serve the needs of decision makers and establishes the foundation for financial statement analysis through the understanding of the relationships among the balance sheet, income statement and cash flow statement. Participants should also be able to determine the impact of business transactions on financial statements and the resulting changes in a firm's financial position. Foundation Course.

Theme I: Fundamentals and Analytics  
9.25 cr.

Organizational Behavior  
1.25 cr.
Sets the base for the proper understanding of organizational behavior including the role of individual and group behavior within organizations. Concepts covered include communication, control, culture, motivation, and organizational behavior across cultures. Prerequisite: Applied Behavioral Skills for Executives. Foundation Course.

Organizational Culture and Design  
1.0 cr.
This course focuses on corporate culture and organization structure. It explores issues of culture and structure from a top management perspective i.e. the role of culture and structure in supporting strategy and the need to ensure that culture, strategy, structure, management systems and rewards all reinforce each other and ensure good performance on a sustainable basis. The course also delves into the details, the language and frameworks used for analyzing corporate culture and structure.

Management Accounting  
2 cr.
Examines the use of accounting information by managers for decision making in order to improve overall performance and profitability. Topics covered include cost behavior, cost allocation methods, activity-based costing, budgeting and control, cost-volume-profit analysis and performance measurement. Prerequisite: Financial Accounting.

Statistical Analysis for Management  
1.75 cr.
Introduces some basic and advanced statistical concepts and tools that are useful for managerial decision making under conditions of uncertainty. The course covers descriptive statistics, inferential statistics, and regression analysis, as well as forecasting and time series. Participants will acquire a fundamental understanding of the application of statistical analysis using a software package on small and large samples of real data. In addition, participants will analyze cases from their own work experience. Foundation Course.

Executive Communication Skills Workshop  
1.0 cr.
This course establishes a strong foundation for developing and delivering effective written communication strategies customized to specific business contexts and audiences. Participants learn to establish a systematic framework for analyzing and developing written communications, develop a clear storyline with one main message, transform a storyline into a well-focused written deliverable and develop action-oriented executive summaries. Other topics such as writing style and data charts are covered.

Basics of Decision Making Tools  
0.5 cr.
Introduces executives to the art and science of informed decision making. Executives will develop their analytical skills and will be introduced to the modeling framework and powerful tools that will enhance their ability to analyze and solve a wide variety of business problems. Emphasis is on introducing the modeling process in decision making, evaluating various modeling approaches, and applying them in business situations using spreadsheets. Foundation Course.

Economic Analysis  
1.75 cr.
Introduces microeconomics and macroeconomics. The objective is to enhance understanding of how firms are influenced by the microeconomic and macroeconomic environments in which they operate. Topics covered include: demand and supply analysis, consumer behavior, production and costs, market structures, national output, inflation and unemployment, aggregate supply and aggregate demand, monetary and fiscal policies, the balance of payments and exchange rate policy. Foundation Course.
Corporate Legal Environment 0 cr.
Relates business to its legal environment. This course provides a broad analysis of how laws influence management decisions and strategies; reviewing the characteristics of various legal structures, setting the legal framework for doing business and focusing on how business decisions and transactions should comply with the law. The course familiarizes participants with certain basic legal concepts relating to doing business on national and international levels. Core concepts relating to shareholder rights, governance, and joint ventures are explored through a mixture of class discussion, case analysis and project work.

Taxation Environment 0 cr.
Relates business to the taxation environment. It provides an overview of the taxation system in the Middle East in particular and exposes the participants to the various tax regimes and concepts and provides them with tax tools and tips that help them in their companies. It also highlights the impact of taxation on the finances of corporations and provides executives with a proper understanding of how taxation impacts businesses on national and international levels.

Theme II: Operational Management 16.5 cr.

Financial Management 3.25 cr.
Provides an understanding of the key areas of financial management: financial analysis, break-even, investment decision-making (NPV, IRR, etc.). These topics are central to decisions made by executives regarding the goals and financial strategy of a corporation, as well as to analysis of financial statements and financial forecasting and planning. Prerequisite: Financial Accounting.

Marketing Management 3.0 cr.
Offers a contemporary understanding of marketing management through a comprehensive, yet streamlining and balanced coverage of marketing frameworks, key concepts and practical tools. Marketing addresses the issue of how to provide customers with superior products and services they want, at a profit. Marketing decisions must be based on understanding customers and competitors and involves the coordination of strategic and tactical marketing. Strategic marketing involves selecting target markets and positioning the product or service for sustainable advantage. Tactical marketing involves managing the “marketing mix” (such as setting prices, managing the sales force and developing effective advertising and appropriate distribution). Issues covered include: achieving customer satisfaction, value, and retention; adapting marketing practice to the new economy; and assessing models of practice related to social media marketing. Topics include market orientation, development of marketing plans and programs, growth strategies, strategic brand management, marketing research and assessment of performance. Foundation Course.

Information, Process and Technology Management 3.0 cr.
This module teaches executives to be knowledgeable participants in information technology management decisions in their organizations. The module covers: basic terms and concepts of information technology; key management frameworks that are relevant to understanding technology and information management issues; the fundamental role of organizational processes, as well as process analysis and mapping techniques; small and medium size enterprise challenges in adopting and deploying information technology in support of operations; and highlighting the significance of social media and cloud computing applications for business.

Strategic Human Resource Management 1.25 cr.
The course analyses the role of Human Resources (HR) and its practices. It explores the different human-resource management functions and the strategic role of HR in today's working environment, including the challenge of designing a coherent HR strategy and the critical need for strategic integration and alignment. The course leverages new trends and actual case studies to illustrate HR best practice across different organizational settings. Prerequisites: Organizational Behavior and Organizational Culture and Design.

Competitive Advantage from Operations 2.5 cr.
Introduces operations management principles and methodologies with an emphasis on practical business applications. The course introduces operating systems, process flow and design with reference to both the manufacturing and service sectors. Participants will learn to analyze time-to-market through project management and waiting lines; they will gain an understanding of quality management within a strategic context; participants will recognize the importance of inventory management and develop managerial insights through the application of practical concepts and rigorous models. Case studies are used to highlight all the central issues. Foundation Course.

Decision Models 2.0 cr.
Introduces decision makers to the “art of modeling” and allows them to solve and analyze business problems in a systematic and rigorous way with the help of spreadsheet modeling tools. The course introduces practical problem solving techniques to help executives tackle some recurrent and often complex business issues. It covers optimization models to extract maximum value from constrained resources while exploring complex combinations of possibilities to achieve desired goals; decision analysis in the presence of uncertainty to help design strategic action plans; and simulation analysis to assess risk and to manage and value complex portfolios under various scenarios. Case-based problems are analyzed and discussed.

Supply Chain Management 1.5 cr.
Discusses the design and management of the supply-demand interaction between businesses in a world where industries have been globalized in terms of sourcing and distribution. This course presents a framework for studying a supply chain, tackling the coordination of the flow of information and suggesting optimal ways to design a supply chain network and manage its logistics. Case studies are used to analyze supply chain decisions. Prerequisites: Competitive Advantage From Operations and Operations and Quality Management.

Theme III: Strategic Management 18 cr.

Strategic Management 3 cr.
A holistic and integrative course that integrates the strategies learned during the EMBA program. Emphasis is on combining analytical, integrative, communication, and decision-making skills to develop the strategic direction for an enterprise. Executives will learn to analyze strategic issues, make decisions and recommend effective strategies. The course also explores the application of effective strategic planning processes in the real world. Topics covered include the underlying concepts of planning and control, a structured holistic approach to strategy development as well as the practical and theoretical issues surrounding the planning process and the implementation of strategies at the business-unit and corporate level. Prerequisites: Business Context, Organizational Behavior and Design, Marketing Management and Strategic Financial Management.
Strategic Financial Management 3.5 cr.
Strategic financial management refers to the study of finance with a long term view considering the strategic goals of the enterprise. The objective of Financial Management is the maximization of shareholders wealth. To satisfy this objective a company requires a “long term course of action” and this is where strategy fits in. The course entails enhancing value through better corporate governance practices, accurate estimation of corporate and project cost of capital, assessing working capital practices, improving risk management, evaluating mergers and acquisitions, and diversification through investing in private equity and other alternative investments. While the course avoids complicated mathematical exposition where possible, emphasis is placed on developing a sound conceptual framework. The concept of shareholders wealth maximization is emphasized by showing the cost/benefit trade-offs that the financial manager constantly confronts. Prerequisite: Financial Management.

Corporate Social Responsibility 0.5 cr.
In the context of a global crisis in business ethics and the ascendency and growing resonance of Corporate Social Responsibility (CSR), this unit examines the challenges of ethical decision making while focusing on CSR as a new management paradigm with ethical, responsible leadership and sustainability at its core. The course is dynamic and interactive, highlighting different approaches with which to examine CSR both conceptually and empirically and using actual case examples of organizations that have become trend-setters in the CSR domain.

Change Management 1.0 cr.
The course examines the issues involved in the implementation and management of change. Participants analyze the triggers for change, explore ways to pro-actively prepare their organizations to benefit from external change; learn to understand the dynamics that cause internal resistance to change and explore methodologies for dealing with such resistance. Actual case studies are analyzed to achieve a thorough understanding of possible organizational behaviors in a change intensive environment. The course also sheds light on the pressures and complex factors that may exist in organizations facing change and the importance of the skill sets required to effectively manage change. It enables participants to objectively assess their organizations’ dynamic and to understand the requirements of successfully managing change. Issues covered include types of change, objectives of change, resistance to change, effective methodologies for managing change, culture and social alignment. Prerequisites: All courses in Themes I, and II.

Leadership Theory and Practice 1.0 cr.
Focuses on the concepts and skills needed for executive leadership in the modern organization. Emphasis is placed on leadership concepts such as vision, power, influence, motivation, values, attitudes, behavior, communication, leading strategic change and empowerment. The course draws on case studies and role modeling exercises.

Conflict Management and Negotiation 2.0 cr.
The course focuses on the development of analytical and behavioral skills for successful negotiation and resolution of corporate conflict. Emphasis is placed on developing effective diagnostic and communication strategies as well as negotiation and problem solving techniques both within corporations and also with external business stakeholders. The course includes simulations and role-play as well as a private developmental consultation for each participating executive.

Special Topics in Finance 0 cr.
An analysis of contemporary financial issues such as project finance, risk management and valuations. Topics will vary according to participants’ interest.

Practicum 1.75 cr.
Participants take part in a "simulation" exercise, competing in teams in a fast-paced realistic business setting. Participants will apply and integrate analytical tools and organizational skills learned in various courses of the program.

Leadership and Reflection Seminar 5.25 cr.
Leadership and reflection seminar (4.5 credits) will focus on several themes from a practical real-world perspective and will be moderated by various instructors and practitioners. Several themes will be discussed, debated and reflected upon including: managing oneself in an organizational setting, learning from practitioners (sharing of experiences), addressing major challenges, leadership in the region and beyond, and creating value. There will be a strong element of reflection in this seminar in order to derive long term learning benefits and to practice the art of disciplined reflection. Each topical area will culminate in a "reflective assignment" integrating conceptual inputs from the classroom and experiences from work. Executives will be expected to make their own (creative) links between the world of ideas and the world of practice.

The MBA Program

Philosophy
The MBA program has been in existence at AUB since the mid-1940s and is committed to the highest standards of quality in graduate management education. The MBA is intended for ambitious professionals on track to becoming senior managers and provides a dynamic balance between a top-down strategic mindset and a bottom-up operational orientation. While the program develops systematic, big-picture thinking and problem framing, it underscores the importance of implementation, execution and results-based management for maximum impact. The OSB MBA has a number of characteristics that warrant its leadership status:

- Continuously reviewed and updated programmatic content, benchmarked against international best-practices in graduate management education
- Rigor of admission standards unparalleled in the region
- Alignment with AACSB accreditation standards, whose fulfillment is a strategic target of the program
- A robust general management orientation which combines integrative strategic thinking with analytical rigor
- An explicit focus on leadership, in keeping with the AUB tradition of producing corporate and business executive talent of the finest caliber
- An educational process that is student-driven, team-based and group-oriented
- On-going assessment of learning outcomes geared toward continuous improvement

Admission to the Program
Normally, there are two admission deadlines a year: in February, for enrollment in the fall semester; and in November, for enrollment the following spring. For more detail, please refer to the Admissions section of the AUB graduate catalogue, under Application Procedures.
Criteria for Admission

To be eligible for admission to the MBA program, an applicant must hold a university degree recognized by AUB and meet the English Language Proficiency Requirement (ELPR) of the University. Admitted applicants will normally have attained the following:

- An undergraduate average of at least 80 or equivalent in any major. The undergraduate degree must be obtained from a University recognized by AUB.
- A recent (no older than 5 years at the time the application is submitted) GMAT score of no less than 570.
- A minimum of 2 years of relevant work experience.
- A successful personal interview (optional and by invitation at the discretion of the OSB Graduate Studies Committee).

Applicants with an outstanding undergraduate record (higher distinction or distinction) and a high GMAT score, normally of at least 650, may be admitted without satisfying the condition of a minimum of 2 years of relevant work experience.

As per AUB's bylaws, the Graduate Studies Committee shall act on admission to the MBA program of all applicants. For additional information on graduate admissions, refer to the Admissions section of this catalogue.

The Application Process

To apply for admission to the MBA program, an applicant must submit all of the following:

- An application form
- Two letters of recommendation
- An official transcript for all undergraduate and/or graduate course work
- A GMAT score report*
- An application fee
- A curriculum vitae

Program Outline

Overview

Students admitted to the Master of Business Administration (MBA) program are required to take 6 credits of pre-MBA foundation courses (or to pass a related exemption test upon the approval of the program director). In addition, they must complete a minimum of 42 credits hours or 45 credit hours as follows:

- 42 credit hours: All MBA Students who partially or fully benefit from a Graduate Assistantship must complete a minimum of 27 graduate credit hours in required course work, 12 graduate credit hours in business electives and 3 credit hours in an MBA project. The MBA project can be an extended Research Paper, a Field Consulting Project or a Case Study as agreed with the faculty readers in question.

- 45 credit hours: All part-time and full-time MBA students who do not benefit from a Graduate Assistantship will have the option of completing the MBA project or taking an extra elective course. Those opting not to complete the MBA project must complete a minimum of 27 graduate credit hours in required course work and 18 graduate credit hours in business electives (i.e. 6 elective courses or 4 electives + MBA project).

The program is designed to allow a full-time student to complete all requirements in a 14 month period.

The Pre-MBA Integrative Foundation Module

The integrative pre-MBA foundation module is an intensive, level-setting suite of courses designed to create a common platform of business fundamentals and tools across key business disciplines. The case method and problem-based learning underpin the curriculum. The module normally takes place over a period of 10 days (7.5 hours per instructional day), one month prior to the start of each of the fall and the spring semesters.

Non-degree Students not working for a degree are required to complete the foundation period (or pass the exemption test) prior to registering in any course in the MBA program. As Non-degree Students, they are able to register for a maximum of two courses in addition to the foundation period.

The Curriculum

<table>
<thead>
<tr>
<th>Pre-MBA Integrative Foundation Module</th>
<th>6 cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Quantitative Methods in Management</td>
<td>3</td>
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<tr>
<td>Financial Accounting</td>
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<tr>
<td>Tools for Management Applications</td>
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<table>
<thead>
<tr>
<th>Required Core Business Courses</th>
<th>27 cr.</th>
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</thead>
<tbody>
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<td>ACCT 301 Financial Reporting and Analysis</td>
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</tr>
<tr>
<td>DSCN 300 Models for Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>BUSS 315 Advanced Business Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUSS 349 Advanced Seminar in Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>INFO 300 Technology and Information Management</td>
<td>3</td>
</tr>
<tr>
<td>DCSN 310 Operations and Process Management</td>
<td>3</td>
</tr>
<tr>
<td>FINA 306 Intermediate Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>MNGT 306 Leadership and Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 306 Marketing Management</td>
<td>3</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>The MBA Project or Electives</th>
<th>3 or 6 cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSS 398 MBA Project (optional for part-time or full-time students not benefiting from a Graduate Assistantship) or</td>
<td>3</td>
</tr>
<tr>
<td>Two Business Elective Courses</td>
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</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th>12 cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Four Business Elective Courses</td>
<td>12</td>
</tr>
</tbody>
</table>

| Grand Total | 48 or 51 |

Kindly note that although there are two deadlines for Fall semester applications, GMAT results are expected by one month after the second deadline. There is only one deadline for Spring semester applicants.
Program Delivery
The MBA Program delivery flexibly caters to the time demands of the working professional. The program can be completed in 14 months.

A student may take a maximum of 12 credits each regular semester and a maximum of 9 credits in the summer term; but must complete a minimum of 11 credits in an academic year, including the summer term. A request for taking a course load exceeding the maximum limit must be approved in advance by the OSB Graduate Studies Committee. All requirements for the MBA degree must be completed within a maximum of four years after admission to graduate study. OSB recommends the following study plan:

Year 1
Pre-MBA Integrative Foundation Period (6 credits) prior to the beginning of the semester:

For students commencing the program in the fall semester, the foundation module will be offered over an intensive two-week period (full-day session format), including two Saturdays in late July and/or early August. A comprehensive exam will be scheduled during the first week of September.

For students commencing the program in the spring semester, the foundation will be offered over a three-week period (full day and evening-session format to accommodate part-time students) in early December. A comprehensive exam will be scheduled early in the second week of January.

Semester 1 (Fall)
Up to 12 credits of core courses.

Semester 2 (Spring)
Up to 12 credits of core courses.

Semester 3 (Summer Session)
Choice of elective courses. Total credit load not to exceed 9 credit hours.

Year 2
Semester 4 (Fall)
Shortfall of core and/or elective courses and BUSS 398 (Project graded Pass/Fail - optional). Total credit load not to exceed 9 credit hours including the MBA project or 12 credit hours if the student is not taking the MBA project.

Academic Policies
Academic Rules and Regulations

University Academic Rules and Regulations on courses, grades, probation and dismissal apply. The minimum passing grade in a course is 70. Students in the MBA program are required to maintain a cumulative average of at least 80 in all courses taken for graduate credit.

Academic Advisers
Each student has an academic adviser who normally approves the student’s schedule each semester. The General University Academic Information section of this catalogue provides further information on academic advisers.

MBA Courses

MBA Course Prefixes

MBA courses all have a prefix indicating the discipline: ACCT (accounting), DCSN (Business Decision Systems), ENTM (Entrepreneurship), FINA (Finance), INFO (Business Information Systems), MKTG (Marketing) and MNGT (Management). Integrative and multi-disciplinary courses that do not belong to a particular discipline are labeled by the prefix BUSS. It is important to note that the successful completion of the Pre-MBA Integrative Foundation Module is a pre-requisite for enrollment in all the core and elective courses listed below.

BUSS Courses

BUSS 300 Business Research Methods 3 cr.
Provides an introduction to the main theories and practices in the field of business research. The course aims to show how to do research and locate issues of research method within a wider context. Topics include: business research process; research design and strategies; methods of quantitative research; design of experiments (sampling and survey design for data collection, basic analytical data analysis, analysis and multi-variant analysis); methods of qualitative research; and research reporting and evaluation. An elective course strongly recommended for all students who opt with their advisors to work on the MBA project as a research paper.

BUSS 305 Advanced Managerial Economics 3 cr.
An advanced treatment of the theory of the firm. Topics include different pricing techniques, government regulation of the industry, competitive markets under asymmetric information, regulation and pricing of public utilities, externalities and market failure, long-term investment decisions of the firm and international aspects of managerial economics.

BUSS 315 Advanced Business Analysis 3 cr.
Enhances understanding of how firms are influenced by the microeconomic and macroeconomic environments in which they operate. On the microeconomic level, topics include pricing decisions in practice, externalities and government regulation, and risk and uncertainty in managerial decision-making. On the macroeconomic level, the course discusses the IS-LM model and uses it to demonstrate the effect of fiscal and monetary policies on the economy; pays particular attention to the open economy; focuses on the balance of payments, exchange rate determination, and macroeconomic policy under both fixed and floating exchange rates; and concludes with a discussion of economic depression, hyperinflation and budget deficits.

BUSS 349 Advanced Seminar in Strategic Management 3 cr.
An advanced course on strategic management philosophy, methodology and tools in local and global settings. Special emphasis is placed on competitive positioning and strategic analysis using an applied, hands-on approach. The course involves case writing and analysis. Prerequisites: minimum 18 credits of core MBA courses including MKTG 306 and MNGT 306.
BUSS 398  Project  3 cr.
The MBA project consists of an extended Research Paper, a Field Consulting Project or a Case Study defined in agreement with the faculty readers in question. The project is optional for part-time and full-time students not benefiting from a Graduate Assistantship. For MBA students benefiting from a Graduate Assistantship, the project must be undertaken, in partial fulfillment of the requirements for the degree, upon the completion of at least 33 credits of core and elective courses. Each student is assigned a committee consisting of an adviser (first reader) and a second reader who jointly supervise and guide the student throughout. It is the responsibility of the student to select a topic and submit a project proposal to be approved by his/her readers and then by the OSB Graduate Studies Committee. All accepted projects should be deposited at the Library. A student who is unable to finish the project in one semester can register for up to two additional times; subject to the consent of the readers. Exceptionally, one additional registration may be approved by the OSB Graduate Studies Committee. Students pay for the three credits on their first registration, but are not billed for the additional registrations.

MBA Courses in the FAME (Finance, Accounting, and Managerial Economics) Track

MBA Accounting Courses

ACCT 301  Financial Reporting and Analysis  3 cr.
Integrates contemporary corporate financial reporting issues with financial statements analysis, interpretation, and performance evaluation using a case approach. It presents an in-depth discussion of factors affecting analysis of business organizations and business strategy, and explores measurement of items on financial statements, disclosures, standard-setting issues, financial reporting internationally, financial reporting implications and investment evaluation.

ACCT 315  Intermediate Financial Accounting II  3 cr.
A review of generally accepted accounting principles, current and long-term assets and liabilities, consolidated statements, multinational accounting and interim reporting and disclosures.

ACCT 320  Profit Planning and Control  3 cr.
Deals with comprehensive profit planning and control, sales planning and control, planning production, planning expenses, development and application of variable budgets, techniques and managerial application of cost-volume-profit analysis, performance reports for management control and analysis of budget variances.

ACCT 325  Advanced Auditing  3 cr.
Covers financial statement audits and auditors’ responsibilities, audit objectives, evidence and working papers, materiality, risk, preliminary audit strategies, internal control, audit testing methodology, auditing the transaction cycles and completing the audit, reporting and other services. Prerequisite: ACCT 315.

ACCT 330  Accounting Theory  3 cr.
Presents the principal approaches and proposed solutions to the problem of formulating an accounting theory. The emphasis is on the current issues in defining the elements of an accounting theory; namely, the objectives of financial statements, the fundamentals of accounting, the asset valuation and income determination concepts and the future scope of accounting. Prerequisite: ACCT 315.

ACCT 340  Activity Based Costing  3 cr.
Covers the components of activity-based costing systems, activity analysis, activity-based management, identifying value-added and non-value-added activities, benchmarking value-added activities and cost management through a total quality management system.

ACCT 345  Financial Statements Analysis  3 cr.
deals with major financial statements, including the foundations of ratio and financial analysis, analyzing current assets, investments, fixed assets, current and long-term liabilities and owners’ equity.

ACCT 350  Special Topics  3 cr.
An analysis of contemporary accounting issues and problems. The course may be repeated for credit when the topics vary. Credits depend on the course offered. Prerequisite: Approval of track convener.

ACCT 351  Accounting Tutorial  3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. The course includes presentation of a report on the work. Prerequisite: Approval of track convener.

MBA Finance Courses

FINA 306  Intermediate Corporate Finance  3 cr.
Covers topics such as financial management decision-making, financial planning, forecasting and valuation models, capital budgeting under uncertainty, modern capital structure theories, leasing, equity and debt financing, modern dividend theories, working capital policies, ethical issues in finance, and mergers and acquisitions using cases simulating real-world decision making.

FINA 315  Investment Analysis and Evaluation  3 cr.
An analysis of investments in financial securities that focuses on securities markets, investment risk-return trade-off, asset pricing models, and stock price behavior in relation to the capital market efficiency hypotheses. Particular emphasis is placed on stocks, bonds, and financial futures and options.

FINA 318  Derivative Securities  3 cr.
Emphasizes derivatives theories and applications, derivatives exchanges, valuation of derivatives (futures, forward, swaps, standard and exotic options on different underlying assets), trading practices and regulations, management of financial risks and empirical evidence on derivative markets efficiency. Prerequisite: FINA 306.

FINA 320  Investment Banking  3 cr.
Designed to meld the practical and the theoretical aspects of investment banking, focusing on a review of syndication and underwriting, advisory services, clearing and funding operations, corporate restructuring, evaluation of capital investment opportunities and integrating financial engineering into real-world investment banking applications. Prerequisite: FINA 306.

FINA 325  Global Finance  3 cr.
A study of global financial markets and instruments. Topics covered include financial and investment decisions in an international environment, operations of international money and capital markets, management of foreign exchange risk, working capital management, direct foreign investment, political risk analysis and currency derivatives forward and swap markets.
FINA 330  Banking Risk Management  3 cr.
Deals with financial decision-making procedures and policies of commercial banks. The focus is on regulatory environment, strategic credit decision, international banking, applications of financial engineering in risk management and management of assets and liabilities of commercial banks using the portfolio analysis approach and capital adequacy indicators. Case work is emphasized. Prerequisite: FINA 306.

FINA 335  Portfolio Theory and Management  3 cr.
Addresses the investment management processes, investment objectives and constraints, investors' attitudes and behavior, modern portfolio theories, selection and timing skills, asset allocation methods, active versus passive investment strategies, trading practices, swaps, performance evaluation, evaluation of current events in the financial press and the role of derivatives in managing securities risk, using a case study and simulation approach. Prerequisite: FINA 315 or equivalent.

FINA 337  Market Risk Measurement and Management  3 cr.
Aims to give hands-on experience of the techniques used by risk professionals to measure and manage market risk. The topics covered include emerging market risks, including currency crises, Value-at-Risk (delta-normal, historical simulation, Monte Carlo), conditional value-at-risk, risk budgeting, stress testing, liquidity risk and measuring and managing corporate exposures, including cash flow at risk.

FINA 340  Advanced Corporate Finance  3 cr.
Emphasizes strategic financial policies in theory and practice, and the formulations and implementations of financial policies through the case study approach. Case analysis covers issues such as management of short-term and long-term assets, raising capital, distribution and retention of earnings, agency problems, mergers and acquisitions, corporate failure and restructuring. Prerequisite: FINA 306.

FINA 341  Corporate Governance  3 cr.
A study of legal accountability in conformity with corporate and securities disclosure laws, market for corporate control, the role of institutional investors, leveraged buyouts, hiring and firing strategies, management compensation packages and the role of the board of directors in ensuring an appropriate accountability system and the integrity of financial reporting.

FINA 342  Entrepreneurial Finance  3 cr.
Explores financial issues that face entrepreneurs, including the stages of financing, business cash flow models, and strategic positioning of the early-stage company. This course also examines the role of angel investors, venture capital funds, institutional investors, strategic alliances, licensing agreements, and exit strategies; and analyzes the unique financial issues facing entrepreneurial firms. Topics include assessing financial performance, financial forecasting and planning, financial management of rapidly growing businesses, start-up ventures, valuation, sources of financing, venture capital, initial public offering, and the decision to harvest. Prerequisite: FINA 306.

FINA 350  Special Topics  3 cr.
An analysis of contemporary financial issues and problems. The course may be repeated for credit when the topics vary. Credits depend on the course offered. Prerequisite: Approval of track convener.

FINA 351  Finance Tutorial  3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. The course includes presentation of a report on the work. Prerequisite: Approval of track convener.

MBA Courses in the MM and E (Management, Marketing and Entrepreneurship) Track

MBA Management Courses
ENTM 310  Entrepreneurship and Venture Capital  3 cr.
An analysis of the problems facing newly established businesses. Topics covered include personnel, capital, marketing, accounting, alternative financing scenarios, leasing and venture project evaluations. Prerequisite: ACCT 301.

MNGT 306  Leadership and Behavior in Organizations  3 cr.
An analytical excursion into the behavioral aspects of the modern workplace, including such processes as leadership, communication, motivation, conflict resolution and team building. Particular attention is accorded to leadership as a focal point of group processes and as a critical ingredient in successful organizational endeavors and transformations.

MNGT 319  Change Management  3 cr.
Examines in depth the change management process as a central paradigm in modern management theory and practice. The course spans a broad spectrum, including different change models and the various organizational forces that enable and resist change; change processes at the individual, group, and organizational levels. The course also introduces theories, tools, approaches and key competencies for managing change, as well as practical case studies in the management of change.

MNGT 320  Emerging Issues in Management Theory and Practice  3 cr.
Helps students keep pace with rapid developments in managerial know-how, covering both conceptual breakthroughs and innovative applications. This course focuses on the rapidly changing intellectual landscape in management, in an attempt to discuss future directions and dominant trends in the making. The intended learning output is to ensure students' preparedness for the sharp edge of management practice.

MNGT 330  Quality Management  3 cr.
An analytical examination of modern quality management philosophies for building and maintaining competitive advantage in organizations. Relevant theoretical models are highlighted, with emphasis on the executive role and the intensive study and design of practical applications. Prerequisite: MNGT 306.

MNGT 332  Human Capital Management  3 cr.
An advanced analysis of the human resource function and the challenge of managing human capital in a modern corporation. The course highlights the interrelationships of the different human-resource-management functions and the strategic role of HR in today's environment, and capitalizes on new trends and actual case examples to illustrate current HR best practices. Prerequisite: MNGT 306.
MGT 336 Personnel Management 3 cr.
An examination of the models and practices of human resource planning, with particular emphasis on the development and implementation of successful performance management systems. The course addresses the design of and diagnosis of performance measures, as well as HR best practices and the effective management of worker compensation. The purpose is to impart the skills and knowledge needed to contribute to HR related activities in modern organizations. Prerequisite: MGT 332.

MGT 340 Organization Theory 3 cr.
An analytical overview of management systems, with special emphasis on current schools of thought, organizational models, management functions, concept-formation, methodology, and implementation. Prerequisite: MGT 306.

MGT 350 Special Topics 3 cr.
An analysis of contemporary management issues and problems. The course may be repeated for credit when the topics vary. Credits depend on the course offered. Prerequisite: Approval of track convener.

MGT 351 Management Tutorial 3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. The course includes presentation of a report on the work. Prerequisite: Approval of track convener.

MBA Marketing Courses

MKTG 306 Marketing Management 3 cr.
Deals with the fundamental aspects of marketing as it relates to the whole business enterprise. Topics include marketing in the twenty-first century, analyzing marketing opportunities, developing and analyzing marketing strategies, making marketing decisions and managing and delivering marketing programs.

MKTG 311 Applied Market Research 3 cr.
The course is designed to offer an advanced understanding of the market research process through coverage of the steps comprising the process from defining the research problem, to developing an approach, to formulating a research design and designing survey or questionnaire forms, to data collection, analysis, and implementation. The course takes on an applied orientation in covering the research process. Prerequisites: MKTG 306 and BUSS 300.

MKTG 312 Consumer Behavior 3 cr.
Uses a behavioral science perspective to describe, understand and predict the behavior of consumers in the marketplace. This course also magnifies the basic decision-making processes followed by consumers when faced with a choice situation. Prerequisite: MKTG 306.

MKTG 325 Services Marketing Management 3 cr.
Addresses topics such as creating a sustained competitive advantage, designing the service delivery system, creating a service culture, building customer loyalty, exploiting the virtual value chain, reengineering the delivery system, delivering services on the Web, implementing total quality management program, and globalization of services. Prerequisite: MKTG 306.

MKTG 341 Global Marketing Strategy 3 cr.
An examination of the global strategic marketing task through the eyes of the marketing manager. Topics covered include understanding the global marketing environment, analyzing global marketing opportunities, developing global marketing strategies, designing global marketing program and managing the global effort. Prerequisite: MKTG 306.

MKTG 350 Special Topics 3 cr.
An analysis of contemporary marketing issues and problems. The course may be repeated for credit when topics vary. Credits depend on the course offered. Prerequisite: Approval of track convener.

MKTG 351 Marketing Tutorial 3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. The course includes presentation of a report on the work. Prerequisite: Approval of track convener.

Courses in the BIDS (Business Information and Decision Systems) Track

MBA Decision Systems Courses

DCSN 300 Models for Decision Making 3 cr.
Covers the modeling process in decision making; explains the various modeling approaches under conditions of certainty, uncertainty, and risk; and considers single and multiple-objective decision making scenarios. Business models are drawn from diverse applications in finance, marketing and operations. Emphasis is placed on the interpretation of the results of models and the managerial insights provided. In addition, students analyze real cases from their own work experience and the literature.

DCSN 310 Operations and Process Management 3 cr.
Gives an overview of the strategic and tactical decisions involved in operating a production or service system for sustainable competitive advantage. Topics include operations strategy framework; process management; management of technology; work-force management; total quality management and statistical quality control; capacity, location, and layout planning; inventory management; aggregate planning; material requirement planning; master production scheduling; business forecasting and scheduling and managing complex projects.

DCSN 320 Performance Management 3 cr.
Strategic performance management is essential for ensuring the sustainability, continuous improvement and setting targets of any public or private organization. The course covers qualitative and quantitative performance measurement and management frameworks that consider performance indicators from stakeholders’ perspective. It addresses complex decision-making scenarios where a mix of tangible and intangible measures with tradeoffs needs to be considered to determine an overall relative performance measure for an organization with respect to its peers. Approaches such as the Analytic Hierarchy Process (AHP); Data Envelopment Analysis are covered to analyze various metrics and balanced scorecard information. Students form groups and select a topic for their final project and have hands-on learning experiences with appropriate software tools. Prerequisite: DCSN 300.
DCSN 330 Project Management 3 cr.
The modern business relies upon improving and aligning processes with business strategy. These improvements are implemented as projects. While managing traditional projects such as construction is covered, this course emphasizes the management of the building blocks of a project; processes. Since project management is both an art and a science that balances soft (management) and hard (tool and technology) skills, both are taught. The course equips students to manage or participate in complex projects and work with project stakeholders.

DCSN 340 Supply Chain Management 3 cr.
Addresses issues of matching supply with demand in the context of supply chain management by managing both supply and demand. While the treatment is model based, the course is aimed at developing the insights needed by general managers or management consultants. The emphasis is on managing uncertain demand, both within the firm and across the supply chain. Topics include: drivers of supply chain management, designing the supply chain network, planning demand and supply in a supply chain, designing and planning transportation networks, the Newsvendor model, quick response strategies, the order-up-to inventory model, risk-pooling strategies, and supply chain coordination. An introduction to managing demand through revenue management is also provided. Prerequisite: DCSN 310.

DCSN 351 Decision Systems Tutorial 3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. This course includes presentation of a report on the work. Prerequisite: Approval of track convener.

MBA Management Information Systems Courses

INFO 300 Technology and Information Management 3 cr.
The specific learning objective is to function as knowledgeable participants in the technology and innovation (T&I) management decision-making of organizations. The emphasis is on achieving market and organizational excellence through dual attention to strategic and operational issues of T&I management. The course covers basic terms and concepts of T&I; key frameworks for strategic/operational management of T&I issues; fundamental role of organizational processes in exploiting T&I for strategic/operational advantage; understanding basic process analysis and mapping to exploit T&I; implementation challenges in adopting T&I in support of organizational operations; and the significance of emerging business T&I issues.

INFO 305 Data and Information Management 3 cr.
Provides an overview of key topics in designing, building, and managing information systems (IS) that incorporate database management systems (DBMS) as their foundation. Topics include fundamentals of DBMS technology and their application in IS development; mastering technology issues based on data/information as a valuable business resource; new IS business uses enabled by advances that build upon the core DBMS technology; information systems development life cycle; techniques for researching system requirements; analyzing and modeling organizational processes and data and development and implementation of information systems in organizations. The course also provides hands-on experience in the analysis and design of a system and developing a database application using a state-of-the-art DBMS.

INFO 310 Enterprise and Systems Integration 3 cr.
Addresses the issues and solutions involved in internal coordination and external customer focus through integrated processes, using an enterprise approach to information systems. The two primary approaches to integration; namely, enterprise systems and enterprise application/data integration are covered, with emphasis on the business and technical principles of each approach, as well as their pros and cons. Design and implementation examples of enterprise resource planning systems, customer relationship management systems, and supply chain management systems will be used to illustrate the challenges and benefits of integration.

INFO 315 E-Commerce Business Models and Technologies 3 cr.
Provides both the strategic and technical essentials of what a manager needs to know in order to manage and lead an electronic commerce (EC) initiative. Topics include EC business models, economics of information goods, virtual value chain, impact of EC on organizational strategy and industry structure, in-depth assessment of successful EC strategies, and emerging issues related to electronic communities and virtual organizations as well as website design. Issues of design of e-commerce applications are considered, including hardware, software and network issues; usability; software tools; web analytics; and team dynamics. The course also includes producing a business plan, a requirements definition document, and several case studies.

INFO 320 Building Business Value with Technology Innovation 3 cr.
Information technology (IT) is the key enabler of most key innovations and improvements in business and society. This course develops critical analysis skills required to bring new ideas into fruition that build and maintain organizations. These innovations require leveraging IT in these businesses. The course covers marketing to technology organizations; employing IT to create new business models; innovation at industry-leading companies using IT; current IT trends.

INFO 330 Improving Service Delivery with IT / Operations Management 3 cr.
Provides tools and frameworks for managers to understand, assess, and improve the performance of their operations with an emphasis on services. Topics include service management, service blueprinting, needs of customers, managing service delivery processes, and continuous improvement of services. Services are generally delivered through information technology (IT) so the course will weave IT into both service design (strategic use of IT) and operations (IT applications).

INFO/DCSN 350 Special Topics 3 cr.
Focuses on analysis of contemporary decision systems or information systems issues and problems. The course may be repeated for credit when the topics vary. Credits depend on the course offered. Prerequisite: Approval of track convener.

INFO 351 Information Systems Tutorial 3 cr.
Provides opportunities for students to pursue directed study and preliminary research relevant to an area of expertise they want to develop when existing courses do not serve that purpose. This course includes presentation of a report on the work. Prerequisite: Approval of track convener.
The Masters in Finance (MF) Program

Philosophy

In 2012, the OSB introduced a specialized Masters in Finance (herein referred to as the MF) to its suite of graduate degree program offerings as part of its 5-year strategy to better serve the region, increase its graduate enrollment and further enhance AUB’s global brand as the regional business education leader. The MF is aimed at graduating proficient individuals, wishing to become technical experts in the finance profession. It seeks to supply the regional financial markets with a workforce that is equipped with knowledge of relevant, cutting-edge financial theories and tools.

Admission to the Program

Normally, there is one admission deadline a year: in February, for enrollment in the fall semester. For more detail, please refer to the Admissions section of the AUB graduate catalogue, under Application Procedures.

Criteria for Admission

To be eligible for admission to the MF program, a student must hold a Bachelor’s degree and must satisfy the requirements of the University for admission to graduate study.

To be accepted into the MF program, the applicant must possess an undergraduate university average in the last two years of study greater than 80 or equivalent. A minimum of 600 GMAT score (or equivalent GRE score) is required from those coming from a non-quantitative background. Students with a quantitative background, specifically those coming from the following fields: Finance, Accounting, Math, Physics, Engineering, and Economics, are exempted from the GMAT requirement. Applicants with previous work experience in the field of finance are at an advantage. Personal interviews will be conducted with the MF applicants whenever deemed necessary by the graduate committee.

The program is open to students from other educational backgrounds including engineering, economics, mathematics, statistics and so forth. Students not having an undergraduate degree in business will be required to take at least two pre-requisite courses prior to enrollment in the core.

The Application Process

• To apply for admission to the MF program, an applicant must submit all of the following:
  • An application form
  • Two letters of recommendation
  • An official transcript for all undergraduate and/or graduate course work
  • Refer to the English Language Proficiency Requirement (ELPR) page 37.
  • A GMAT or GRE score for students coming from a non-quantitative background.
  • An application fee
  • A curriculum vitae

Program Outline

Overview

The MF program can be completed in a 14 month period by students with non-business backgrounds. A minimum of one calendar year of residence is required for graduation for students with business backgrounds.

In order to fulfill the MF graduation requirements, a student must complete the following on a full-time basis as tabulated below. No project will be required.

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Credits</th>
<th>Hours (minimum)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>21</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Total Number of Credits Required for Graduation</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

The Curriculum

The graduate program consists of 7 core courses and 3 electives spanning the various areas of corporate financial management, risk analysis and management, investments and portfolio theory, quantitative finance. The program follows closely the CFA curriculum and covers the material of the three CFA levels and beyond.

The core courses are in the general area of:
• MFIN 301: Quantitative Methods of Finance
• MFIN 302: Financial Statement Analysis
• MFIN 303: Security Analysis
• MFIN 304: Financial Strategy
• MFIN 305: Structured Finance
• MFIN 306: Portfolio Management
• MFIN 307: Equity Valuation

Three elective courses may be chosen from the following list of courses:
• MFIN 351: Fixed Income Securities
• MFIN 352: Islamic Finance
• MFIN 353: Empirical Finance
• MFIN 354: Credit Risk Measurement and Management
• MFIN 355: Entrepreneurial Finance
• MFIN 356: International Finance

Students not having an undergraduate degree in business will be required to take, prior to enrolling in the MF program, at least two pre-requisite/remedial courses of 3 credits each:
• Financial Accounting/ Basics of Finance
• Quantitative Analysis/Economics

As mentioned previously, these students can complete the program in 14 months.
Program Structure
The MF can be completed in three semesters (one year) in accordance with the recommended time frame suggested below for students enrolled in the program on a full-time basis.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Normal (cr.)</th>
<th>Core/Elective/Remedial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Summer Semester (Required for Non-BBA Holders)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preterm Course: Financial Accounting/Basics of Finance</td>
<td>3</td>
<td>remedial</td>
</tr>
<tr>
<td>Preterm Course: Quantitative Analysis/Economics</td>
<td>3</td>
<td>remedial</td>
</tr>
<tr>
<td><strong>Fall Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFIN 301: Quantitative Methods of Finance</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>MFIN 302: Financial Statement Analysis</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>MFIN 303: Security Analysis¹</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>MFIN 304: Financial Strategy</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td><strong>Spring Semester</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFIN 305: Structured Finance</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>MFIN 306: Portfolio Management¹</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>MFIN 307: Equity Valuation</td>
<td>3</td>
<td>core</td>
</tr>
<tr>
<td>Students to select 1 of 3 electives (below):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFIN 351: Fixed Income Securities</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td>MFIN 352: Islamic Finance</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td>MFIN 353: Financial Econometrics²</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td><strong>Summer Semester: Students to select 2 of 3 electives (below):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MFIN 354: Credit Risk Measurement and Management¹</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td>MFIN 355: Entrepreneurial Finance</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td>MFIN 356: International Finance</td>
<td>3</td>
<td>elective</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Academic Policies

Academic Rules and Regulations
University Academic Rules and Regulations on courses, grades, probation and dismissal apply. The minimum passing grade in a course is 70. Students in the MF program are required to maintain a cumulative average of at least 80 in all courses taken for graduate credit.

1. Equivalent courses that can be taken at the Engineering Management department are:
   a. ENMG624 Financial Engineering I as a substitute for the core course MFIN 306 Portfolio Management
   b. ENMG625 Financial Engineering II as a substitute for the elective MFIN 354 Credit Risk Measurement and Management.

2. Equivalent courses that can be taken at the Financial Economics department are:
   a. ECON 340 Financial Economics I as a substitute for the core course MFIN 303 Security Analysis, and

Academic Advisers
Each student has an academic adviser who normally approves the student’s schedule each semester. The General University Academic Information section of this catalogue provides further information on academic advisers.

MFIN Courses

Remedial Courses

Financial Accounting 1.5 cr.
This course provides a brief overview of the accounting cycle. It first includes a discussion of the financial statements a large diversified international company. Next, it briefly discusses the accounting standards in the U.S. and at the international level. This is followed by an analysis of the accounting framework including the objectives behind financial reporting, the main users of financial statements, the elements of the financial statements, in addition to the assumptions, principles, and constraints that apply when reporting the financial position of a firm. The last section of the course covers issues related to the accounting cycle including recording business transactions, preparing trial balance and financial statements, to conclude with closing entries.

Basics of Finance 1.5 cr.
This course is an introduction to business finance (corporate financial management and investments). Participants develop a toolkit to analyze financial decisions based on principles of modern financial theory. The course introduces concepts such as discounted cash flow, corporate capital budgeting and corporate financial policy.

Quantitative Analysis/Economics 3 cr.
This is a foundation course that covers the essential tools from quantitative analysis and economic theory required for investment analysis. In the first part of the course, topics covered include probability distributions, sampling and estimation and hypothesis testing. The latter part of course gives an overview of the essentials of micro and macroeconomic theory, such as elasticity, market structure, aggregate supply and demand and monetary policy.

Core Courses

MFIN 301 Quantitative Methods of Finance 3 cr.
This course introduces students to the basics of quantitative methods, providing many basic tools used in the investment decision-making. Statistical analysis is covered in depth.

MFIN 302 Financial Statement Analysis 3 cr.
Integrates contemporary corporate financial reporting issues with financial analysis, interpretation, and performance evaluation using a case approach. It presents an in-depth discussion of factors affecting analysis of business organizations and business strategy issues, and explores measurement of items on financial statements, disclosures, standard setting issues, financial reporting internationally, financial reporting implications, and investment evaluation.

MFIN 303 Security Analysis 3 cr.
Provides institutional elements of capital markets, mechanisms of securities trading; analytical techniques for evaluating investment management. This course also puts emphasis on the behavior of security prices, efficient diversification, techniques for measuring performance of securities and portfolios, security valuation, and portfolio selection.
MFIN 304  Financial Strategy  3 cr.
Provides students with the conceptual framework necessary to appreciate and understand the problems facing the financial manager. Readings, case analysis, and problem sets focus on the basic tools used by financial analysts and financial decision makers. This course is devoted to the two basic financial questions that all companies face: (1) where should funds be invested (i.e., investment decisions)? and (2) from where should funds be obtained (i.e., financing decisions)?

MFIN 305  Structured Finance  3 cr.
Covers forwards, options and futures. At the end of the course, students will gain an understanding of the mechanics of derivatives (contingent claims) markets and how derivative products are used and priced. Students will also be introduced to continuous-time financial models and their uses in modeling and valuing contingent claims.

MFIN 306  Portfolio Management  3 cr.
This course will be divided into two parts: security analysis and portfolio management. The first half of this course deals with capital markets; fixed-income securities and equity valuation models. Areas such as Capital-Asset Pricing Model, Arbitrage Pricing Theory, and Market Efficiency are covered. The second part examines the role of strategic asset allocation in relation to systematic risk. Issues like capital allocation and optimal risky portfolios are explored in the framework of the macroeconomic conditions, exogenous shocks, forecasting, and business cycle dynamics. Then the process of portfolio management is studied; evaluating portfolio performance, the theory of active portfolio management, and global investment performance standards are among the issues to be discussed.

MFIN 307  Equity Valuation  3 cr.
Provides students with a deep understanding of the relevant issues that financial analysts, firms, and investors must deal with when valuing a firm. Topics to be covered will include the role of valuation, discounted cash flow valuation, understanding the basic of financial statements, the basic of risk analysis, cost of capital, comparative analysis, valuing private firms, and other related topics.

Elective Courses

MFIN 351  Fixed Income Securities  3 cr.
Provides an in-depth analysis of the concepts that are most often encountered in the global market for fixed income securities. The goal of the course is to develop a theoretical and mathematical approach to valuation that will be useful in a wide range of financial applications as it will develop the set of tools required to evaluate virtually any fixed income instrument.

MFIN 352  Islamic Finance  3 cr.
This course introduces the concept of interest-free transactions, commonly called Islamic Finance, where students acquire hands-on knowledge of the Islamic law of contracts, Islamic finance applications and Islamic financial instruments. The course prepares the student to the Islamic banking practice by introducing hand-on concepts, methodologies, structures and cash flow for all Islamic financial instruments in the market: trade financing, equity financing, fixed income and debt instruments and derivatives.

MFIN 353  Financial Econometrics  3 cr.
Introduces graduates to recent research in empirical finance. The course will equip students with quantitative and econometric tools allowing them to model and forecast asset returns and volatility. Topics covered include stochastic processes and their use in empirical finance, the properties of asset returns, tests of the random walk hypothesis, volatility modeling, the econometrics of options and futures markets as well as some elements of forecasting.

MFIN 354  Credit Risk Measurement and Management  3 cr.
Presents students with an array of credit risk models that are used by modern financial institutions. The course is mainly divided into two parts: measuring risk and managing risk. Students will learn various techniques in measuring and valuing risks in the realm of recent development in securitization, off-balance-sheet banking, and international banking. The course also provides a thorough discussion on credit derivatives as the most powerful tools available for managing risk. Credit Default Swaps (CDSs) and Collateralized Debt Obligations (CDOs) are analyzed in the context of the credit crisis of 2007.

MFIN 355  Entrepreneurial Finance  3 cr.
Seeks to understand how private equity firms work, why they take the forms that they do, how they support small and medium enterprises, and where crucial problems and opportunities for innovation exist. The strategies and incentives of the various players and how they maneuver through the business cycle are examined. The course provides a comprehensive overview of the Venture Capital and Private Equity (VCPE) investment businesses, from the perspectives of the private equity investor as well as the entrepreneur seeking funding for his or her company. From the investor’s viewpoint, the course is structured around Entrepreneurial Finance concepts and is designed to help managers make better investment and financing decisions in entrepreneurial settings. As such, the course will cover all stages of the process, from startup to harvest. It will look at the business from fund formation, through the investment process, and on to the “exit”. This integrates people into the equation by taking into account their capabilities, their incentives, and the cognitive biases they bring to decision-making. The course will go in depth in structuring multi-staged financings, understanding business models, and valuing entrepreneurial ventures. From the perspective of the entrepreneur, it will examine all aspects of deal negotiation, company valuation, structuring, board relations, succession planning, and, finally, gain realization.

MFIN 356  International Finance  3 cr.
This course provides an analysis of the opportunities, problems, and financial decisions confronting multinational companies. The focus of this course is on understanding and using case studies to apply concepts related to the international regulatory and environment differences, access to money and capital markets, use of derivatives to hedge exchange rate risk, exposure to political risk and other types of risk, and international diversification.

The Masters in Human Resource Management (MHRM) Program

Philosophy
In 2012, the OSB introduced a Specialized Masters in Human Resource Management (herein referred to as the MHRM) to its suite of graduate degree program offerings as part of its 5-year strategy to better serve the region, increase its graduate enrollment and further enhance AUB’s global brand as the regional business education leader. The MHRM is aimed at early-to-mid career professionals in HR or other fields (potential career switchers) who wish to advance within the HR structures of the best organizations throughout the Middle East region. The envisioned program would prepare participants to become “expert leaders” in the HR function, whether in large local or multinational corporations, in small and medium or family enterprises or as management consultants. In addition to providing a current toolkit of highly sophisticated, yet practical human resource management skills that are applicable to the industry, the MHRM program is also designed to allow adequate preparation for the pursuit of doctoral education should students choose to pursue further study.
Admission to the Program

Normally, there is one admission deadline a year: in February, for enrollment in the fall semester. For more detail, please refer to the Admissions section of the AUB graduate catalogue, under Application Procedures.

Criteria for Admission

To be eligible for admission to the MHRM program, an applicant must hold a university degree recognized by AUB, must possess a minimum of one year of professional work experience and must satisfy the requirements of the University for admission to graduate study (including meeting the English Language Proficiency Requirement (ELPR) of the University).

Admitted applicants will normally have attained the following:

• An undergraduate average of at least 80 or equivalent in any major. The undergraduate degree must be obtained from a University recognized by AUB.
• A minimum of 2 years of relevant work experience preferably in the field of human resources.
• A successful personal interview (optional and by invitation at the discretion of the OSB Graduate Studies Committee).

Admitted participants with non-business undergraduate degrees are required to successfully complete two remedial business courses prior to the commencement of the HRM program.

The GMAT will not be required but professional work experience is necessary and the typical student will be an early career professional with an interest in HRM. However, the GMAT and work experience criteria may be modified in the future depending on the volume of applicants.

The Application Process

To apply for admission to the MHRM program, an applicant must submit all of the following:

• An application form
• Two letters of recommendation
• An official transcript for all undergraduate and/or graduate course work
• Refer to the English Language Proficiency Requirement (ELPR) page 37
• An application fee
• A curriculum vitae
• A cover lettering including a one-to-two page summary of relevant work experience

Program Outline

Overview

The MHRM requires a minimum of 30 credit hours in 9 required courses (27 credits) and one (3 credit) industry project/practicum. The comprehensive industry project is rooted in applying analytical and conceptual skills, knowledge and tools to a real-time strategic HR problem. Admitted students not having an undergraduate degree in business will be required to take, prior to enrolling in the MHRM program, two pre-requisite courses (remedial courses) of 3 credits each.

Program Delivery

Participants normally complete the program in 15–18 months depending on their backgrounds. Classes are normally delivered in three 8-hour days (Thursday, Friday, Saturday) every 3 weeks requiring approximately 1.25 years (15 months) for program completion. For students with non-business backgrounds, the program will require 36 credit hours or approximately 1.5 years (18 months) to complete.

The Curriculum

The graduate program consists of 9 core courses (3 credit hours each) and 1 comprehensive industry project to be completed on a modular basis in a 15 month period. The courses are:

- MHRM 301: Managing the Recruitment Process (3 Credits)
- MHRM 302: Human Capital Training and Development (3 Credits)
- MHRM 303: Compensation in the Broader Performance Management Context (3 Credits)
- MHRM 304: Business Ethics and Sustainability (3 Credits)
- MHRM 305: Leadership and Behavior in Organizations (3 Credits)
- MHRM 306: Strategic HRM and Change Management (3 Credits)
- MHRM 307: Professional HRM Challenges in the Middle East (3 Credits)
- MHRM 308: HRM Best Practices in a Global Context (3 Credits)
- MHRM 309: Organizational Research Design and Methods (3 Credits)
- MHRM 310: MHRM Project (3 Credits)

Students not having an undergraduate degree in business will be required to take, prior to enrolling in the MHRM program, at least two pre-requisite courses (remedial courses) of 3 credits each:

• Overview of Accounting and Finance
• The Business Value Chain

Academic Policies

Academic Rules and Regulations

University Academic Rules and Regulations on courses, grades, probation and dismissal apply. The minimum passing grade in a course is 70. Students in the MHRM program are required to maintain a cumulative average of at least 80 in all courses taken for graduate credit.

Academic Advisers

Each student has an academic adviser who normally approves the student’s schedule each semester. The General University Academic Information section of this catalogue provides further information on academic advisers.
MHRM Courses

Remedial Courses

Overview of Accounting 1.5 cr.
This course provides a brief overview of the accounting cycle. It first includes a discussion of the financial statements of Procter and Gamble. Next, it briefly discusses the accounting standards in the U.S. and at the international level. This is followed by an analysis of the accounting framework including the objectives behind financial reporting, the main users of financial statements, the elements of the financial statements, in addition to the assumptions, principles, and constraints that apply when reporting the financial position of a firm. The last section of the course covers issues related to the accounting cycle including recording business transactions, preparing trial balance and financial statements, to conclude with closing entries.

Overview of Finance 1.5 cr.
This course is an introduction to business finance (corporate financial management and investments). Participants develop a toolkit to analyze financial decisions based on principles of modern financial theory. The course introduces concepts such as discounted cash flow, corporate capital budgeting and corporate financial policy.

Core Courses

MHRM 301 Managing the Recruitment Process 3 cr.
This course explores how organizations plan for changes in their workforce, create recruitment strategies, and develop selection systems to identify the best talent for their businesses. It encompasses planning for, establishing, and maintaining a quality work force; identifying critical specifications for filling positions; recruiting a pool of talent; developing methods for selecting from the talent pool and creating desirable person/job and organization fit.

MHRM 302 Human Capital Training and Development 3 cr.
The first part of this course introduces students to the psychology of training. It focuses on how the research literature supports different approaches to training needs analysis, training design and training evaluation. The second part of the course introduces students to principles of employee development, with focus on coaching. It focuses on the history of coaching, coaching models, the importance of evidence-based practice and the use of methods drawn from behavioral science, along with ethical considerations and evaluation.

MHRM 303 Compensation in the Broader Performance Management Context 3 cr.
This course examines compensation practice, the criteria used to compensate employees, compensation system design issues, and employee benefits, challenges of compensating key strategic employee groups, and employee benefits and services. The course also discusses compensation as part of the broader performance management context. This course is most suited for the HR professional interested in knowledge of the art and science of compensation practice and its role in promoting companies’ competitive advantage.

MHRM 304 Business Ethics and Sustainability 3 cr.
This course is designed to provide a forum for students to discuss, apply and develop more ethically-informed and socially responsible rationales for decision making in business and corporate situations. Key concepts and decision-making frameworks in Business Ethics and Corporate Social Responsibility will be used as a basis to assess business scenarios and to justify particular courses of action. Through cases focusing on the social, reputational, and environmental consequences of corporate actions, students will learn how to make difficult choices and critically argue in favor of these choices.

MHRM 305 Leadership and Behavior in Organizations 3 cr.
This course introduces students to many of the basic principles of human behavior that effective managers apply when managing individuals and groups in organizations. These include individual differences in abilities and attitudes, perception, attribution and bias, motivation, group dynamics including teams and communication, power and politics, organizational culture, and organizational structure and design. Particular attention is given to the psychological aspects of the employment relationship. Leadership is also highlighted as a crucial underpinning of group processes, and as a decisive factor in organizational success, with the tone of leadership having important implications for HRM success.

This course aims to highlight the complex interactions and the needed alignment of human resource management and strategy. It starts by highlighting the ABCs of effective strategy making and how people strategies are organically linked to corporate strategy making and essential for their successful achievement. Thus the unit captures the complex human issues which invariably affect the formation and execution of strategy. The course examines changes in human resource practices against the background of business strategy and objectives, and links human resource practices to business performance and outcomes. The entire unit is grounded in the context of change management theories and concepts given that SHRM requires a significant change away from transactional HRM prevalent today. The course will also include relevant critique of the SHRM paradigm.

MHRM 307 Professional HRM Challenges in the Middle East 3 cr.
This course addresses contemporary issues and challenges facing human resource management professionals in the Middle East region. The course addresses potentially salient internal and external challenges that may face HR practitioners, including organizational culture and myopic CEOs, organizational structure, and short term strategizing but also external challenges relating to peculiarities of labor laws and socio-cultural norms and how they can affect HP practice. The course promotes an appreciation of the unique characteristics and challenges that exist within the socio-economic, political and cultural context of the Middle East and entices participants to reflect upon how to address those challenges and craft relevant HRM practices for the region.

MHRM 308 HRM Best Practices in a Global Context 3 cr.
This course provides a comprehensive, international perspective of the consequences of internationalization for the management of people across borders. Main topics covered include a thorough overview of the ways that HRM has been conceptualized to date, expatriate management and employment practices seen from both their external environment and the internal environment of the multi-national corporation and the current state of the field on IHRM practices (which extends to the role of globalization and the extent to which HRM differs between countries and the underlying reasons for these differences). The course will also accord consideration to the latest international debate in relation to HRM structural issues, including outsourcing, shared service development, and relationships between HR and organizational design/development.
MHRM 309  Organizational Research Design and Methods  3 cr.
This course will be an overview of methods and statistics most commonly used in organizational research, focusing on research design and strategies. The course will cover basic inferential statistics including t-test and regression. Students will also be exposed to qualitative research techniques such as interviews, focus groups, case studies and grounded theory using content analysis. The course will dwell on the organic links between these various research methods and an overall evidence based approach to management and HRM specifically. It will also provide an introduction to basic consulting skills and techniques that are likely to be useful for the HR practitioner.
Faculty of Engineering and Architecture (FEA)
Faculty of Engineering and Architecture (FEA)

Officers of the Faculty
- Peter F. Dorman: President of the University
- Ahmad Dallal: Provost, ex-officio
- Makram Suidan: Dean
- Fadl Moukalled: Associate Dean
- Moueen Salameh: Registrar, ex-officio
- Salim Kanaan: Director of Admissions, ex-officio
- Lokman Meho: University Librarian, ex-officio

Faculty Administrative Support
- Ghada Kamar Najm: Executive Officer
- Alia Kazma Serhal: Student Services Officer
- Lara Touma: Financial Officer
- Suzanne Kobeisse: Accreditation Officer

Historical Background
The first programs leading to a master's degree were introduced in 1962. Since then other programs have been added to help meet the growing demand for advanced engineering education. Between October 1990 and October 1994, six new master's degree programs were introduced: the Master of Engineering Management (1990); four programs leading to the degree of Master of Engineering, with majors in civil engineering; environmental and water resources engineering; electrical and computer engineering; mechanical engineering; and chemical engineering*. The Faculty also offers the degrees of Master of Engineering Management (MEM); Master of Urban Design (MUD); Master of Urban Planning and Policy (MUPP); Master of Science in Environmental Technology (MS); Master of Engineering (ME), major applied energy; Master of Science in Chemical Engineering (MS); and Master of Science in Construction Engineering (MS). The requirements for admission to the master's programs are those specified for the master's degree in the Admissions section in this catalogue, with the following interpretations and additions:

Mission
The Faculty of Engineering and Architecture (FEA) at the American University of Beirut is a leading professional school in the Middle East. The FEA offers educational programs of the highest standards, advances knowledge through research and scholarly creative work of its faculty and students, and provides services to the community at large, while addressing the needs of Lebanon and the region. The FEA undergoes continuous improvement to maintain a challenging and intellectually stimulating environment, and prepares its students to be lifelong learners, innovators, and professionals capable of being leaders in their chosen careers, committed to personal integrity, and civic responsibility.

Graduate Programs

Master's Degree Programs
The Faculty of Engineering and Architecture offers graduate programs of study leading to the degree of Master of Engineering (ME), with majors in civil engineering; environmental and water resources engineering; electrical and computer engineering; mechanical engineering; and chemical engineering*. The Faculty also offers the degrees of Master of Engineering Management (MEM); Master of Urban Design (MUD); Master of Urban Planning and Policy (MUPP); Master of Science in Environmental Technology (MS); Master of Engineering (ME), major applied energy; Master of Science in Chemical Engineering (MS); and Master of Science in Construction Engineering (MS). The requirements for admission to the master's programs are those specified for the master's degree in the Admissions section in this catalogue, with the following interpretations and additions:

Deadlines
Applications for admission to graduate study should be submitted on line through the link https://graduateadmissions.aub.edu.lb/ according to deadlines set in the Admissions section pages 33–46.

- Applications are considered complete upon receipt of at least two letters of recommendation from professors or supervisors of the applicant, and an official transcript covering at least the end of the first semester of the senior year or its equivalent. In addition, applicants to the electrical and computer engineering graduate programs are required to sit for the GRE General Test.
- All applications may include an application for graduate assistantships which is also submitted on line. All applications for graduate assistantships received after admission application deadlines will be considered, pending availability.

Process of Admission
- The Office of Admissions forwards applications for graduate admission to the program/department concerned directly. The graduate faculty adviser, the departmental representative on the graduate studies committee, and the chairperson consider each case individually.
- Recommendations for admission are forwarded to the FEA Graduate Studies Committee from the Dean's Office.*

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* Pending approval of New York board of Education
** At this time the department or program of the intended major may also recommend a waving of up to nine credits of course work for students who have completed a Bachelor of Engineering Degree (BE) and are applying for admissions to a Master of Engineering Program (ME), which is subject to approval by the advisor and the chairperson. To apply, the student must have completed electives in advanced engineering courses (600 and above) that meet the program requirements with a score of at least 80. In addition, the total number of transferable credits from BE to ME should not exceed 12 credits. This means that if a student has taken overload during his/her undergraduate BE studies, he/she can only waive a maximum of 12 credits.
• The Faculty Graduate Studies Committee meets in ‘special sessions for admission’ and recommends applicants for admission.

• Upon confirmation of the admission list by the Graduate Studies Committee, the chair of the graduate studies committee will forward it to the Dean who in turn will forward the list to the university Office of Admissions.

• The Office of Admissions prepares and sends the admission packages.

• Students who are accepted must confirm their acceptance of admissions and assistantships within one month. If a student does not respond within this time, the assistantship will be re-assigned.

• At this time the department or program of the intended major may also recommend a waving of up to nine credits of course work for students who have completed a Bachelor of Engineering Degree (BE) and are applying for admissions to a Master of Engineering Program (ME), which is subject to approval by the advisor and the chairperson. To apply, the student must have completed electives in advanced engineering courses (600 and above) that meet the program requirements with a score of at least 80. In addition, the total number of transferable credits from BE to ME should not exceed 12 credits. This means that if a student has taken overload during his/her undergraduate BE studies, he/she can only waive a maximum of 12 credits.

Criteria for Admission to Master’s Programs

Admission to graduate study offered by the departments of FEA is merit-based and limited to applicants who either hold a bachelor’s degree from AUB or from an approved institution in an appropriate field as specified by the department. Furthermore, such applicants should have completed undergraduate or graduate study that is of sufficient quality and scope to indicate high promise of success in the opinion of the Graduate Studies Committee and the department in which the applicant proposes to study. Admission to graduate study is in one of three categories. The minimum admission standards in all categories are described below. Additional requirements specific to each graduate program within FEA are included in the departmental sections.

Admission as a Regular Student

An applicant is admitted as a regular student if s/he meets the following minimum admission requirements: an average of 80 for the last two years at AUB or the equivalent at other universities as determined by the Faculty, adequate English proficiency as established by the University, and at least two letters of recommendation from faculty or supervisors familiar with the academic ability of the applicant. An applicant whose last semester’s grades are not included in the application is admitted on probation provided that s/he has maintained an average of 75 for the last two years of undergraduate study. In addition, an applicant who does not meet the above minimum requirements but appears to have reasonable potential for success as a graduate student, as manifested by appropriate practical experience or a high score on a relevant standardized exam such as the GRE, may be admitted on probation. A student admitted on probation must complete nine credits of graduate level courses during the first two semesters of graduate study, must pass all courses, and must attain a minimum cumulative average of 80 to receive regular student status. If the student fails to meet any of these conditions, s/he will be dropped from the program.

Admission as a Prospective Master’s Student

This category is reserved for students applying to graduate study in a field other than that of their undergraduate major. An applicant is admitted as a prospective graduate student if s/he meets the following minimum admission requirements: an average of 75 for the last two years at AUB or the equivalent at other universities, as determined by the Faculty, in their undergraduate study; demonstrated competence in courses related to the field being sought; adequate English proficiency as established by the University; and at least two letters of recommendation from faculty members familiar with the academic ability of the applicant. The Graduate Studies Committee shall act on the admission of prospective graduate students upon the recommendation of the department or program of the intended major. The department or program of the intended major recommends the supplementary undergraduate courses the applicant must take before s/he may be considered for admission, to graduate work, by the Graduate Studies Committee. Upon the completion of the supplementary undergraduate courses with an average of at least 80, the department or the academic unit may recommend to the Graduate Studies Committee admission of the applicant to the graduate program. The supplementary courses must be completed within four consecutive semesters, excluding summers.

Academic Evaluation

• A student admitted on probation must complete nine credits of graduate level courses during the first two semesters of graduate studies, must pass all courses, and must attain a minimum cumulative average of 80 to receive regular student status. If the student fails to meet any of these conditions, s/he will be dropped from the graduate program.

• A student is placed on probation if s/he attains a cumulative average of 70 or more, but less than 80. This probation is removed at the end of the following term by the attainment of a cumulative average of at least 80. If the student fails to remove the probation, s/he will be dropped from the graduate program.

• A student is dropped from the graduate program if s/he attains a cumulative average of 70 or more, but less than 80, in any term and fails one course in that term. (This rule does not apply to the first term of study.)

• A student is dropped from the graduate program if s/he attains a cumulative average of less than 70 or fails two courses in one term.

• A student who fails the comprehensive examination twice will be dropped from the program.

• A student who accumulates two consecutive failures in the seminar course will be dropped from the Faculty.

• A student dropped from a graduate program will not be allowed to re-enroll in the same program at any future date.
Doctor of Philosophy (PhD) Programs

The Faculty of Engineering and Architecture offers graduate programs leading to the degree of Doctor of Philosophy (PhD) with specializations in civil engineering, electrical and computer engineering, environmental and water resources engineering, and mechanical engineering.

Criteria for Regular Admission to PhD Programs

Candidates for a doctoral degree program must hold a master's degree or its equivalent and must demonstrate outstanding academic ability (minimum average of 85 or its equivalent) at the master's level, as well as the potential to conduct scholarly research. Additional specific requirements for each program can be found in the departmental sections of this catalogue.

Application to the doctoral program will follow the deadlines set by the Admissions Office. All applicants are required to take the General Exam part of the Graduate Record Examination (GRE) and submit their scores. Students other than AUB graduates and graduates of recognized colleges or universities in North America, Great Britain, Australia, and New Zealand must meet the English language proficiency requirements described for Master's students.

Admission to a PhD program requires the recommendations of a department, the FEA Graduate Studies Committee, and the approval of the AUB Board of Graduate Studies.

Criteria for Admission to the Accelerated PhD Programs

To apply to the accelerated program, students must have an average in their undergraduate work of 85 or above. This applies to the average in the major as well as the cumulative average. In addition to meeting the requirements described in the General University Academic Information Section of the AUB catalogue there may be specific requirements described in the departmental sections of the catalogue.

Financial Support Available to Graduate Students

The FEA offers three types of financial assistance to the most qualified applicants to its graduate programs: fellowships, graduate research assistantships (GRA), and graduate teaching assistantships (GA).

The students who receive financial support are expected to maintain a high level of academic performance, satisfactory progress toward a degree, and a satisfactory performance of the work assignments associated with the aid.

Fellowships, GRAs, and GAs, covering tuition and stipends are available for students at the graduate level in return for assisting faculty members in teaching and/or research for a specified number of hours per week in an academic department. Recipients are selected on the basis of their academic record and departmental need.
Department of Architecture and Design

Chairperson: Musfy, Leila
Graduate Coordinator: Fawaz, Mona
Architectural Coordinator: Najjar, Karim
Professors: Al-Harithy, Howayda; Musfy, Leila
Associate Professors: Arbid, George; Fawaz, Mona; Harb, Mona; Maasri, Zeina;
Sadek, Walid; Saliba, Robert; Shorto, Sylvia
Assistant Professors: Abedini, Reza; Ghaibeh, Lina; Gharbieh, Ahmad; Najjar, Karim
Visiting Assistant Professor: Graef, Alexander
Senior Lecturers: Azar, Kamal; Haddad, Walid; Hassan, Sinan; Jamal, Sany;
Kosermelli, Simone; Nader, Marc; Samara, Rana;
Serof, Gregoire; Yared, Maya; Zgheib, Hani
Lecturers: Abboud, Rania; Abou Rahme, Dahna; Alamuddin, Hana;
Aramouny, Carla; Assi, Najj; Baki, Fadi; Barclay, Ahmad;
Boyadjian, Rafi; Feschfesch, Antoine; Freijj, Mayda;
Genz, Bettina; Haddad, Rana; Hajjar, Majdi; Hallaj, Omar;
Imam, Hatem; Kanaan, Joy; Karanouh, Renia; Khouja, Ahmed;
Mahmoud, Samir; Mallat, Bernard; Nader, Karim; Najem, Wagih;
Nasrallah, Maha; Saikali, Maya; Traboulsi, Jana; Yeretzian, Aram;
Zahreddine, Hassan
Instructors: Abi Hanna, Margheritta; Apelian, Khajag; Captan, Lara;
Hachem, Pascal; Kahwagi, Bassam; Kerbaj, Mazen;
Khoury, Roulia; Maasri, Ghassan; Richani, Sandra;
Youssef, Shawki; Zein, Najla; Zoghbi, Pascal

Graduate Programs
Master of Urban Design (MUD)
Master of Urban Planning and Policy (MUDD)

General Information
The MUPP and MUD programs offer a first graduate degree to students interested in acquiring the necessary skills to tackle the challenges of contemporary urbanization. The programs prepare students to be highly qualified, well-rounded professionals who are able to address the multi-faceted issues of today’s built environments, focusing especially on Lebanon and the region.

The two-year curriculum combines theoretical and methodological seminar courses designed to secure a command of the tools of intellectual inquiry with hands-on studio courses articulated around real-life exercises. The training is multi-disciplinary and research-based. Through these courses, students learn to analyze urban contexts and to formulate interventions in the form of projects and/or policies.

Mission Statements

Master of Urban Design
The Master’s of Urban Design program aims to prepare highly qualified well-rounded professionals who are able to deal with design challenges in the urban environment. The program emphasizes the mastery of the design tools necessary for the effective practice of urban design. Students are exposed to a multi-disciplinary understanding of contemporary urban challenges that trains them to position the design profession amidst other professions of the city. They learn to integrate design tools with policy strategies and institutional development. The Master of Urban Design has adopted the studio-based approach to professional education as the main context of learning. The program accepts university graduates and practitioners from design fields and prepares them to occupy leading professional roles in design and planning firms.

Master of Urban Planning and Policy
The Masters in Urban Planning and Policy program aims to prepare highly qualified, well-rounded professionals who are able to address the multi-faceted issues of urban planning and policymaking in today’s urban environments in Lebanon and the region. The program is designed to provide a broad professional education in urban planning. Emphasis is placed on the development of multi-disciplinary analytical skills necessary to address contemporary urbanization as well as the mastery of the tools and approaches adopted in the contemporary practice of urban planning and policymaking. The program guides students in defining a specific area of expertise within the wider practice of urban planning and in locating their expertise in relation to other professions of the city. The program welcomes university graduates with professional degrees and/or degrees in the social sciences and prepares them to occupy leading professional roles in the public, private, and non-profit sectors.

Program Structure
The two graduate programs each extend over two years of full-time enrollment. The MUPP track requires students to take a total of 30 credits, nine of them in a sub-discipline of specialization where planning and policy-making skills are applied and six credits in applied studio format. The MUD track requires students to take a total of 33 credits, 12 of them in applied design studios. The two tracks share a common core of 21 credits consisting of three core courses (Research Methods, Planning Theory and Policy, and Urbanism); one planning/design workshop; and a six-credit final thesis. The thesis is research based and aims to generate innovative ways of thinking and understanding the context of the regional urban planning and design practice. In addition, all students enrolled in the MUPP/MUD programs are required to register for the zero-credit seminar titled City Debates at least twice during their university enrollment.
Common Core MUPP/MUD

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>URPL 630</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>URPL 631</td>
<td>Introduction to Planning Theory and Policy</td>
<td>3</td>
</tr>
<tr>
<td>URPL 632</td>
<td>Urbanism</td>
<td>3</td>
</tr>
<tr>
<td>URPL/URDS 661</td>
<td>Planning and Design Workshop</td>
<td>6</td>
</tr>
<tr>
<td>URPL 660</td>
<td>City Debates Seminar</td>
<td>0</td>
</tr>
<tr>
<td>URPL/URDS 662</td>
<td>Comprehensive Exams in Field</td>
<td>0</td>
</tr>
<tr>
<td>URPL/URDS 681</td>
<td>Urban Design Thesis</td>
<td>6</td>
</tr>
</tbody>
</table>

Total 21

MUPP Courses
MUPP students are required to take three courses from one area of concentration (9 credits), in a field of applied social science or engineering (such as sociology, economics, public administration, civil or environmental engineering) leading toward concentration areas such as urban policy, community development, transportation, labor, housing, or environmental sustainability. Other options may be agreed upon with the MUPP/MUD academic adviser.

Three courses in area of concentration 9

Total 9

MUD Courses
MUD students are required to take one design studio and two approved electives (12 credits).

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>URDS 602</td>
<td>Urban and Landscape Design Studio</td>
<td>6</td>
</tr>
<tr>
<td>Two approved electives</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

Total 12

Program Agenda
The typical course load for the Urban Planning and Policy, and Urban Design tracks is normally distributed over two years as shown below. Course distribution is subject to the approval of the academic adviser.

Urban Planning and Policy Track

First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>URPL 631</td>
<td>3</td>
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Total 6

Second Year

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Total 9

Urban Design Track

First Year

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Total 6

Second Year

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<td>URPL 660</td>
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Total 9
Admission Qualifications

Applicants who meet all of the AUB and FEA regulations governing admission to graduate study, including acceptable EEE or TOEFL scores (refer to the English Language Proficiency Requirements [EPLR] page 37), and who hold the equivalent of an undergraduate degree in architecture, landscape architecture, environmental design, urban or regional planning, engineering, public health, economics, public administration, sociology, or other social science degree, may be admitted to the Master of Urban Planning and Policy Program as regular graduate students.

Applicants who meet all of the AUB and FEA requirements governing admission to graduate study, including acceptable EEE or TOEFL scores (refer to the English Language Proficiency Requirements [EPLR] page 37), and who hold the equivalent of a professional Bachelor of Architecture or a Bachelor of Landscape Architecture degree may be admitted to the Master of Urban Design Program as graduate students.

Course Descriptions

Mandatory Core Courses

Each of the following courses is required for MUPP/MUD students. Non-majors must secure the approval of the program adviser and the instructor concerned to enroll in any of the courses listed below.

**URDS 601 Planning and Design Workshop 6 cr.**
This course seeks to introduce students to the actual practice of urban planning and design. It engages them in a cyclical process of documenting and analyzing a real-life setting, “framing” issues to be addressed (problems and assets), and in conceptualizing, formulating and developing interventions that work in telescopic form across small and large scales and address issues in a multi-disciplinary form. In the process, students become familiar with local planning tools and learn how to borrow and adapt experiences and approaches developed elsewhere. They also learn how to work in multi-disciplinary teams, to talk across the various disciplines of design and planning (e.g. landscaping, traffic, land use), and to translate and communicate their ideas to stakeholders. The course is open only to students enrolled in the MUPP/MUD programs.

**URDS 602 Urban and Landscape Design Studio 6 cr.**
The aim of this course is to build on students’ knowledge and skills in improving the quality of the physical urban environment and reinforcing the identity of place through design intervention. A selected study area is investigated in terms of its morphological evolution and unique physical features with a clear reading of the social, institutional, and economic dynamics impacting urban form. Through a critical assessment of development and planning processes, a set of design guidelines are articulated on sector, subsector and block levels. The outcome consists of scale drawings and 3D representations with an explicative written report emphasizing design problematic, methodology, recommendations and implementation framework.

**URDS 603 Comprehensive Exams 0 cr.**
This course is 0 credit; Grading Mode: Pass/Fail; Type: Urban Design Comprehensive Exam.

**URDS 604 Urban Design Thesis 6 cr.**
Supervised research and design is conducted individually by the student leading first to a thesis proposal approved by the Graduate Studies Committee and culminating in a final thesis in urban design. A thesis is expected to test either an approach/tool in the local context or inform a conception/theorization of a particular planning and/or design issue on the basis of a grounded investigation. All theses need to lead to practical recommendations and/or a well-formulated proposal for an intervention that qualify them as contributions to the fields of urban design.

**URPL 630 Research Methods 3 cr.**
This course trains students in the research skills needed for the practice of urban planning and design. It takes them through the multiplicity of steps required for the formulation and development of the research needed to support a design or planning intervention. Students learn to identify issues characterizing a particular urban condition, to problematize these issues vis-a-vis related conceptual frameworks, to gather the needed empirical evidence, and to conduct the analysis necessary to reach a diagnosis. Students learn to articulate findings into an informed urban diagnosis on which planning and design goals and interventions are formulated.

**URPL 631 Introduction to Planning Theory and Policy 3 cr.**
This course is designed to introduce students, enrolled in the urban design or urban planning and policy programs, to current debates and practices in the field of urban planning and design in lower income countries, looking at how, where, and by whom interventions in the city are being generated and how the goals of such interventions have evolved over the past decades. The course is conducted in seminar format where students learn to discuss and interpret approaches and test their applicability to the local and regional context of the Middle-East. Special value is placed on allowing students to articulate their own positions as future professional urban planners and/or urban designers.

**URPL 632 Urbanism 3 cr.**
This course is designed as an introduction for students in urban design and urban planning and policy to the field of urban studies, with a major focus on how this field has been conceptualized since the early 1970s. It seeks to expose students to some of the ways in which social scientists have conceptualized and researched urban spaces, such as the social production of space, the city as growth machine, the city as body politics, and others. Special emphasis is placed on the implications of these theories to the practice of urban planning and design and to their relevance in the regional context.

**URPL 660 City Debates Seminar 0 cr.**
The yearly seminar titled City Debates, addresses various urban issues. In particular, it tackles ongoing planning and design concerns from a multi-disciplinary perspective related to Lebanon’s post-war development in its regional context. The seminar is offered annually during the spring semester. Topics have included: A Critical Assessment of the Lebanese National Master Plan; Urban Heritage and the Politics of the Present: Perspectives from the Middle East, Spaces of Faith and Fun, Cities of/in Security, and Contemporary Urbanism in the Arab World.

**URPL 661 Planning and Design Workshop 6 cr.**
See description of URDS 601.

**URPL 662 Comprehensive Exams 0 cr.**
This course is 0 credit; Grading Mode: Pass/Fail; Type: Planning Comprehensive Exam.
URPL 663 Planning Thesis 6 cr.
Supervised research conducted individually by the student leading to a thesis proposal approved by the Graduate Studies Committee and culminating in a final thesis in urban planning and policy. A thesis is expected to build on a real case study context and either test an approach/tool in the local context or inform a conception/theorization of a particular planning and/or design issue on the basis of a grounded investigation. All theses need to lead to practical recommendations and/or a well-formulated proposal for an intervention that qualify them as contributions to the fields of urban planning and policy.

Elective Courses

MUPP-MUD elective courses are open to graduates and senior undergraduates from all AUB departments.

URPL 620 Building the Colonies: Colonialism, Imperialism, and Urban Change 3 cr.
Colonialism and imperialism can be interpreted as part of larger ideological and sociopolitical systems that continue to inform changing cultural values today. This course uses sites of colonial urbanism to investigate ways by which spatial organization is used to produce historical knowledge. We consider alterations made to pre-existing cities, as well as new city plans, both built and projected, in the Americas, in Asia, and around the Mediterranean Rim.

URPL 621 Urban Form and its Formation 3 cr.
The course examines the various elements that make up urban patterns, giving insight into the city-building processes that generate these patterns. Students are exposed to urban morphology and planning history, and urban historical geography. The goal is to build an ability to “read” and “write” the city through a range of disparate approaches. The course concludes by considering the ways in which knowledge about urban forms can contribute to the practice of planners and designers as molders and managers of changing urban landscapes.

URPL 637/ ARCH 036 Illegal Cities 3 cr.
This seminar is designed as an introduction for students enrolled in architecture, urban planning and policy, and urban design to the ongoing debates about the relationship between law and the building process, specifically looking at its actual materialization in illegal/informal settlements. It is based on a combination of lecture/seminar sessions in which various theorizations of the city/law nexus are explored and on field studies/class discussions in which the applications of these theories are investigated using a local case study.

URPL 639 Spaces of Faith and Fun 3 cr.
This course teaches how the city shapes and is shaped by ideas about pious morality. Taking South Beirut’s pious leisure places as a case-study, it investigates three sets of questions. First, how do leisure geographies provide young pious groups with opportunities for social interaction, self-development and identity formation? Second, how do leisure places contribute to shaping socio-spatial networks within and outside different city’s neighborhoods, contributing to urban experiences of/in the city? Third, how do leisure geographies reconfigure and redraw socio-spatial boundaries and hierarchies in the city?

URPL641 Introduction to GIS and Spatial Analysis for Planning and Architecture 3cr.
This course offers an introduction to geographic information systems (GIS) as applied to urban and regional planning, community development, and local government. Emphasis is placed on learning GIS technology and spatial analysis techniques through extensive hands-on exercises using real-world data sets such as the census of population and housing. The course includes an introduction to urban planning problems, involving the selection of appropriate methods, the use of primary and secondary data, computer-based modeling, and spatial analysis.

URPL 664 Urban Land Use Planning 3 cr.
This course examines the theory and practice of land use planning as it has developed within the wider practice and theorization of planning. The course explores the ways in which land use controls have been developed and managed in different institutional and regional contexts, unraveling the different conceptualizations of planning that support each of them. Special emphasis is placed on the case of Lebanon where the practice of land use planning is explored through a detailed introduction to planning institutions, agencies, and regulations.

URPL 665/ ARCH 062 Development and Planning Policies 3 cr.
The course examines local and regional development and spatial planning projects and policies. It investigates the policy governance and institutional setup, the role of professional expertise, the spatial impacts on the built and un-built environments, as well as the social and environmental impacts. Using case-study analysis of selected cities and regions, students learn how the built environment’s growth and development is being managed, across different contexts, by a constellation of stakeholders negotiating conflicting interests, often yielding benefits and costs unequally distributed across various constituent groups.

URPL 666 Transportation Planning and Policy 3 cr.
The course focuses on transportation policy and planning for transportation facilities and services as well as the interaction between transportation and built, natural, and social environments. The course’s intent is to provide students with the necessary knowledge for analyzing transportation problems in the field, as well as the policy framework for examining the broader social, economic, and environmental implications of alternative transportation planning decisions. The course discusses policy making and policy instruments, considers alternative institutional arrangements for policy development and implementation, and evaluates the efficacy of different policy interventions. The interaction between technical analysis and policy making is also addressed.

URDS 624 Hybrid Beirut: Morphogenesis of the Contemporary City 3 cr.
Looking East and West, Beirut has been part of modernization efforts from the mid-nineteenth century to the present. Subjected to colonialism, Beirut was able to develop its own response to early modernization through the assimilation of Western urban models and architectural trends. The resulting cultural hybridity and townscape diversity can only be understood by exploring the transitional years of the city from a Medieval Arab-Islamic town in the 1840s to a showcase of the French Mandate in the Levant in the 1920s and 30s. This course is an attempt to read the contemporary city through its recent colonial past and to trace the continuity and change in its social, economic and cultural conditions as mirrored in the spatial urban structure and building typologies.
URDS 632 From Urban Design to Landscape Urbanism 3 cr.
This course explores the changing conception of city space examining the shifts in environmental design theory and practice. The class will cover the foundation of urban design as a traditional discipline while opening up to emerging design ideologies and tactics in line with contemporary urban mutations. The course will appeal to students in architecture, landscape architecture and urbanism who are interested in crossing the boundaries between disciplines and exploring new potentialities in design thinking.

URDS 634 The Contested Urban Heritage of Cities in the Arab World 3 cr.
The seminar focuses on urban heritage and the politics of its identification, conservation, and representation. The principal theoretical position recognizes heritage as an intrinsically contested notion. Issues such as collective memory, invented traditions, constructed identities, heritage tourism, cultural consumption and sacredscapes are debated and examined through case studies that include Jerusalem, Beirut, Cairo, Riyadh, and Dubai.

URDS 664 Ecological Landscape Design and Planning 3 cr.
The course which is an introduction to the theory and methodology of ecological landscape design and planning, aims at introduce the holistic approach of landscape ecology and its application to the sustainable management of natural and cultural landscapes/ecosystems. The course syllabus is planned to prioritize Mediterranean ecosystems and landscapes and equally to promote interdisciplinary collaboration in research and project management.
Department of Civil and Environmental Engineering

Chairperson: El-Fadel, Mutasem
Professor Emeritus: Iliya, Raja
Professors: Ayoub, George; Basha, Habib; El Fadel, Mutasem; Hamad, Bilal; Harajli, Mohamed; Kaysi, Isam; Mabsout, Mounir; Sadek, Salah; Suidan, Makram
Associate Professor: Chehab, Ghassan
Assistant Professors: Abou Najm, Majdi; Abou Zeid, Maya; Alameddine, Ibrahim; El-Khoury, Hiam; Hamzeh, Farook; Hantouche, Elie; Najjar, Shadi; Saad, George; Salam, Darine
Part time Senior Lecturer: Azar, Kamal
Part time Lecturers: Basha, Hisham; El Souri, Amer; Fawwaz, Youssef; Inglessis, Constantine; Nader, Halim; Nasreddine, Khaldoun; Sadeck, Salah El-Dinn
Part time Instructor: Hasbini, Hayssam
Laboratories: El Khatib, Helim; Semerjian, Lucy

Graduate Programs

Master of Engineering and Master of Science Programs

Programs are offered leading to the ME degree in Civil and Environmental Engineering with the following majors:

- Master of Engineering (ME); major, Civil Engineering (CE)
- Master of Engineering (ME); major, Environmental and Water Resources Engineering (EWRE)

Also offered is a program leading to the MS degree in Environmental Science with the following major:

- Master of Science (MS); major, Environmental Technology (ET)

The master's degree programs prepare students through course work and research giving them in-depth knowledge in the various fields of civil and environmental engineering. They provide students with significant research experience, and equip graduates with the necessary tools for professional practice and/or the pursuit of higher education.

Doctor of Philosophy Programs

Two programs are offered leading to the PhD degree in Civil and Environmental Engineering with the following specializations:

- Doctor of Philosophy (PhD); specialization, Civil Engineering; areas of concentration:
  - Structural and Materials Engineering
Non-Thesis Program Requirements
In order to fulfill graduation requirements in the Non-Thesis Program a student must complete a minimum of 33 credit hours of graduate courses. The required course work for the ME degree with a major in civil engineering (Non-Thesis Program) is distributed as follows:

- A minimum of five courses (15 credit hours) in the field of concentration
- A maximum of three courses (9 credit hours) in a relevant field
- A maximum of three courses (9 credit hours) of free electives

Courses in the last two categories need to be approved by the department.

All students registered in the program must take CIVE 797, Civil Engineering Seminar (0 credit), whenever offered.

A minimum of one calendar year of residence is required for graduation. The student must satisfy all relevant FEA and AUB requirements.

Master of Engineering (ME)
Major: Environmental and Water Resources Engineering (EWRE)

General Information
The Department of Civil and Environmental Engineering offers a graduate program leading to the degree of Master of Engineering (ME): major, Environmental and Water Resources Engineering (EWRE). The program prepares students through course work and research giving them in-depth knowledge in the fields of environmental and water resources engineering.

In order to fulfill graduation requirements, a student must complete a minimum of 24 course credit hours as well as a six credit hour thesis. This may be accomplished on either a full, or a part-time basis. A minimum of one calendar year of residence is required for graduation.

The ME program in Environmental and Water Resources Engineering offers two tracks with course requirements as listed below.

- **Track A**
  - Specialization in Environmental Engineering
  - Minor in Water Resources Engineering

- **Track B**
  - Specialization in Water Resources Engineering
  - Minor in Environmental Engineering

Admission Requirements
To be eligible for admission to the environmental and water resources engineering graduate program, a student must hold a bachelor's degree in environmental engineering or its equivalent. Engineering graduate students in majors other than civil engineering may be admitted to the program and are required to take prerequisite courses set by the department. Students must also satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of this catalogue.

Graduates of universities other than AUB may be required to take undergraduate prerequisite courses to make up for deficiencies they may have. A minimum grade of 70, or its equivalent, is required in each of these courses. No credit, toward the graduate degree, is given for these courses.

Thesis Program Requirements
In order to fulfill graduation requirements in the Thesis Program a student must complete a minimum of 24 credit hours of graduate courses and a thesis based on independent research, equivalent to at least six credit hours. The required course work for the ME degree with a major in civil engineering (Thesis Program) is distributed as follows:

- A minimum of four courses (12 credit hours) in the field of specialty
- A maximum of two courses (6 credit hours) in a relevant field
- A maximum of two courses (6 credit hours) of free electives

Courses in the last two categories need to be approved by the department.

All students registered in the program must take CIVE 797, Civil Engineering Seminar (0 credit), whenever offered.

A minimum of one calendar year of residence is required for graduation. The student must satisfy all relevant FEA and AUB requirements.
• All students admitted to the program are normally required to take, or to have taken, the following courses, or their equivalent, as prerequisites.

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<td>CIVE 441 Engineering Hydrology</td>
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<tr>
<td>CIVE 450 Water and Wastewater Treatment and Laboratory</td>
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• A minimum grade of 70, or its equivalent, is required in each of these courses. Students required to take undergraduate prerequisite courses to make up for deficiencies will receive no credits toward the graduate degree.

• All students registered in the program must take ENSC 690, Seminar in Environmental Sciences (0 credit), whenever it is offered.

Course Requirements

Track A  Specialization: Environmental Engineering Minor: Water Resources Engineering

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<th>Thesis Option</th>
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<tr>
<td>Electives II Group B1+B2+AB</td>
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<td>Thesis Option CIVE 799</td>
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Thesis Option | Non Thesis Option |
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Track B  Specialization: Water Resources Engineering Minor: Environmental Engineering

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Thesis Option | Non Thesis Option |
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* A1 FNSC is for students who did not take CIVE 350 or its equivalent.

Other relevant graduate courses from any Faculty may be taken as Electives I (up to a maximum of two courses) with the consent of the academic adviser and the approval of the chairperson.

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<th>Group A0, B0 Core Courses in Environmental Engineering and Water Resources Engineering</th>
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<td>CIVE 657 Experimental Design and Statistical Methods</td>
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<th>Group A1 Core Courses in Environmental Engineering</th>
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<td>ENSC 620 Water and Wastewater Treatment Technology</td>
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<td>CIVE 652 Environmental Biotechnology and Bioremediation Applications</td>
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<td>CIVE 654I Solid Waste Management I</td>
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<td>CIVE 656I Air Pollution and Control I</td>
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<td>CIVE 650 Methods of Environmental Sampling and Analysis</td>
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<td>CIVE 651 Environmental Chemistry and Microbiology</td>
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<td>CIVE 653 Water and Sewage Works Design</td>
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<td>CIVE 654II Solid Waste Management II</td>
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<tr>
<td>CIVE 656II Air Pollution and Control II</td>
<td>3</td>
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<td>CIVE 658 Industrial/Hazardous Waste Management</td>
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<td>CIVE 750 Wastewater Reclamation and Reuse</td>
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<td>CIVE 751 Air Pollution Modeling</td>
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<td>CIVE 753 Processes in Water and Wastewater Treatment</td>
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<tr>
<td>CIVE 640 Hydraulic Structures</td>
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<td>CIVE 641 Surface Water Hydrology</td>
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<td>CIVE 642 Ground Water Hydrology</td>
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<td>CIVE 644 Coastal Engineering</td>
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<tr>
<td>CIVE 643 Hydraulics of Open Channels</td>
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<td>CIVE 645 Transport Phenomena in Surface and Subsurface Waters</td>
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<tr>
<th>Group AB Common Requirements/Electives in Environmental and Water Resources Engineering</th>
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<tr>
<td>CIVE 646 Water Resource Systems: Planning and Management</td>
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<tr>
<td>CIVE 647 GIS for Water Resources and Environmental Engineering</td>
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<td>CIVE 648 Climate Change and Water Resources</td>
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<td>CIVE 655 Surface Water Quality Modeling and Management</td>
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<td>CIVE 659 Environmental Impact Assessment</td>
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<td>CIVE 752 Environmental Case Studies and Conflict Resolution</td>
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<td>CIVE 796 Special Projects</td>
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<td>ENSC 690 Seminar in Environmental Sciences</td>
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</table>
Doctor of Philosophy (PhD)
Specializations: Civil Engineering (CE); Environmental and Water Resources Engineering (EWRE)

General Information

Through the PhD programs offered by the CEE department, graduate students are trained to address and solve current challenges in civil and environmental engineering, and to develop theory, methodology, and adequate experimental skills to investigate emerging issues in this domain. In addition, PhD students are trained to be future educators, to participate in industrial research, and to work on interdisciplinary teams. The PhD programs provide training that equips graduate students with the maturity and ability to assume academic and professional leadership roles in various fields related to civil and environmental engineering. These programs address issues and provide solutions which directly contribute to societal progress and development in this part of the world. The objectives of the PhD program are to:

- cultivate expertise in specialized concentration areas of civil and environmental engineering;
- develop research skills which include the formulation and study of original ideas as well as development of theory, methodology, and experimental skills;
- promote involvement in inter-disciplinary teams and activities and develop skills pertinent to group and collaborative efforts; and
- acquire teaching expertise through offering class lectures and assisting in courses and labs.

Admission Requirements

Applicants to the PhD program and the accelerated track are expected to have demonstrated distinct academic ability. To be eligible for admission to the program, a candidate

- for the regular track must hold a master's degree in civil engineering or a related discipline from AUB or another recognized institution of higher learning with a minimum cumulative average of 85 over 100 or its equivalent.
- holding a BS in civil engineering or a related discipline may apply to the accelerated program. These students will be required to take additional courses as recommended by the department on a case by case basis.
- provide scores for the General Exam part of the Graduate Record Examination (GRE).
- students from non-English-speaking countries must show proficiency in the English language (refer to catalogue section on English Language Proficiency Requirement page 37).
- submit a complete application including a statement of interest, transcripts of academic record from all institutions attended after high school, a curriculum vita, and three letters of recommendation, and
- complete an interview, either in person or by phone (for non-AUB students).

The application to the doctoral program will follow the deadlines set by the Office of Admissions at AUB. Admission decision for the PhD program is made upon the recommendations of the CEE department and the FEA Graduate Studies Committee, with the approval of the AUB Board of Graduate Studies.

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### Master of Science (MS)

**Major: Environmental Technology (ET)**

The Department of Civil and Environmental Engineering offers a graduate program leading to the degree of Master of Science (MS): major, Environmental Technology (ET). The program, which is part of the Interfaculty Graduate Environmental Sciences Program (IGESP), is open to non-engineering students who hold a degree in basic sciences.

For more details on IGESP program refer to the Interdisciplinary Research Centers and Programs section of this catalogue.

All Environmental Technology students are required to take the following courses in order to fulfill the graduation requirements.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Thesis Option</th>
<th>Project Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core 1</td>
<td></td>
<td></td>
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<tr>
<td>ENSC 630</td>
<td>Natural Resources Management</td>
<td>6</td>
<td>6</td>
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<tr>
<td>ENSC/ENHL 640/310</td>
<td>Toxicology and Environmental Health Hazards</td>
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<tr>
<td>ENSC/ PSPA 650/316</td>
<td>International Environmental Policy</td>
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<tr>
<td>Core 2</td>
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<td>Core 3</td>
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<tr>
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<tr>
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</table>
Program Requirements

Course Requirements

The regular PhD program requires a minimum of 24 credit hours of course work beyond the master's degree and 24 credit hours of thesis work. The course work consists of a minimum of 12 credits in the area of concentration within a major, six credits in a related area, and six credits in an area other than the candidate's field of research, which can be taken inside or outside the department.

The accelerated PhD program requires a minimum of 36 credit hours of course work beyond the bachelor's degree and 42 credit hours of thesis work. The course work consists of a minimum of 21 credits in the area of concentration within a major, nine credits in a related area, and six credits in an area other than the candidate's field of research, which can be taken inside or outside the department. Courses selected must be approved by the graduate student's adviser. It is expected that the student will be involved in setting a plan of course work with the help of the thesis adviser that is consistent with the area of research.

<table>
<thead>
<tr>
<th>Track A'</th>
<th>Specialization: Environmental Engineering</th>
<th>Minor: Water Resources Engineering</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal With MS/ME (cr.)</td>
<td>Accelerated With BE (cr.)</td>
</tr>
<tr>
<td>Core</td>
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<tr>
<td>Core</td>
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<tr>
<td>Electives I</td>
<td>Group A2+AB 9</td>
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<tr>
<td>Electives II</td>
<td>Group B1+B2+AB 6</td>
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</tr>
<tr>
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<table>
<thead>
<tr>
<th>Track B'</th>
<th>Specialization: Water Resources Engineering</th>
<th>Minor: Environmental Engineering</th>
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<td>Normal With MS/ME (cr.)</td>
<td>Accelerated With BE (cr.)</td>
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<tr>
<td>Core</td>
<td>Group B0 3</td>
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<tr>
<td>Core</td>
<td>Group B1 6</td>
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</tr>
<tr>
<td>Electives I</td>
<td>Group B1+B2+AB 9</td>
<td>15</td>
</tr>
<tr>
<td>Electives II</td>
<td>Group A1+A2+AB 6</td>
<td>6</td>
</tr>
<tr>
<td>Thesis</td>
<td>24</td>
<td>42</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>78</td>
</tr>
</tbody>
</table>

* Other courses can be taken upon consent of Academic Advisor

Qualifying Exam Part I: Comprehensive Exam

All students admitted to the PhD program must successfully complete a written comprehensive examination administered by the department. The purpose of the comprehensive exam is to ascertain the student's knowledge in his/her field of specialization and related areas. The written exam will cover major topics from within the concentration area and related fields. A student on the regular track must take the comprehensive exam not later than 12 months after enrollment in the PhD program. Normally, a student on the accelerated track will take the comprehensive exam 18 months after enrollment in the PhD program and after completing at least 30 credits of course work with a minimum of 12 credits in the area of concentration. Students who do not pass the comprehensive exam may, upon the recommendation of the department, take it for a second time in the following semester. Failure on the second attempt will result in the student's discontinuation from the graduate program.

Qualifying Exam Part II: PhD Thesis Defense

All students must successfully complete a qualifying examination, which is to be taken at least two semesters prior to the final defense of the PhD thesis. The qualifying exam, administered by the thesis committee, is an oral exam in which the student presents his/her research proposal. This proposal should include the projected research methodology and anticipated outcomes, as well as the preliminary results. The objective of the oral exam is to determine whether the candidate's proposal and methodology are adequate for a PhD thesis. The candidate must show positive preliminary results and considerable promise of original research. It is the responsibility of the student to inform and update the thesis committee members about his/her research progress, especially during the period between the comprehensive and qualifying exams. Students who do not pass the qualifying exam are allowed to take it for a second time in the following semester. Failure on the second attempt will result in the student's discontinuation from the graduate program.

Admission to Candidacy

Students enrolled in the program must be admitted to candidacy at least two semesters before obtaining their PhD degree. To be eligible for candidacy, students must

- pass the qualifying exam (Part I and Part II) as per pages 63–66, and
- complete at least 24 credits of course work on the regular track and 36 credits of course work on the accelerated track with a minimum cumulative grade average of 85.

Thesis Requirements

In partial fulfillment of the requirements for the degree of doctor of philosophy, a student must submit a thesis (equivalent to 24 credit hours on the regular track and 42 on the accelerated track) that is expected to make a significant and original contribution to his/her field of research. The research work is to be carried out under the supervision of a full-time faculty member from the Civil and Environmental Engineering department.

Thesis Committee

The thesis work will be supervised by a committee of at least five members. One of the committee members should be from outside the department/program and one from outside the university.
The thesis adviser and at least three thesis committee members must be of professorial rank. All members of the committee must hold a doctoral degree in a relevant field. The chair of the committee must be a full professor who is not the PhD thesis adviser. The PhD thesis committee must be approved by the department, the Faculty graduate studies committee, and by the AUB Graduate Council.

The doctoral thesis committee approves the thesis topic, research plan, conducts the Qualifying Exam (Part I and Part II), and the thesis defense.

The PhD thesis topic, examining committee, and admission to candidacy require the approval of the AUB Graduate Council.

The thesis proposal and the selection of the thesis committee should be approved by the AUB GC at least two semesters before the student defends his/her thesis.

**Thesis Defense**

All PhD candidates must defend their thesis in public. The candidate will be examined by the thesis defense committee chaired by one of the members of the thesis committee other than the thesis adviser. A grade of pass or fail will be reported for the PhD thesis. If a grade of fail is reported, the student may resubmit the thesis and defend it after a period of at least four months.

**Residence Requirements**

To satisfy the minimum residence requirements for the PhD degree, all students must register and be in residence for at least three years beyond the completion of the master’s degree. To satisfy the minimum residency requirements for the PhD degree in the accelerated PhD program, all students must register for at least eight semesters beyond the completion of the bachelor’s degree. The requirements for the degree of doctor of philosophy must be completed within a period of six years after joining the PhD program. Extension beyond the six-year period will require Graduate Council approval upon the recommendation by the Faculty Graduate Studies Committee.

**Graduation Requirements**

To earn a PhD degree in the Department of Civil and Environmental Engineering, a student must fulfill the following graduation requirements:

- Attain a minimum grade of 80 courses taken at the PhD level;
- Attain a minimum cumulative average of 85 in 24 credits (regular program) or 36 credits (accelerated program) of course work taken at the PhD level;
- Pass the PhD thesis defense;
- Satisfy the minimum residence requirements;
- Present evidence of a paper submittal to a leading international journal, based on the PhD research;
- Have at least one accepted refereed conference paper, based on the PhD research;
- Satisfy all pertinent AUB regulations.

**Sample Study Program**

A typical program of study for a PhD student is shown below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
<th>Total</th>
<th>Timeline</th>
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<tr>
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<td>Thesis Adviser Selection</td>
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<td></td>
<td>Spring</td>
<td>Major course</td>
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<td>15</td>
<td>Comprehensive Exam</td>
</tr>
<tr>
<td>2</td>
<td>Fall</td>
<td>Minor course</td>
<td>3</td>
<td>24</td>
<td>Thesis Proposal and Committee selection</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Minor course</td>
<td>3</td>
<td>33</td>
<td>Qualifying Exam</td>
</tr>
<tr>
<td>3</td>
<td>Fall</td>
<td>Minor course</td>
<td>3</td>
<td>42</td>
<td>Thesis Defense</td>
</tr>
<tr>
<td></td>
<td>Spring</td>
<td>Thesis</td>
<td>6</td>
<td>48</td>
<td></td>
</tr>
</tbody>
</table>

**PhD in Civil Engineering (CE)**

The concentration areas and specialized tracks of the PhD programs in CE and EWRE are consistent with the fields of expertise and research interests of the faculty members, and the existing teaching, research, and laboratory facilities, and relevant to local and regional needs.

The PhD program in CE will be offered in the following areas of concentration:

**Structural and Materials Engineering**

- Advanced design and behavior of concrete, steel structures, and fiber-reinforced composites
- Strengthening and rehabilitation of structural systems; and structural health monitoring
- Advanced concrete technology including plain, hot-weathered, and high-strength concrete
- Petrographic, chemical, and mechanical properties of sands and aggregates
- Seismic evaluation and assessment, and earthquake engineering design
- Numerical modeling and computer-aided structural engineering

**Geotechnical Engineering**

- Land reclamation and site improvement
- Geographic Information Systems (GIS) used in decision making and expert tool applications
- Geo-environmental engineering with reference to waste disposal and site contamination
- Geotechnical earthquake engineering, geo-hazards and risk assessment
- Behavior of soils
Transportation Systems
- Intelligent Transportation Systems (ITS) - traveler information systems and behavior
- Public and urban transport planning and operations
- Transport operations management
- Transport infrastructure planning and management
- Air quality linkages and modeling

Construction Engineering
- Lean construction and productivity improvement in construction
- Building information modeling and knowledge management
- Applications of innovative sensing approaches and information technology to construction
- Construction processes and methods
- Life cycle cost analysis and value engineering for construction projects
- Sustainable construction
- Infrastructure health monitoring
- Procurement and supply chain management in construction

PhD in Environmental and Water Resources Engineering (EWRE)
The PhD program in EWRE provides courses and research opportunities along the following specialized tracks:
- Water and wastewater treatment systems
- Solid and industrial waste management
- Air pollution control and air quality management
- Environmental and water resources management and planning
- Water resource optimization and conflict management
- GIS and IT applications in water resources
- Risk assessment, mass emergency and disaster, with particular emphasis on dam safety
- Hydrologic systems analysis and watershed modeling and management
- Hydraulic systems analysis

Course Descriptions

Construction Sequence

CIVE 680 Advanced Construction Scheduling 3 cr.
A course that provides advanced techniques in schedule development and implementation for effective project management during the programming or construction phase of a project. It examines monitoring, updating, and controlling the project schedule; analyzing time-related change orders and delays; network and non-network models; advanced resource leveling algorithms, money and network schedules, impact of scheduling on productivity, short-interval schedules, CPM in dispute resolution and litigation, advanced linear scheduling and PERT techniques, operational planning and scheduling, and use of scheduling software (primavera). Prerequisite: CIVE 585 Construction Planning and Scheduling

CIVE 681 Infrastructure Construction and Rehabilitation 3 cr.
This is a course on urban requirements and engineering technologies and procedures for construction of infrastructure facilities including: roads and pavements, bridges, water and sanitary networks, electric power lines, and telephone/communication lines; as well as their applications to urban and rural areas. The course content also includes the study of quality (QA/QC), environment, and safety standards and their integration and management in construction projects.

CIVE 682 Construction Business Management 3 cr.
A course that covers the principles of business management of construction companies - theory as well as international and regional practice; an overview of construction business operations including strategic planning, organizational structure, accounting, financing, risk analysis, and quality; and the principles and sources of construction funding for contracting firms and projects.

CIVE 683 IT Applications in Construction 3 cr.
A course that covers computing tools impacting the construction industry and the analysis techniques used to determine company automation requirements; mobile computing and information systems to support field engineering tasks; computerized systems applications to perform specific functions, such as estimating, scheduling, cost control; emerging sensing and instrumentation technologies to solve construction problems and case studies.

CIVE 684 Building Information Modeling 3 cr.
A course that covers Building Information Model (BIM) use and benefits in the industry by different disciplines- integrated management of building data during its life cycle, three-dimensional, real-time, dynamic building modeling techniques to increase productivity in building design and construction; examination of BIM which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components required for estimation, bidding and scheduling into the model.

CIVE 685 Design and Analysis of Construction Operations 3 cr.
A course that covers planning and simulation modeling of construction operations, design of efficient processes, productivity and resource use considerations, site layout design and analysis, preplanning for construction operations, use of quantitative methods and queuing theory, and the effects of new technologies on construction operations.

CIVE 686 Lean Construction Methods and Applications (Blended) 3 cr.
In this course, students will learn about the Toyota production system, the last planner system, value stream mapping, process improvement and other lean topics. Students will also learn fundamental project management concepts and techniques to define, plan, and execute construction projects. The focus will be on actions that can be taken to meet and sometimes exceed expectations for project time, cost, and quality. The importance of communication and risk management throughout all project stages will be emphasized. Students will also be exposed to software applications that aid project management. Students will be challenged as individuals and as members of a team. Prerequisites: CIVE 580 and working knowledge of Microsoft Excel, statistics, and probability theory.

CIVE 687 Construction Methods and Safety 3 cr.
A course that exposes students to the real world of construction and the complexity of managing machines, material and people with the one goal, to be on time and on budget while performing safely. The course content includes the selection of construction equipment and material based on applications, methods, and production requirements for earthmoving, heavy and building construction. Prerequisite: CIVE 320.
CIVE 690  Construction Technology for Tall Buildings  3 cr.
This is a course that introduces the latest construction practices and processes for tall buildings from foundation to roof. It covers advanced methods, materials, equipment, and systems used for the construction of tall buildings, as well as principles of sustainable construction. It examines site investigation, excavation and foundations, basement construction, structural systems for the superstructure, site and material handling, wall and floor construction, cladding, and roof construction. Prerequisites: CIVE 582, and CIVE 584.

CIVE 691  Construction Decisions under Uncertainty  3 cr.
This is a course that covers construction project and organization decisions for the uncertain future. The selection of construction method, equipment, contract, markup, and financing alternatives having the highest expected values; uses decision theory, competitive bid analysis, probabilistic modeling and simulation, and multiple regression analysis in managing construction.

CIVE 692  Construction Safety  3 cr.
A course that covers basic safety and loss control concepts, practices, and skills to improve construction job site safety; OSHA regulations, accidents, ergonomics, documentation, safety policies and procedures; safe work environments; crisis management; and other safety related topics.

CIVE 693  Design of Temporary Support Structures  3 cr.
A course that covers design and construction of temporary support structures used in the construction industry, including concrete formwork, scaffolding, caissons, cofferdams, and dewatering systems.

CIVE 694  Legal Aspects of Construction  3 cr.
This is a course that covers legal problems and liability issues in the area of construction contracts, torts, and insurance.

CIVE 695  Sustainable Design and Construction  3 cr.
This is a course that covers principles of sustainable design and construction, including life-cycle cost analysis, evaluation of economic and environmental impacts, state-of-the-art technology.

CIVE 696  Evaluation of Cost Alternatives  3 cr.
This a course that covers the basic principles of economic evaluations using fundamental concepts of time value of money to compare cost alternatives related to construction, design, and real property development.

**Structural Sequence**

CIVE 610  Advanced Structural Analysis  3 cr.
A course that offers a review of matrix algebra; basic principles of structural analysis: stiffness, flexibility, and energy methods; direct stiffness method for plane and space trusses and frames; linear and non-linear problems; special problems; and computer programming and applications. Prerequisite: CIVE 410.

CIVE 620  Concrete Technology  3 cr.
This is a course that examines portland cements; aggregates; pozzolans; proportioning normal concrete mixtures; pumping concrete; consolidating, finishing, and curing concrete; durability; testing hardened concrete; high-strength concrete; light and heavy weight concretes; and hot and cold weather concreting.

CIVE 621  Special Topics in Concrete  3 cr.
This is a course that reviews reinforced concrete (R/C) design; torsion in R/C members; wind load on structures; earthquake load and seismic design of structures; design of shear walls; design of corbels, brackets and deep girders; circular and rectangular water tanks; and spherical. Prerequisites: CIVE 410 and CIVE 421.

CIVE 622  Prestressed Concrete  3 cr.
A course on materials characteristics; pre-stress losses; working strength design procedures; composite construction; ultimate flexural strength and behavior; continuous pre-stressed concrete members. Prerequisites: CIVE 420 and CIVE 421.

CIVE 623  Bridges  3 cr.
A course that discusses types of bridges; influence lines; loads and their distribution on bridges; serviceability of bridges; methods of design of bridge deck, superstructure, and substructure. Prerequisites: CIVE 410 and CIVE 421.

CIVE 624  Steel Design  3 cr.
A course that examines loads on structures; philosophies of design; LRFD versus ASD; behavior, analysis, and design (according to AISC) of tension members, bolted connections, compression members, and beams. Prerequisite: CIVE 410.

CIVE 625  Strengthening and Rehabilitation of Concrete Structural Systems  3 cr.
This is a course on assessment of materials and structural deficiency using field test or analytical methods; repair and strengthening materials; strengthening and repair techniques; strengthening of structural members in flexure, shear and axial load; and upgrading of gravity load-designed buildings for earthquake load resistance. Prerequisites: CIVE 410 and CIVE 421.

CIVE 626  Earthquake Engineering  3 cr.
A course that examines the nature of earthquake ground motion; seismic hazard evaluation in engineering practice; response analysis of structures and effect of soil conditions on structural response and behavior under earthquake ground motion; and the design of structures under earthquake loading.

CIVE 632  Reliability Based Design of Civil Systems  3 cr.
A course that covers applications of reliability theory in assessing the safety and reliability of civil systems in the presence of uncertainty; decision making and risk analysis; definition of the probability of failure; modeling uncertainty in resistance and load; limit states and limit state functions; approximate and exact methods for assessing reliability; load and resistance factor design (LRFD) in structural and geotechnical engineering; basics of design code calibration; reliability assessments of existing structures, updating reliability with load tests.

CIVE 710  The Finite Element Method  3 cr.
A course on matrix algebra; energy theorems; analysis of discrete member systems; interpolation functions; numerical integration; plane stress and plane strain problems; axisymmetric problems; problems in three dimensions; plate bending. Prerequisite: CIVE 610.

CIVE 711  Advanced Mechanics of Solids  3 cr.
A course that covers theories of stress and strain; stress-strain relations, generalized Hooke's law; modes of failure, failure criteria; energy principles and applications; torsion; beams on elastic foundations; introduction to the theory of plates; thin-wall and thick-wall cylinder. Prerequisite: CIVE 310.
CIVE 712  Structural Dynamics  3 cr.
A course on analysis of vibration of single degree, multi-degree, and infinite degree of freedom systems; free and forced vibration response; analysis of dynamic response by approximate methods; introduction to earthquake engineering.

CIVE 720  Behavior of Reinforced Concrete Members  3 cr.
A course on building codes; limit state design; mechanical characteristics of concrete and steel reinforcement; creep and shrinkage; flexure: moment-curvature and force-deformation relationships; columns: axial force-moment-curvature relationships; shear: mechanisms of shear resistance, and truss analogy; bond and anchorage of reinforcement. Prerequisite: CIVE 421.

CIVE 722  Advanced Steel Design  3 cr.
A course that investigates stability, column strength, beam-columns, composite steel-concrete construction, plate buckling, plate girders, torsion, and combined torsion and bending. Prerequisite: CIVE 624.

CIVE 723  Introduction to Offshore Structures  3 cr.
A course on types of offshore structures, components comprising fixed offshore structures, components comprising floating Production Storage and Offloading Units (FPSOs), loading on offshore structures, design and analysis of fixed offshore structures, design and analysis of Mobile Jack-up structures, and design and analysis of Floating Production Storage and Offloading (FPSOs) structures.

Geotechnical Sequence

CIVE 630  Applied Foundation Engineering  3 cr.
A course on braced excavations; retaining structures; deep foundations; slope stability; and computer applications. Prerequisite: CIVE 530.

CIVE 631  Environmental Geotechnics  3 cr.
A course on geotechnical practice in environmental protection and restoration; methods of soil and site characterization for sifting of waste repositories and site restoration; influence of physical and chemical processes in soils on the evaluation of contaminant distribution; design of waste containment systems including landfills, slurry walls, and soil stabilization; the applicability and use of geosynthetics; and technologies for site restoration and cleanup. Prerequisite: CIVE 431.

CIVE 632  Soil Behavior  3 cr.
A course on soil mineralogy, soil formation, and composition; influence of geological factors on properties; colloidal phenomena in soils; soil structure; analysis of conduction phenomena (hydraulic, diffusive, thermal, and electrical); compressibility, strength, and deformation properties. Prerequisite: CIVE 431.

CIVE 634  Soil and Site Improvement  3 cr.
A course that covers compaction, admixture stabilization, foundation soil treatment, reinforced soil and composite materials, and material sites reclamation.

CIVE 635  Shear Strength of Soils  3 cr.
A course that covers stresses within a soil mass, tests to measure stress strain properties, stress-strain relationships, shear strength, drained conditions, undrained, constitutive models, and failure criteria applications. Prerequisite: CIVE 431.

CIVE 731  Earth Dams  3 cr.
A course that examines hydraulic dams, rolled earth dams, homogenous dams, thin core dams, filters, causes of dam failures, seepage control, and seismic stability of dams.

CIVE 732  Geotechnical Earthquake Engineering  3 cr.
A course on causative mechanisms of earthquake, earthquake magnitudes, ground motion; influence of soil conditions on site response; seismic site response analysis; evaluation and modeling of dynamic soil properties; analysis of seismic soil-structure interaction; evaluation and mitigation of soil liquefaction and its consequences; seismic code provisions and practice; seismic earth pressures, seismic slope stability and deformation analysis, seismic safety of dams and embankments, seismic performance of pile foundations, and additional current topics. Prerequisite: CIVE 431.

Materials and Pavement

CIVE 620  Concrete Technology  3 cr.
(See course description listed in Structural Sequence)

CIVE 660  Pavement Engineering  3 cr.
A course examining highway and airport pavement design; flexible and rigid pavement types and wheel loads; stresses in flexible and rigid pavements; pavement behavior under moving loads; soil stabilization. Prerequisite: CIVE 461.

CIVE 667  Highway Materials and Construction  3 cr.
The course covers various materials constituents in highway pavement structures with emphasis on asphalt concrete, aggregate-soil mixtures, geotextiles, and bituminous liquids. Material properties, design, quality control, and methods of construction will be described. Forensic studies, distress surveys, non-destructive and accelerated pavement testing are also discussed. Prerequisite: STAT 230.

CIVE 763  Viscoelastic Behavior of Construction Materials  3 cr.
The objective of the course is to introduce graduate students to viscoelastic behavior of construction materials, particularly asphalt concrete and polymer composites. The course covers basic concepts in material characterization, rheology, time-temperature superposition principles, in addition to linear and non-linear viscoelastic models. Laboratory tests needed for model development and numerical methods necessary for performance prediction are described and conducted. The course is of interest to graduate students in the areas of structures, materials, geotechnical and pavement engineering.

Transportation Sequence

CIVE 661  Urban Transportation Planning I  3 cr.
An introductory course on methods and models used in transportation planning with emphasis on the urban context. Prerequisite: CIVE 461.

CIVE 662  Traffic Engineering  3 cr.
A course outlining traffic engineering studies; traffic control of signalized and unsignalized intersections; signal control hardware and maintenance; arterial performance and operations; and network optimization. Prerequisite: CIVE 461.
CIVE 663 Transportation Systems Analysis 3 cr.
A course on transportation and traffic problems in modern society. Among the topics covered are travel forecasting problems and methods; theoretical techniques for traffic flow description and management; highway, railway, and runway capacity and performance characteristics; economic considerations; and cost functions.

CIVE 664 Design and Management of Transport Operations 3 cr.
A course that covers the application of quantitative techniques from operations research and probabilistic analysis to transportation problems. Applications covered include: pickup and delivery systems, emergency urban services, facility location, and network problems. Prerequisite: STAT 230 or equivalent.

CIVE 665 Transportation Economics 3 cr.
A course that investigates the application of economic principles to the evaluation of projects and policies in the transport sector such as transport project benefits, costs and financing, and pricing in the transport sector.

CIVE 666 Transport Operations 3 cr.
A course on public transportation modes and services; single route, network, and strategic planning; tasks involved in system operations; management of public transportation; privatization issues. Pre- or corequisite: CIVE 661.

CIVE 670 Public Transportation 3 cr.
A course on public transportation modes and services; single route, network, and strategic planning; tasks involved in system operations; management of public transportation; privatization issues. Pre- or corequisite: CIVE 661.

CIVE 671 Urban Transportation Planning II 3 cr.
A course examining advanced topics in urban transportation planning; transportation systems management techniques; travel demand analysis; and discrete choice modeling of travel demand. Prerequisite: CIVE 661.

CIVE 672 Traffic Flow Theory 3 cr.
A course on characteristics of traffic flow, density, and speed; models describing traffic flows; hydrodynamic analogue; and computer simulation models. Prerequisite: CIVE 461 or equivalent.

Environmental and Water Resources Sequence

CIVE 640 Hydraulic Structures 3 cr.
A course that covers closed conduit flow, water distribution systems, transient analysis, open channel flow, flood control, culvert hydraulics, design of various hydraulic structures. Prerequisite: CIVE 440.

CIVE 641 Surface Water Hydrology 3 cr.
A course on design storm, rainfall-runoff modeling, overland flow, flood routing, reservoir routing, simulation models, and stochastic hydrology. Prerequisite: CIVE 441 or equivalent.

CIVE 642 Groundwater Hydrology 3 cr.
This is a course that deals with properties of groundwater, Darcy's Law, steady groundwater flow, unsteady groundwater flow, well hydraulics, unsaturated flow, sea-water intrusion, and numerical modeling. Prerequisite: CIVE 441.

CIVE 643 Hydraulics of Open Channels 3 cr.
A course that examines gradually varied flow theory and analysis, spatially varied flow, and numerical modeling of unsteady flow in open-channels. Prerequisite: CIVE 440.

CIVE 644 Coastal Engineering 3 cr.
A course on small-amplitude wave theory (linear theory); finite-amplitude wave theory (nonlinear theory); cnoidal wave theory; solitary wave theory; wave refraction, diffraction, and reflection; wave forces and interaction with man-made structures; and design of maritime structures e.g. breakwaters. Prerequisite: CIVE 440.

CIVE 645 Transport Phenomena in Surface and Subsurface Waters 3 cr.
A course on advection, diffusion, and dispersion of pollutants; transport in rivers and estuaries; transport in groundwater; numerical modeling; design of wastewater discharge system.

CIVE 646 Water Resource Systems: Planning and Management 3 cr.
A course that introduces the concepts and principles of water resources planning and management. It demonstrates the logical steps in engineering planning as it applies to water resources management. The course provides coverage of mature and state of the art technologies and tools applied in the water resources industry. Emphasis will be placed on systems analysis, GIS and economic and financial analysis, environmental impact assessment techniques.

CIVE 647 GIS for Water Resources and Environmental Engineering 3 cr.
A course that introduces the concepts and principles of Geographic Information Systems (GIS) from the perspective of water resources and environmental engineering. It provides coverage of state-of-the-art GIS methods and tools specifically targeting water resources and environmental applications including: spatial and terrain analysis, geostatistical analysis, watershed delineation and identification of river networks, representation of groundwater and aquifer systems, time series analysis and development of GIS integrated water and environmental models. The course will be based on the recently released ESRI ArcGIS 9.3 and the Arc Hydro data model developed by the Consortium for GIS in Water Resources (CoWR).

CIVE 648 Climate Change and Water Resources 3 cr.
The course introduces students to the global issue of climate change and its potential impact on water resources and implications to their management particularly in the semi-arid MENA region. It explores the drivers of climate change, green house gases mitigation efforts, and adaptation options in the water resources sector with special emphasis on the Integrated Water Resources Management (IWRM) and adaptive management approach.

CIVE 649 Microbial Ecology and Molecular Biology for Engineers 3 cr.
A course that introduces students (undergraduate and graduate) from different engineering disciplines to the concepts and tools in microbial ecology and how to apply these concepts and tools to understand microbial communities underpinning environmental biotechnology processes. Prerequisites: CHEM 202, BIOL 210, or equivalent.

CIVE 650 Methods of Environmental Sampling and Analysis 3 cr.
A course on sampling techniques and instrumental methods in environmental sciences; determination of pollutants in water, air, and soil; analytical techniques; adaptation of procedures to specific matrices; case studies.
CIVE 651 Environmental Chemistry and Microbiology 3 cr.
A course that deals with organic, inorganic, and physical chemistry; chemical equilibrium; reaction kinetics; acidity and alkalinity; composition, morphology, and classification of microorganisms; energy, metabolism, and synthesis; growth, decay, and kinetics; biological water quality indicators. Prerequisites: CHEM 202, BIOL 210, or equivalent.

CIVE 652 Environmental Biotechnology and Bioremediation Applications 3 cr.
This course examines current and emergent environmental biotechnologies used for environmental quality evaluation, monitoring, and remediation of contaminated environments, and provides the student with a working knowledge of the science that underpins them. The fundamentals of environmental microbiology are presented; these provide a foundation for subsequent discussions of biotreatment of problem environmental pollutants, and engineering strategies for bioremediation.

CIVE 653 Water and Sewage Works Design 3 cr.
A course that examines the design of water and wastewater schemes, including design reports and literature search on the development of conventional treatment processes. Prerequisite: CIVE 450.

CIVE 654I Solid Waste Management I 3 cr.
A course on engineering principles, practices, and techniques for the management of solid wastes: sources, composition, properties, impacts, generation, storage, collection and transport, processing, resource recovery, and disposal. Prerequisites: recommended but not required CHEM 201 and MATH 201.

CIVE 654II Solid Waste Management II 3 cr.
A course on the design of solid waste disposal schemes, including design reports and a literature search on the development of conventional treatment and disposal processes. Prerequisite: CIVE 654 or consent of instructor.

CIVE 655 Surface Water Quality Modeling & Management 3 cr.
This course will introduce students to surface water quality pollution problems in streams, rivers, lakes, reservoirs, and estuaries. The course will focus on both the quantitative modeling aspects of surface water quality alongside the management and policy aspects relating to the problem. Both mechanistic and empirical models for assessing the status of surface water bodies and for predicting the fate of pollutant discharge into surface water bodies will be introduced throughout the course. The main aim of this class is to develop the students' skills needed to model a natural surface water system and to assess whether the system meets designated use criteria within realistic constraints.

CIVE 656I Air Pollution and Control I 3 cr.
A course on engineering principles, practices, and techniques for the management of air pollution: types, sources, properties, impacts, standards, control technologies and equipment, atmospheric dispersion, transport sector, and indoor air quality. Prerequisites: recommended but not required CHEM 201 and MATH 201.

CIVE 656II Air Pollution and Control II 3 cr.
A course that examines process analysis, operational limitations, cost and performance, and evaluation of control process and equipment; case studies, field visits, and inspection of industrial installations. Prerequisite: CIVE 656 or consent of instructor.

CIVE 657 Experimental Design and Statistical Analysis for Engineers 3 cr.
A course that covers the main steps required to efficiently plan, conduct, analyze, and interpret the results from an experiment. The main aim is to maximize statistical inference, minimize cost, and quantify uncertainty. The course will also cover concept in statistical analysis and modeling that are often used to analyze experimental and observational data (e.g. ANOVA, t-tests, regression models, and non-parametric tests). In addition to introducing relevant statistical concept, the course will go over a myriad of practical examples and engineering related case studies. The course will include a lab session, where the students will learn how to implement the introduced concepts in a statistical modeling environment.

CIVE 658 Industrial/Hazardous Waste Management 3 cr.
A course on engineering principles, practices, and techniques for the management of industrial-hazardous wastes: sources, generation, properties, impacts and auditing of industrial facilities. Basic treatment processes and disposal methods. Site remediation. Prerequisites: recommended but not required CHEM 201 and MATH 201.

CIVE 659 Environmental Impact Assessment 3 cr.
A course on procedures of assessing/preparing/reviewing/presenting environmental impacts of developmental projects/facilities: Industrial, waste management/disposal, wastewater treatment, transportation, dams, reservoirs, irrigation/drainage, coastal zone developments, natural forest management, plantation development/reforestation, and so on. Prerequisites: recommended any course from: CIVE 650 to CIVE 659 and CIVE 640 to CIVE 647.

CIVE 750 Wastewater Reclamation and Reuse 3 cr.
A course that examines environmental issues in water reuse, risk assessment, water reclamation technologies, storage of reclaimed water, usage of reclaimed water, and planning of wastewater reclamation and reuse. Prerequisites: CIVE 651 and CIVE 450.

CIVE 751 Air Pollution Modeling 3 cr.
A course that deals with mathematical models, air pollution meteorology, plume rise, dispersion and atmospheric chemistry, meteorological models, as well as Gaussian, statistical, and other special application models. Prerequisite: CIVE 656 or consent of instructor.

CIVE 752 Environmental Case Studies and Conflict Resolution 3 cr.
A course on case studies in environmental management: pesticide application, air pollution, solid waste land filling, wastewater treatment facilities, oil exploration, ocean dumping, deep well injection, reservoirs, and water resources. Prerequisites: CIVE 450, CIVE 654, and CIVE 656; or consent of instructor.

CIVE 753 Processes in Water and Wastewater Treatment 3 cr.
A course on sedimentation, filterability, permeability and fluidization, ion exchange, aeration, flotation, membrane filtration, and aerobic digestion. Experimental applications of processes. Prerequisite: CIVE 450 or consent of instructor.

Common Courses
CIVE 670 Computer Methods in Civil Engineering 3 cr.
A course on the use of the computer for analysis, design, and decision making in civil engineering, including programming, numerical, and CAD methods and applications. Prerequisites: EECE 230 and CIVE 370.
### CIVE 671 Numerical Modeling 3 cr.
A course that deals with ordinary differential equations: initial-, boundary-, and characteristic-value problems; partial differential equations: steady state, time dependent, and oscillatory problems; techniques: Runge-Kutta, shooting, iterative, finite difference, and finite element methods.

### CIVE 672 Introduction to Geographic Information Systems 3 cr.
An introductory course on Geographic Information Systems (GIS) and their applications in the planning and engineering fields, alternatives in computer-based graphics, data concepts and tools, network data management and planning applications, and implementation issues. This course can be taken as an elective for credit in all graduate engineering programs.

### CIVE 673 Infrastructure Systems Management 3 cr.
A course on modeling and optimization methods and their application to inspection, performance prediction and maintenance decision making for the management of infrastructure systems.

### Special Courses and Thesis

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVE 796</td>
<td>Special Projects</td>
<td>3 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 797</td>
<td>Civil Engineering Seminar</td>
<td>0 cr.</td>
<td></td>
</tr>
<tr>
<td>ENSC 690</td>
<td>Seminar in Environmental Sciences</td>
<td>0 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 798</td>
<td>Special Topics</td>
<td>3 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 799</td>
<td>Thesis</td>
<td>6 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 799T</td>
<td>Comprehensive Exam</td>
<td>0 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 898</td>
<td>Advanced Topics in Civil and Environmental Engineering</td>
<td>3 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 980</td>
<td>Qualifying Exam Part I: Comprehensive Exam</td>
<td>0 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 981</td>
<td>Qualifying Exam Part II: Defense of Thesis Proposal</td>
<td>0 cr.</td>
<td></td>
</tr>
<tr>
<td>CIVE 982</td>
<td>PhD Thesis</td>
<td>3 cr.</td>
<td>Every semester. Taken while total required credit hours have not been completed.</td>
</tr>
<tr>
<td>CIVE 983</td>
<td>PhD Thesis</td>
<td>6 cr.</td>
<td>Every semester. Taken while total required credit hours have not been completed.</td>
</tr>
<tr>
<td>CIVE 984</td>
<td>PhD Thesis</td>
<td>9 cr.</td>
<td>Every semester. Taken while total required credit hours have not been completed.</td>
</tr>
<tr>
<td>CIVE 985</td>
<td>PhD Thesis</td>
<td>12 cr.</td>
<td>Every semester. Taken while total required credit hours have not been completed.</td>
</tr>
</tbody>
</table>

### CIVE 796 Special Projects 3 cr.

### CIVE 797 Civil Engineering Seminar 0 cr.
A seminar that consists of current research or applied projects presented by faculty members, students, or invited speakers.

### ENSC 690 Seminar in Environmental Sciences 0 cr.
A seminar that consists of current research or applied projects presented by faculty members, students, or invited speakers.

### CIVE 798 Special Topics 3 cr.

### CIVE 799 Thesis 6 cr.

### CIVE 799T Comprehensive Exam 0 cr.

### CIVE 898 Advanced Topics in Civil and Environmental Engineering 3 cr.

### CIVE 980 Qualifying Exam Part I: Comprehensive Exam 0 cr.

### CIVE 981 Qualifying Exam Part II: Defense of Thesis Proposal 0 cr.

### CIVE 982 PhD Thesis 3 cr.
Every semester. Taken while total required credit hours have not been completed.

### CIVE 983 PhD Thesis 6 cr.
Every semester. Taken while total required credit hours have not been completed.

### CIVE 984 PhD Thesis 9 cr.
Every semester. Taken while total required credit hours have not been completed.

### CIVE 985 PhD Thesis 12 cr.
Every semester. Taken while total required credit hours have not been completed.

### CIVE 986 PhD Thesis 0 cr.
Every semester. Taken after total required credit hours have been completed.

### CIVE 987 PhD Thesis Defense 0 cr.
Every semester
Graduate Programs
The Department of Electrical and Computer Engineering offers the degree of Master of Engineering (ME) in Electrical and Computer Engineering, and the degree of Doctor of Philosophy (PhD) in Electrical and Computer Engineering.

Master of Engineering in Electrical and Computer Engineering
The department offers the following graduate programs, all leading to the Master of Engineering in Electrical and Computer Engineering (ME in ECE) degree:

• ECE Thesis Program
• ECE Non-thesis Program
• Information and Communications Technology Program (EICT)

All programs must satisfy either the thesis program requirements or the non-thesis program requirements. The program is indicated on the student’s transcript.

Requirements
All relevant requirements and regulations of the University and the Faculty of Engineering and Architecture for the master’s degree apply to the ME in ECE programs.
The 9-credits in elective courses should satisfy the following conditions:
• one regular 3-credit course from either the software systems elective pool or the telecommunications elective pool
• one regular 3-credit course from the business/management elective pool
• the remaining 3 credits consist of one graduate level lab course and two technical special courses

All elective courses should be taken from the three defined pools of elective courses (software systems pool, telecommunications pool, and business/management pool).

Core Courses

- **Software Systems**: EECE 630, EECE 633, EECE 652, and EECE 696
- **Telecommunications**: EECE 640, EECE 643, EECE 651, EECE 653, EECE 655, and EECE 656
- **Business/Management**: DCSN 330, INFO 300, INFO 310, INFO 315, INFO 320, and INFO 330

Elective Courses

- **Business/Management**: DCSN 330, INFO 300, INFO 310, INFO 315, INFO 320, MKTG 306, ENMG 654, ENMG 656, ENMG 657
- **Lab courses**: EECE 640L, EECE 651L, EECE 655L, EECE 691L, EECE 694L

Major or Minor Areas

The major and minor areas for the ME and PhD in ECE programs are shown below, with their corresponding courses.

1. Applied Electromagnetics and RF Systems Area

<table>
<thead>
<tr>
<th>Core Graduate Courses</th>
<th>Elective Graduate Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 613 Radio Frequency (RF) Circuits Design</td>
<td>EECE 643 RF System Engineering for Wireless Communications</td>
</tr>
<tr>
<td>EECE 680 Antenna Theory and Design</td>
<td>EECE 681 Advanced Antenna Design</td>
</tr>
<tr>
<td>EECE 682 Time-Harmonic Electromagnetic Fields</td>
<td>EECE 683 Numerical Methods in Electromagnetics</td>
</tr>
</tbody>
</table>

2. Biomedical Engineering Area

<table>
<thead>
<tr>
<th>Core Graduate Courses</th>
<th>Elective Graduate Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 601 Biomedical Engineering I</td>
<td>EECE 603 Biomedical Signal and Image Processing</td>
</tr>
<tr>
<td>EECE 602 Biomedical Engineering II</td>
<td></td>
</tr>
<tr>
<td>EECE 605 Neuromuscular Engineering</td>
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<tr>
<td>EECE 661 Robotics</td>
<td></td>
</tr>
<tr>
<td>EECE 667 Pattern Recognition</td>
<td></td>
</tr>
<tr>
<td>EECE 693 Neural Networks</td>
<td></td>
</tr>
</tbody>
</table>

3. Communications Area

<table>
<thead>
<tr>
<th>Core Graduate Courses</th>
<th>Elective Graduate Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 640 Wireless Communications</td>
<td>EECE 644 Communications Engineering for Genetics and Bioinformatics</td>
</tr>
<tr>
<td>EECE 641 Information Theory</td>
<td>EECE 642 Introduction to Coding Theory</td>
</tr>
<tr>
<td>EECE 646 Advanced Digital and Data Communications</td>
<td>EECE 643 RF System Engineering for Wireless Communications</td>
</tr>
<tr>
<td>EECE 644 Stochastic Processes, Detection, and Estimation</td>
<td>EECE 644 Stochastic Processes, Detection, and Estimation</td>
</tr>
<tr>
<td>EECE 645 Wireless Cellular Technologies</td>
<td>EECE 645 Wireless Cellular Technologies</td>
</tr>
<tr>
<td>EECE 691 Digital Signal Processing</td>
<td>EECE 691 Digital Signal Processing</td>
</tr>
<tr>
<td>EECE 695 Adaptive Filtering</td>
<td>EECE 695 Adaptive Filtering</td>
</tr>
</tbody>
</table>

4. Computer Architecture and VLSI Circuits Area

<table>
<thead>
<tr>
<th>Core Graduate Courses</th>
<th>Elective Graduate Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>EECE 611 Introduction to Analog VLSI Systems</td>
<td>EECE 613 Radio Frequency (RF) Circuits Design</td>
</tr>
<tr>
<td>EECE 612 Digital Integrated Circuits</td>
<td>EECE 614 Computer-Aided Analysis and design of VLSI Circuits and Systems</td>
</tr>
<tr>
<td>EECE 616 Advanced Digital Integrated Circuits</td>
<td>EECE 615 Computer Methods for Circuit and System Analysis</td>
</tr>
<tr>
<td>EECE 621 Advanced Computer Architecture</td>
<td>EECE 617 Reliability and Statistical Design</td>
</tr>
<tr>
<td>EECE 623 Reconfigurable Computing</td>
<td>EECE 622 VLSI for Communications and Signal Processing</td>
</tr>
<tr>
<td>EECE 624 Digital Systems Testing</td>
<td>EECE 624 Digital Systems Testing</td>
</tr>
<tr>
<td>EECE 625 Embedded Systems Design</td>
<td>EECE 625 Embedded Systems Design</td>
</tr>
</tbody>
</table>
5. Control Systems Area

**Core Graduate Courses**
- EECE 660 System Analysis and Design
- EECE 661 Robotics
- EECE 663 System Identification

**Elective Graduate Courses**
- EECE 662 Optimal Control
- EECE 664 Fuzzy Sets, Logic and Applications
- EECE 665 Adaptive Control
- EECE 667 Pattern Recognition
- EECE 693 Neural Networks

6. Energy and Power Systems Area

**Core Graduate Courses**
- EECE 670 Power System Planning
- EECE 675 Renewable Energy Systems
- EECE 678 Advanced Power System Analysis

**Elective Graduate Courses**
- EECE 671 Environmental Aspects of Energy Systems
- EECE 672 Energy Policy and Planning
- EECE 673 Power Electronics Systems and Applications
- EECE 677 Electric Power Systems Control and Stability
- EECE 679 Energy Efficiency in the Power Sector
- EECE 798A Special Topics in High Voltage Transmission Systems
- EECE 798B Special Topics in Generation Operation and Control

7. Machine Intelligence Area

**Core Graduate Courses**
- EECE 633 Data Mining
- EECE 664 Fuzzy Sets, Logic and Applications
- EECE 667 Pattern Recognition
- EECE 693 Neural Networks

**Elective Graduate Courses**
- EECE 631 Advanced Topics in Algorithms
- EECE 639 Advanced Data Mining
- EECE 661 Robotics
- EECE 662 Optimal Control
- EECE 663 System Identification
- EECE 665 Adaptive Control
- EECE 668 Game Theory and Decision Making
- EECE 694 Digital Image Processing
- EECE 695 Adaptive Filtering

8. Networks and Security Area

**Core Graduate Courses**
- EECE 632 Cryptography and Computer Security
- EECE 651 Internet Engineering
- EECE 653 Multimedia and Networking
- EECE 655 Internet Security
- EECE 656 Mobile Ad hoc and Sensor Networks
- EECE 657 Wireless Network Security

**Elective Graduate Courses**
- EECE 630 Distributed and Object Databases
- EECE 640 Wireless Communications
- EECE 647 Queueing Theory
- EECE 652 Web Server Design and Programming
- EECE 654 Pervasive Computing

9. Signal and Image Processing Area

**Core Graduate Courses**
- EECE 603 Biomedical Signal and Image Processing
- EECE 691 Digital Signal Processing
- EECE 694 Digital Image Processing
- EECE 695 Adaptive Filtering

**Elective Graduate Courses**
- EECE 644 Stochastic Process, Detection and Estimation
- EECE 663 System Identification
- EECE 667 Pattern Recognition
- EECE 693 Neural Networks
- EECE 696 Applied Parallel Programming

10. Software Engineering Area

**Core Graduate Courses**
- EECE 631 Advanced Topics in Algorithms
- EECE 636 Analysis and Verification of Software
- EECE 637 Advanced Programming Practice
- EECE 638 Software Testing
- EECE 731 Advanced Topics in Complexity Theory

**Elective Graduate Courses**
- EECE 630 Distributed and Object Database Systems
- EECE 632 Cryptography and Computer Security
- EECE 634 Introduction to Computational Arabic
- EECE 652 Web Server Design and Programming
- EECE 654 Pervasive Computing Systems and Applications
- EECE 696 Applied Parallel Programming
- EECE 732 Pseudo Randomness
PhD in Electrical and Computer Engineering

Mission
The mission of the doctoral program is to provide high quality education in electrical and computer engineering which prepares students for employment and leadership roles in academic, industrial, or research positions.

Objectives
The objectives of the program are to:
• provide the student with the research opportunities to acquire a depth of knowledge in one specialization area of electrical and computer engineering, and familiarity with allied areas
• provide opportunities for the doctoral student to develop competence in performing independent research, communicating effectively, and learning independently
• advance the state of electrical and computer engineering research at AUB, in Lebanon, and the region
• and advance the state of the art in electrical and computer engineering.

Program Outcomes
Graduates of the program are expected to have:
• a breadth of knowledge in electrical and computer engineering, and a depth of knowledge in their specific area of research
• an ability to identify and define research problems
• experience in performing research and communicating the results effectively
• experience in doing independent academic work
• a published contribution to the existing knowledge in electrical and computer engineering.

Admission Requirements for Students Holding a Master's Degree
Applicants who have an excellent record of academic achievement, and a potential for creative and independent work, may be admitted into one of the following categories:
• Admissions for Students Holding a Master's Degree
• Admissions for Students Holding a Bachelor's Degree

The minimum admission requirements for the two categories are described below:

Admission Requirements for Students Holding a Master's Degree
Applicants to the PhD program must hold a master's degree in electrical and computer engineering or in a related discipline from AUB or another recognized institution of higher education, with a minimum cumulative average of 85.0 over 100 or its equivalent. Admission is determined by evaluating the following:
• Transcripts of academic record from the institution(s) of higher education attended by the applicant
• Graduate Record Examination (GRE) general test scores
• A written statement of purpose
• Three letters of recommendations

Program Requirements for Students Holding a Master's Degree
The basic program of study for the PhD degree is built around one major area and a minimum of one minor area. Students take courses to satisfy the major and minor area requirements and to acquire the knowledge needed for the required written and oral examinations.

• The major can be in one area or a combination of two ECE areas.
• Nine credits of core courses must be taken in the major area.
• Students must take at least six graduate courses, including courses prior to admission to the PhD program, in their PhD major area.
• Students must also take at least three graduate courses in their PhD minor area, including courses taken prior to admission to the PhD program.
• The minor courses may be taken in one of the ECE areas.
• The minor courses, based on the recommendation of the advisor and approval of the ECE Graduate Committee (EGC) can be from an area outside the ECE department, or a combination of courses taken in the department and outside the department.

Each student must maintain an 85.0/100 cumulative average in order to remain in good standing. The cumulative average is calculated for courses taken beyond the master's degree. A student will be placed on probation if s/he fails a course (below 70), or her/his cumulative average falls below 85.0. A student has one semester to raise his/her cumulative average to 85.0 or better and has to repeat failed courses as soon as they are offered. Failure to do so will result in academic dismissal. A student cannot earn the PhD with a cumulative average below 85.0.

PhD Qualifying Exam for Students Holding a Master's Degree
All PhD students are required to pass the qualifying exam. The PhD qualifying exam is two parts. Qualifying Exam Part I is a written comprehensive exam administered by the department/program. The Qualifying Exam Part II is an oral thesis proposal defense exam administered by the thesis committee.

Qualifying Exam Part I: Comprehensive Exam for Students Holding a Master's Degree
After taking at least fifteen credits of course work and mastering the knowledge defined in the PhD major area, students take the Qualifying Exam Part I: Comprehensive Exam. The exam is given twice a year, at the end of the fall and spring semesters. Students are informed beforehand of the subjects that will be covered in the examination. Students who do not pass may repeat
the exam only once, during the following semester. If the student does not pass the exam after his/her second attempt, the student will be asked to discontinue his/her PhD studies.

Students sit for two exams that together constitute the comprehensive examination: one in the major area, and one in the minor area. These two exams are taken separately at different times, but during the same examination period. The major area exam consists of eight questions, out of which five questions should be answered in four hours. The minor area exam consists of six questions, out of which three questions should be answered in two and a half hours. The area exams are prepared by the corresponding area faculty committee, and are designed to evaluate the student’s understanding of the fundamentals in the area. Passing the comprehensive exam requires an average of no less than 80/100 with no less than 80/100 in the major area and no less than 70/100 in the minor area.

**Admission to Candidacy for Students Holding a Master’s Degree**

Students must be admitted to candidacy at least two semesters before obtaining the PhD degree.

For admission to candidacy, students are expected to have:

- submitted a program approved by the thesis committee, the EGC, the FEA Graduate Student Council (GSC), and the Graduate Council (GC)
- passed the Qualifying Exam Part I and II
- completed at least 12 credits of graduate courses beyond the master’s degree
- attained a cumulative average of at least 85.0 in all courses taken beyond the master’s degree
- maintained good academic standing.

**Residence Requirements for Students Holding a Master’s Degree**

A student must register for at least four semesters beyond the completion of the master’s degree. Requirements for the PhD degree must be completed within a period of five years after starting graduate work beyond the master’s degree. Extension beyond the five-year limit requires the approval of the EGC, the FEA GSC, and the GC.

**Admission Requirements for Students Holding a Bachelor’s Degree**

- A bachelor degree with a minimum major and cumulative average of 85 over 100 or its equivalent
- Graduate Record Examination (GRE) general test scores
- Three recommendation letters (one from the FYP supervisor)
- An applicant’s written statement of purpose that shows the research potential in the proposed area of study
- Two-three page research proposal
- Performance of the candidate in the EECE 499 research-based course if taken
- An interview, conducted either in person, by phone, or over the Internet with the ECE Graduate Committee (EGC).

**Course Requirements for Students Holding a Bachelor’s Degree**

The completion of at least seventy-eight (78) credits of graduate study consisting of combined course work and research beyond the Bachelor’s degree is required for the PhD Accelerated track in Electrical and Computer Engineering. A minimum of 36 credit hours must be in approved graduate level course work and a minimum of 30 credit hours of thesis work. In addition, normally a maximum of six credit hours out of the 36 credits of course work may be tutorial courses.

The basic program of study for the PhD accelerated track is built around: one major area and a minimum of one minor area. Students take courses to satisfy the major and minor area requirements and to acquire the knowledge needed for the Qualifying Exam Part I and Qualifying Exam Part II.

- The major area can be in one or a combination of two of the ECE areas.
- Nine credits of core courses must be taken in the major area.
- Students must take at least six graduate courses, in their PhD major area.
- Students must also take at least three graduate courses in their PhD minor area. The minor courses may be taken in one of the ECE areas.
- The minor courses, based on the recommendation of the advisor and approval of the ECE Graduate Committee (EGC) can be from an area outside the ECE department, or a combination of courses taken in the department and outside the department.

**PhD Qualifying Exam for Students Holding a Bachelor’s Degree**

All PhD students are required to pass the qualifying exam. The PhD qualifying exam is two parts. Qualifying Exam Part I is a written comprehensive exam administered by the department/program. The Qualifying Exam Part II is an oral thesis proposal defense exam administered by the thesis committee.

**Qualifying Exam Part I: Comprehensive Exam for Students Holding a Bachelor’s Degree**

Comprehensive examinations are written exams taken after completing a minimum of 30 credits of course requirements for the accelerated track. Timing of the examination is set by the department/program no later than the sixth regular semester of the PhD student’s enrolment.

**Residence Requirements for Students Holding a Bachelor’s Degree**

The student must register for at least eight semesters beyond the completion of the bachelor degree. Requirements for the PhD degree in the accelerated track must be completed within a period of six years after starting graduate work beyond the bachelor’s degree. Extension beyond the six-year limit requires the approval of the EGC, FEA GSC, and GC.

Students deemed by the department, within one to two years after admission into the accelerated track, as not qualified to complete a PhD degree, may be granted a master’s degree in the area after completing the equivalence of a non-thesis master’s. Every effort will be made
to screen students carefully to assure their potential and aptitude as researchers prior to acceptance. This could be accomplished by having selected students participate in ongoing research projects while they are registered undergraduates.

**Admission to Candidacy for Students Holding a Bachelor’s Degree**

Students must be admitted to candidacy at least two semesters before obtaining the PhD degree.

For admission to candidacy, students are expected to have:

- submitted a program approved by the thesis committee, the EGC, the FEA GSC, and the GC
- passed the oral qualifying examination
- completed at least 30 credits of graduate courses beyond the bachelor’s degree
- attained a cumulative average of at least 85.0 in all courses taken beyond the bachelor’s degree
- maintained good academic standing

**PhD Thesis Committee**

In accordance to the Lebanese Ministry of Higher Education, the thesis committee should be composed of at least five faculty members:

- Chair of the committee, advisor, and at least one member from the student’s department/program
- Two members must be from outside the university
- At least four committee members must be from the student’s major area
- All members must hold doctoral degrees
- The advisor and at least three of the members must be of professorial rank
- The chair of the thesis committee must be a full professor and cannot be the advisor

Members of the committee are recommended by the student’s thesis adviser and approved by Graduate Studies Committee of the ECE department, the FEA Graduate Studies Committee, and the Graduate Council.

The committee approves the thesis topic, research plan, conducts the oral Qualifying Exam (Part II), and conducts the thesis defense. The thesis proposal and the selection of the committee should be approved at least two semesters before the student defends his/her thesis.

Any changes in the committee, including the thesis advisor, are possible with the approval of the EGC, FEA GSC, and GC.


Within two semesters after passing the comprehensive examination, the student must take an oral qualifying examination, conducted by his/her thesis committee. The defense of the PhD thesis proposal is considered a part of the oral qualifying examination. In addition to reviewing the prospectus of the thesis, the nature and the content of the examination are related to the student’s field of research.

**PhD Thesis**

The student must submit a thesis based on the results of original, independent research. The PhD thesis is expected to make a significant contribution in electrical and computer engineering. Upon completion of the thesis and after its approval by the thesis advisor, the thesis must be defended orally.

**PhD Thesis Defense**

The thesis defense is open to the public. Please refer to the table on page 60 for deadlines. “Pass” or “Fail” is reported for the combined thesis and defense. If “Fail” is reported, the student may resubmit the thesis and defend it after a period of at least four months. Failure on the second attempt results in the discontinuation of graduate work.

A student must be registered for the Thesis Defense in the session in which they expect to graduate.

**Seminar Requirement**

A student must register for EECE 797: Seminar, as long as s/he is in the program.

**Program Completion Requirements**

To earn the PhD degree in electrical and computer engineering, the student must complete the following requirements:

- Have at least one journal paper, based on the PhD thesis, accepted in a leading international journal in his or her field of specialty that requires at least two reviews. Additionally at least two refereed conference papers, based on the thesis, must have appeared in conference proceedings.
- Have a cumulative average, beyond the master’s degree, of 85.0 or above, and be in good academic standing.
- Satisfy the course and research credit requirements.
- Pass the comprehensive and oral qualifying examinations.
- Complete and successfully defend a PhD thesis.
- Satisfy the residence requirement and all other pertinent AUB regulations.

**PhD Major or Minor Areas**

The PhD major or minor areas of study with their corresponding courses are the same as those listed for the Master’s, see page 282.
Course Descriptions

EECE 601  Biomedical Engineering I  3 cr.
This course includes an introduction to: general instrumentation configuration, performance of instrumentation systems; types and characteristics of transducers; sources and characteristics of bioelectric signals; types and characteristics of electrodes; temperature regulation and measurement; cardiovascular system, measurements, and diagnostic equipment; blood instruments; patient care and monitoring; and electrical safety of medical equipment. Prerequisites: EECE 210 and BIOL 210, or consent of instructor.

EECE 602  Biomedical Engineering II  3 cr.
This course covers the respiratory system and measurements; nervous system and measurements; sensory and behavior measurements; biotelemetry; instrumentation for the clinical laboratory; x-rays and radioisotope instrumentation; magnetic resonance; and special surgical techniques. Prerequisite: EECE 601, or consent of instructor.

EECE 603  Biomedical Signal and Image Processing  3 cr.
A course that introduces the fundamentals of digital signal processing as implemented in biomedical applications. It provides a concise treatment of the tools utilized to describe deterministic and random signals as the basis of analyzing biological signals: data acquisition; imaging; denoising and filtering; feature extraction; modeling. The course is tightly coupled with a practical component as it looks at and assigns several laboratory projects. Examples include the auditory system, speech generation, electrocardiogram, neuronal circuits, and medical imaging. Students should have reasonable software skills in Matlab. Prerequisites: STAT 230 and EECE 340, or equivalent, or consent of instructor.

EECE 604  Communications Engineering  3 cr.
This course presents current research efforts in the emerging interdisciplinary field of communications engineering for genetics and bioinformatics. It shows how concepts and techniques from the field of communications engineering can be applied to central problems from the fields of genetics and bioinformatics. As a basic analogy, voice information is digitized, transmitted, and processed in communications, and DNA information is replicated, transmitted, and processed in genetics. The main topics covered include DNA compression, mutual information for functional genomics, channel coding for gene expression, genomic signal processing, and biological computation.

EECE 605  Neuromuscular Engineering  3 cr.

EECE 611  Introduction to Analog VLSI Systems  3 cr.
This course covers an introduction to digital electronic circuits; models, current equations and parasitic of CMOS transistors for digital design; study of CMOS inverter and logic gates, including analysis, design, simulation, layout and verification; advanced circuit styles; sequential circuits; advanced topics: semiconductor memories, power grid, clocking strategies, datapath building blocks, deep-submicron design issues, and interconnect. Prerequisites: EECE 310 and EECE 320, or consent of instructor.

EECE 612  Digital Integrated Circuits  3 cr.
A course on digital electronic circuits; models, current equations, and parasitics of CMOS transistors for digital design; study of CMOS inverter and logic gates, including analysis, design, simulation, layout, and verification; advanced circuit styles; sequential circuits; advanced topics: semiconductor memories, power grid, clocking strategies, datapath building blocks, deep-submicron design issues, interconnect. Prerequisites: EECE 311 and EECE 320, or consent of instructor.

EECE 613  Radio Frequency (RF) Circuits Design  3 cr.
The course focuses on the analysis and design of Radio Frequency (RF) circuits and components. The course covers RF design techniques using transmission lines, strip lines, microstrip and coplanar lines. It covers the design of passive and active RF devices, including impedance transformers, amplifiers, oscillators and mixers. It provides understanding of S-parameters and signal-flow graph analysis techniques. The course enables the student to get hands-on experience in RF circuit design through the use of computer-aided design tools to simulate and analyze radio frequency circuits, build them as part of a course project, and perform measurements in the lab using network and spectrum analyzers. Prerequisites: EECE 311, EECE 340, and EECE 380, or consent of instructor.

EECE 614  Computer-Aided Analysis and Design of VLSI Circuits and Systems  3 cr.
A course on circuit and logic simulation; timing analysis and verification; testing and fault simulation; logic and high-level synthesis; physical design automation. Prerequisite: EECE 311, or consent of instructor.

EECE 615  Computer Methods for Circuit and System Analysis  3 cr.
This course covers numerical methods and techniques for computer simulation of linear and nonlinear circuits and systems. This includes formulation methods, solution of linear equations and systems (DC analysis or static analysis), time-domain solution (transient analysis), solution of large systems, and sensitivity analysis. Application areas include simulation of electronic integrated circuits, power systems, electro-mechanical systems, mechatronics, and systems that can be modeled by sets of algebraic-differential equations. Prerequisites: EECE 210, MATH 202, and MATH 218 or MATH 219, or consent of instructor.

EECE 616  Advanced Digital Integrated Circuits  3 cr.
A graduate level course on advanced digital integrated circuits. The following topics are covered: impact of physical technology on architecture; technology issues: CMOS scaling and issues in deep submicron regimes, process variations; device and interconnect modeling; optimization for speed; high-speed logic families; low-power design: leakage reduction techniques, voltage scaling; power distribution; clocking strategies; timing concepts; memory design: clocked storage elements, SRAM, DRAM, flash memory; and high-speed arithmetic circuits. Prerequisite: EECE 412 or EECE 612, or consent of instructor.
EECE 617  Reliability and Statistical Design 3 cr.
This course explores major aspects of statistical design methodologies with particular emphasis on electrical and computer engineering problems. It covers various topics in the domain of reliability and yield estimation, and encompasses both geometrical-based approximation methods as well as sampling-based methods. The course focuses on variance reduction methods for purposes of extreme statistics and rare fail event estimation. Case studies will be provided to analyze the manufacturability and robustness challenges of advanced circuits and the implications on low power design. Students will learn about the impact of new physical effects on the traditional circuit design solutions and methods, and the rising need for statistical design methodologies. Other applications in electrical and computer engineering will also be covered. Prerequisite: Senior standing of consent of the instructor.

EECE 621  Advanced Computer Architecture 3 cr.
This course focuses on modern advancements in parallel computer architecture, with emphasis on advanced instruction level parallelism (ILP) and multiprocessor architectures. Topics include: advanced branch prediction, data speculation, computation reuse, memory dependence prediction, trace caches, dynamic optimizations, checkpoint architectures, latency-tolerant processors, simultaneous multithreading, speculative multithreading, virtual machines, message passing multiprocessors, UMA, NUMA and COMA shared-memory multiprocessors, single-chip multiprocessors, wormhole routing techniques, cache coherence, memory consistency models, high performance synchronization methods, speculative lock elision and transactional memory. A key component of the course is a research project in which students use architecture performance simulator to investigate novel architecture techniques. Prerequisite: EECE 421, or consent of instructor.

EECE 622  VLSI for Communications and Signal Processing 3 cr.
This course introduces concepts in the design and implementation of digital signal processing systems using integrated circuits. The main emphasis is on the architectural exploration, design and optimization of signal processing systems for communications. Algorithm, architecture, and circuit design techniques are introduced that enable joint optimization across the algorithmic, architectural, and circuit domains. A key component of the course is a project in which students investigate problems in the design and implementation of low-power and high-performance communication systems.

EECE 623  Reconfigurable Computing 3 cr.
A course dealing with the design issues pertaining to the implementation of application specific architectures using the reconfigurable computing paradigm allowing the same circuit to be reused in order to run different applications. Emphasis is on the systematic design of reconfigurable computing platforms that exploit a high degree of parallelism. Prerequisite: EECE 321, or consent of instructor.

EECE 624  Digital Systems Testing 3 cr.
This course covers an overview of digital systems testing and testable design; test economics, fault modeling, logic and fault simulation, testability measures, test generation for combinational circuits, memory test, delay test, IDDQ test, scan design, and boundary scan. Prerequisite: EECE 320, or consent of instructor.

EECE 625  Embedded Systems Design 3 cr.
A course on embedded hardware and software design; the system design process: requirements analysis, specification, hardware/software co-design, testing; embedded computing platforms: general- and special-purpose processors, hardware accelerators, systems-on-a-chip, intellectual property (IP) core-based design, embedded networks; software design tools and technologies: CAD tools, compilers, and assemblers; hardware design tools and technologies: hardware-description languages, high-level synthesis tools, ASIC and FPGA design flows; real-time operating systems: multiple tasks and processes, context switching, task scheduling, interprocess communication mechanisms; low-power computing; circuit, architecture, and application techniques; system reliability and fault tolerance. Prerequisites: EECE 321 and EECE 321L, or consent of instructor.

EECE 630  Distributed and Object Database Systems 3 cr.
A course that covers design techniques used for distributing databases among multiple sites. The fundamental topics include fragmentation, replication, and allocation. The course also discusses the strategies used in executing distributed queries subject to given criteria and the commit protocols for managing transactions in a distributed environment. Other topics covered include parallel database implementations and the design of object database management systems. The course enables students to get hands-on experience in designing distributed database systems using a design project that requires the implementation of low-level functionality associated with the functions of distributed database system. Prerequisite: EECE 433, or consent of instructor.

EECE 631  Advanced Topics in Algorithms 3 cr.
This is a second course on the general principles of algorithm design and analysis. The course is a continuation of EECE 431. Topics include: computability theory; complexity theory: time complexity, P versus NP, circuit complexity, and space complexity; randomized algorithms; linear programming; approximation algorithms; and selected topics. Prerequisite: EECE 431, or consent of instructor.

EECE 632  Cryptography and Computer Security 3 cr.
This course includes an overview of encryption and computer security; classical encryption techniques, block ciphers and the data encryption standard, finite fields; advanced encryption standard confidentiality using symmetric encryption, public-key cryptography, key management, hash and MAC algorithms, digital signatures, authentication applications, email security, and Web security. Prerequisite: Senior standing, or consent of instructor.

EECE 633  Data Mining 3 cr.
This course is an introduction to data mining. Data mining refers to knowledge discovery from huge amounts of data to find non-trivial conclusions. Topics will range from statistics to machine learning to database, with a focus on analysis of large data sets. The course will target at least one new data mining problem involving real data, for which the students will have to find a solution. Prerequisites: EECE 230, EECE 330 and EECE 433, or consent of the instructor.
EECE 634  Introduction to Computational Arabic 3 cr.
This course will focus on knowledge necessary to develop software applications and systems that deals with Arabic data and trends to Arabic users. The course will discuss computational challenges specific to the Arabic language including representation, display, rendering, processing, directionality, structure, interface, and recognition. The course will also discuss multilingual texts where Arabic takes part. We will visit several text processing techniques and algorithms such as encoding, matching, tokenization, search, indexing, and pattern matching and introduce the necessary changes to accommodate the Arabic language. The last part of the course will discuss the state of the art in automating Arabic language processing, understanding, and recognition. Prerequisite: EECE 330 or consent of the instructor.

EECE 636  Logic Verification and Synthesis 3 cr.
This course covers the basic concepts needed to guarantee the correctness of logic systems whether software programs or hardware designs; the basic representations of propositional logic, first order logic, and variations of them. The course discusses how expressive (amenable to express the intent of designers) and how realizable (amenable to automated implementation techniques into circuits) the different logics are. In the course students learn practical tools that take logic descriptions of systems, prove their correctness, either fully or partially, and if possible synthesize or suggest correct circuit implementations. Prerequisite: EECE 431 or consent of instructor.

EECE 637  Advanced Programming Practice 3 cr.
This course is an advanced course on programming practices with a focus on verification. The course introduces programming tools and techniques that make individual engineers more effective and productive and help them develop quality code. Teams will work in Agile and eXtreme programming environments with a focus on design by contract. They will use formal specifications, design patterns and aspect oriented programming. Projects will use tools for code control, building, configuration, language recognition, dynamic documentation, fast prototyping, refinement, coverage, automated and manual debugging, and dynamic and static verification. Prerequisite: EECE 330, or consent of instructor.

EECE 638  Software Testing 3 cr.
The course focuses on concepts, techniques and tools for testing software. It provides practical knowledge of a variety of ways to test software and an understanding of some of the tradeoffs between testing techniques. The topics include: software testing at the unit, module, and system levels; functional and structural testing; regression testing; mutation testing; test suite minimization and prioritization; automatic test case generation.

EECE 639  Advanced Data Mining 3 cr.
A course that covers advanced topics in data mining and recent progress in this field. Discussions will include which techniques fit best for complex applications in data mining. Mining complex data will include general text mining, Arabic text mining, social network analysis, spatial data mining, mining of the World Wide Web, stream data, time-series data, and sequence data. We will also discuss recent application sectors and trends in data mining such as for the telecommunication, biological, and financial sectors. Prerequisites: EECE 633, EECE 667, or EECE 693, or consent of instructor.

EECE 640  Wireless Communications 3 cr.
A course that covers the fundamentals of wireless communications with emphasis on wireless channel modeling; digital modulation in wireless channels; diversity techniques; channel coding and interleaving in fading channels; adaptive equalization; multiple access techniques; the cellular concept; overview of current wireless communications systems. Prerequisite: EECE 442, or consent of instructor.

EECE 640L  Wireless Communications Laboratory 1 cr.
A laboratory course that covers the following topics: basics of radio network planning and optimization, radio network planning for the GSM cellular system, radio network planning for the UMTS cellular system, GSM-UMTS co-existence and co-citing, radio network planning for the WiMAX broadband system, indoor GSM drive testing measurements and analysis, outdoor GSM drive testing measurements and analysis, UMTS drive testing measurements and analysis, and measurement-based wireless channel modeling. Prerequisite: EECE 640, or consent of instructor.

EECE 641  Information Theory 3 cr.
In this course students study "data transmission" through introducing the field of information theory. The theory is introduced in a gradual fashion and students study its applications to communications theory, computer science, statistics and probability theory. Covering all the essential topics in information theory, students are introduced to the basic quantities of entropy, relative entropy, and mutual information to show how they arise as natural answers to questions of data compression, channel capacity, rate distortion and large deviation theory. Prerequisite: STAT 230 or EECE 442, or consent of instructor.

EECE 642  Introduction to Coding Theory 3 cr.
This course introduces the theory of error-correcting codes with a focus on the asymptotic, algorithmic, and algebraic aspects. Topics include: background material from combinatorics and algebra; Shannon's coding theorem; linear codes; classical algebraic codes: Hamming and Hadamard codes, Reed-Solomon codes and Justesen codes, and decoding algorithms; codes from graphs: low density parity check codes, expander codes, explicit constructions, and decoding algorithms; and an introduction to Turbo codes. Prerequisite: Senior standing, or consent of instructor.

EECE 643  RF System Engineering for Wireless Communications 3 cr.
This course introduces students to system blocks, system parameters, and architectures of RF systems for wireless communications. It focuses on the design of a radio system for transmission and reception of voice and data information: receivers and transmitters system topologies, key system blocks in a wireless system, determination of system block parameters from radio requirements and system analysis, tradeoffs between various blocks in a radio system, and frequency planning. It discusses how modulation and demodulation schemes and multiple-access techniques used in present wireless applications influence RF systems requirements. The last part of the course focuses the link budget analysis of RF radio links. Prerequisites: EECE 311, EECE 380, and EECE 442, or consent of instructor.

EECE 644  Stochastic Processes, Detection, and Estimation 3 cr.
This is a graduate-level introduction to the fundamentals of detection and estimation theory involving signal and system models in which there is some inherent randomness. The concepts that we develop are extraordinarily rich, interesting, and powerful, and form the basis for an enormous range of algorithms used in diverse applications. The material in this course constitutes a common foundation for work in the statistical signal processing, communication, and control areas. Prerequisites: STAT 230 and EECE 340, or consent of instructor.
EECE 645 Wireless Cellular Technologies 3 cr.
A course on the evolution of cellular technologies with focus on 2G GSM technology, 3G UMTS/HSPA technology, 4G LTE technology, and beyond. Topics include: cellular network fundamentals; standardization and services; transmitter and receiver link level designs; access and core network architectures; physical channels and signaling procedures; link adaptation and radio resource management; scheduling and multuser diversity; capacity/coverage tradeoffs and radio network planning; capacity/coverage enhancement techniques; MIMO techniques; emerging topics. Prerequisite: EECE 640, or consent of instructor.

EECE 646 Advanced Digital and Data Communications 3 cr.
A course that addresses digital communication principles and techniques aimed at achieving improved reliability. The course examines information measures; such as entropy and mutual information for discrete and waveform channels, source coding, channel capacity and coding theorem, linear block and cyclic codes, hard and soft decision decoding, spread spectrum modulation.

EECE 647 Queuing Theory 3 cr.
A course that covers Poisson counting and renewal processes; Markov chains and decision theory, branching processes, birth death processes, and semi-Markov processes; simple Markovian queues, networks of queues, general single and multiple-server queues, bounds and approximations. Prerequisite: Senior standing, or consent of instructor.

EECE 651 Internet Engineering 3 cr.
A course that examines major protocols used in internet engineering: IP, ICMP, TCP, UDP; new technologies introduced on the Internet, such as IP Multicast, Mobile IP, IP-6, VPNs, and quality of service; routing on the internet; network security and firewall design; and an overview of the application protocols such as SMTP, HTTP, RTP, and SNMP. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 651L Internetworking Laboratory 1 cr.
This laboratory course covers the technologies and protocols of the internet. The experiments cover the internet protocol (IP), address resolution protocol (ARP), internet control message protocol (ICMP), user datagram protocol (UDP) and transmission control protocol (TCP), the domain name system (DNS), routing protocols (RIP, OSPF, BGP), network address translation (NAT), dynamic host configuration (DHCP), network management protocols (SNMP), and IP multicast. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 652 Web Server Design and Programming 3 cr.
This course concentrates on major technologies used in building Web servers. Alternate versions are to be given each year: the Windows-based IIS Server and the Linux-based Apache server. For IIS, ASP.NET along with C# are used for programming Web servers. For Apache, PHP is the language of choice. The course starts with a fast track on client programming, the HTTP protocol, SQL database servers, and XML programming. A weekly lab, two application projects, and a research project constitute the major requirements of the course. Prerequisite: Senior standing, or consent of instructor.

EECE 653 Multimedia and Networking 3 cr.
This course covers topics in multimedia such as system requirements, performance requirements, representation and compression. Multimedia networking is emphasized by discussing multicasting, streaming, multimedia networking protocols and quality of service-based traffic management protocols. Other topics covered include synchronization, VoIP, and Internet2. Multimedia networking applications are designed and implemented as student projects. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 654 Pervasive Computing Systems and Applications 3 cr.
This course covers the technologies involved in integrating front-end mobile devices into local and global networks. An emphasis is placed on the underlying technologies and standards applied when building pervasive solutions. The course has a strong programming component in that it dedicates a significant portion of the time covering the development of mobile applications for three platforms: Windows CE for Pocket PCs, Palm OS for Palm PDAs, and Java 2 Micro Edition (J2ME) for wireless phones that run the Symbian OS. To emphasize this last component, code demonstrations will be held in class, and students will be required to complete three projects targeting the three platforms, designed to cover the different aspects of mobile applications (user interface, local database implementations, and networking). Prerequisite: EECE 430, or consent of instructor.

EECE 655 Internet Security 3 cr.
The course covers topics in internet security. The course discusses security threats, vulnerabilities of protocols and the different types of attacks. Preventive and defensive mechanisms are covered; such as: e-mail security, web security, IP security, network management security, wireless security, intrusion detection techniques, firewalls, VPNs and tracing the source of attacks. Student projects will be composed of implementation, simulation and research components. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 655L Network and Computer Security Laboratory 1 cr.
A laboratory that addresses advanced network and computer security topics. Experiments include the execution of attacks, the setup of intrusion detection and prevention, securing computers and wired and wireless networks, and digital forensics. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 656 Mobile Ad hoc and Sensor Networks 3 cr.
This course covers all aspects of ad hoc and sensor networking, from design through performance issues to application requirements. The course starts with the design issues and challenges that are associated with implementations of ad hoc and sensor network applications. This includes dealing with mobility, disconnections, and awareness of battery power consumption. The course then provides a detailed treatment of proactive, reactive, and hybrid routing protocols, in addition to the various clustering approaches. Next, it covers the IEEE 802.11 Wireless LAN and Bluetooth standards and discusses their characteristics and operations. The course also discusses research topics that involve collaboration among mobile devices, service discovery, and data caching. Through a project, the course gives students hands-on experience in designing a mobile ad hoc network using available Pocket PCs and simulation tools. Prerequisite: EECE 350 or EECE 450, or consent of instructor.

EECE 657 Wireless Security 3 cr.
A course that covers wireless network security; security challenges in wireless networks; security problems facing existing and upcoming wireless networks; security in naming, addressing, neighbor discovery, and routing; and trust and privacy. Prerequisites: EECE 350 or EECE 450 and EECE 632 or consent of instructor.

EECE 660/MECH 654 System Analysis and Design 3 cr.
A course that addresses state-space models of discrete and continuous, linear and nonlinear systems; controllability; observability; minimality; Eigenvector and transforms analysis of linear time invariant multi-input multi-output systems; pole shifting; computer control; design of controllers and observers. Prerequisite: Senior or graduate standing, or consent of instructor.
EECE 661/Robotics 3 cr.
MECH 641
Robotics manipulators classification and work envelope. Robot kinematics, dynamics and forces. Joints trajectory planning for end effector desired tracking and constrained motion. Control of robots using linear, non-linear, and adaptive controllers. Prerequisite: EECE 460 or MECH 435, or consent of instructor.

EECE 662/Optimal Control 3 cr.
MECH 655
A course on optimization theory and performance measures, calculus of variations, the maximum principle, dynamic programming, numerical techniques, LQR control systems. Prerequisite: Senior or graduate standing, or consent of instructor.

EECE 663/System Identification 3 cr.
This course introduces the fundamentals of system identification as the basic mathematical tools to fit models into empirical input-output data. While rooted in control theory, applications extend to general time-series modeling and forecasting, such as stock prices, biological data and others. Topics covered include nonparametric Identification methods: time and frequency response analysis; parametric identification methods: prediction error methods, least squares, linear unbiased estimation and maximum likelihood; Convergence, consistency and asymptotic distribution of estimates; properties and practical modeling issues: bias distribution, experiment design and model validation. Prerequisite: Senior or graduate standing, or consent of instructor.

EECE 664/Fuzzy Sets, Logic and Applications 3 cr.
A course that outlines fuzzy sets and related concepts; logical connectives; mapping of fuzzy sets; extension principle; fuzzy relations and fuzzy set ordering; fuzzy logic inference; applications: fuzzy control, signal processing, pattern recognition, decision-making, and expert systems. Prerequisite: Senior standing, or consent of instructor.

EECE 665/Adaptive Control 3 cr.
A course that includes the control of partially known systems; analysis and design of adaptive control systems; self-tuning regulators; model reference adaptive control of uncertain dynamic systems; typical applications. Prerequisite: EECE 460, or consent of instructor.

EECE 667/Pattern Recognition 3 cr.
The course provides an overview of the theory, principles and algorithms used in machine learning to construct high performance information processing systems that learn from experience. The course discusses main and modern concepts for model selection and parameter estimation in recognition, decision making and statistical learning problems. Special emphasis will be given to regression, classification, regularization, feature selection and density estimation in supervised mode of learning. Students will be assigned typical machine learning problems to investigate as projects. Prerequisite: Senior standing, or consent of instructor.

EECE 668/Game Theory and Decision Making 3 cr.
Game theory provides a set of tools, approaches, and perspectives on decision making to mimic the human elements of decision making that is best described by strategy, coercion and cooperation. This course offers an introduction to fundamentals of game theory and decision making with a special emphasis on the foundations of the mathematical background. Topics covered include: static, evolutionary, supermodular, repeated, cooperative, network, potential and congestion games as well as bargaining and uncertainty games. Students will be assigned real-world examples of game theory and strategic decision making to investigate as projects. Prerequisite: Senior standing or consent of instructor.

EECE 669/Nonlinear Systems: Analysis, Stability and Control 3 cr.
MECH 648
A course that presents a comprehensive exposition of the theory of nonlinear dynamical systems and its control with particular emphasis on techniques applicable to mechanical systems. The course will be punctuated by a rich set of mechanical system examples, ranging from violin string vibration to jet engines, from heart beats to vehicle control, and from population growth to nonlinear flight control. Prerequisite: MECH 435 or EECE 460.

EECE 670/Power System Planning 3 cr.
The course investigates electric energy and peak demand forecasts using weather sensitive, time curve, autoregressive and causal models; generation reliability evaluation, loss of energy expectation, energy limited units, probabilistic production costing, generating capacity expansion analysis, and maintenance scheduling; operational planning, unit commitment, hydrothermal coordination; power system security classification, contingency analysis, external equivalents, optimal power flow; planning in a competitive electric power environment. Prerequisite: EECE 471, or consent of instructor.

EECE 671/Environmental Aspects of Energy Systems 3 cr.
A course that examines world energy resources and classifications; sources and effects of air pollution; air quality modeling, Gaussian dispersion models for pollution estimation; motor vehicle emissions and noise pollution; environmental impacts of electricity generation, pollution control systems, electromagnetic radiation, production and impacts in high-voltage applications; environmental impact assessment; basic concepts.

EECE 672/Energy Planning and Policy 3 cr.
This is a course that focuses on features of modern energy planning and policy. Topics covered include the interaction among the technological, economic, environmental, and sociopolitical aspects of energy supply and use; electricity, oil, and gas industries, and their market structures; elements of energy planning on the sector and national levels; energy decision-making under conditions of uncertainty, risk management in energy planning; liberalization of energy markets; case studies. Prerequisite: Senior standing, or consent of instructor.

EECE 673/Power Electronics Systems and Applications 3 cr.
A course that reviews converter topologies for AC/DC, DC/AC, and DC/DC; power supply applications; converter applications to motor drives; utility interface of distributed energy systems; static VAR systems; flexible AC transmission; high voltage DC; power quality control; active and passive harmonics compensation. Prerequisite: EECE 473 or EECE 471, or consent of instructor.
EECE 675  Renewable Energy Systems  3 cr.
A course that covers the principles of renewable energy, solar radiation, solar water heating, building and other thermal applications, photovoltaic generation, wind power, fuel cells and the hydrogen cycle, biomass, and institutional and economic factors.

EECE 676  Computer Analysis of Power Systems  3 cr.
A course on synchronous machine modeling and simulation, response to small disturbances, and voltage instability. Topics include Park's transformation, flux linkage, voltage, and state-space equations, subtransient and transient parameters, simplified models of the synchronous machine, treatment of saturation, system reference frame, small-signal stability, power system stabilizers, and bifurcation analysis. Prerequisite: EECE 678, or consent of instructor.

EECE 677  Electric Power System Stability and Control  3 cr.
A course on synchronous machine modeling and simulation, response to small disturbances, and voltage instability. Topics include Park's transformation, flux linkage, voltage, and state-space equations, subtransient and transient parameters, simplified models of the synchronous machine, treatment of saturation, system reference frame, small-signal stability, power system stabilizers, and bifurcation analysis. Prerequisite: EECE 678, or consent of instructor.

EECE 678  Advanced Power System Analysis  3 cr.
A course on optimal dispatch of generation, symmetrical components and unbalanced faults, transient stability, control of generation, state estimation in power systems, and power system simulation. Prerequisite: EECE 671, or consent of instructor.

EECE 679  Energy Efficiency in the Power Sector  3 cr.
Topics covered in the course include: utility companies and energy supply, energy sustainability, cogeneration systems: combined heat and power (CHP) and combined cycle gas turbines (CCGT), reciprocating engines, distributed generation, demand side management, energy audit: types and data analysis, monitoring and targeting of energy, energy-efficient rotating machines, design and performance optimization; and case studies. Prerequisite: EECE 370 or consent of instructor.

EECE 680  Antenna Theory and Design  3 cr.
This course provides the students with an understanding of the basic principles of antenna analysis and design; an overview of the fundamental characteristics and parameters of antennas; an overview of analytical and numerical methods used to analyze and design antennas with application to some basic antenna structures such as linear antennas, loop antennas, and antenna arrays. Prerequisite: EECE 380, or consent of instructor.

EECE 681  Advanced Antenna Design  3 cr.
This course provides the students with an understanding of advanced antenna structures and presents an overview of analytical and numerical methods used to analyze and design these antenna structures. This course includes broadband antennas, frequency-independent antennas, aperture antennas, horn antennas, microstrip antennas, and reflector antennas. Students will work on a research paper on a selected antenna design topic. Prerequisite: EECE 680, or consent of instructor.

EECE 682  Time-Harmonic Electromagnetic Fields  3 cr.
A course on time-varying and time-harmonic EM fields; electrical properties of matter; wave propagation and polarization; construction of solutions; reflection and transmission; electromagnetic theorems and principles in particular equivalence; rectangular waveguides and cavities; dielectric waveguide, circular waveguides, spherical waveguide; radiation from structures; scattering by wedges, cylinders and spheres; radiation from apertures, and perturbational and variational techniques. Prerequisite: EECE 380, or consent of instructor.

EECE 683  Numerical Methods in Electromagnetics  3 cr.
This course examines the principles and applications of numerical techniques for solving practical electromagnetics problems. It covers the moment methods, finite difference methods, finite element methods, and hybrid methods. The course also investigates the application of the finite-volume control method in electromagnetics. Prerequisite: EECE 682, or consent of instructor.

EECE 691  Digital Signal Processing  3 cr.
Course topics include a review of signals, systems, and transforms; design of digital filters: FIR and IIR; sampling and reconstruction of signals; multi-rate signal processing with applications; effects of finite word length; discrete random signals and spectral estimation; and an introduction to 2D signal and image processing. Prerequisite: Senior standing, or consent of instructor.

EECE 691L  Digital Signal Processing Lab  1 cr.
This graduate lab is comprised of a set of lab experiments in MATLAB, C and Assembly covering a series of real-time signal processing topics. The developed laboratory material is intended to complement the digital signal processing course (EECE 691). Upon completion of the lab, the student will have acquired the required knowledge and skills to develop real-time DSP systems. Prerequisite: EECE 691 Digital Signal Processing (may be waived upon approval of course instructor).

EECE 692  Computer Vision  3 cr.
An introductory course on the problems and solutions of modern computer vision. Topics covered include image acquisition, sampling and quantization; image segmentation; geometric framework for vision: single view and two-views; camera calibration; stereopsis; motion and optical flow; recognition; pose estimation in perspective images. Prerequisites: MATH 202 and EECE 230.

EECE 693  Neural Networks  3 cr.
The course provides a comprehensive foundation to artificial neural networks and machine learning with applications to pattern recognition and data mining; learning processes: supervised and unsupervised, deterministic and statistical; clustering; single layer and multilayer perceptrons; least-mean-square, back propagation, and Al-Alaoui algorithms; radial-basis function networks; committee machines; principal component analysis; self-organizing maps; and current topics of interest.

EECE 694  Digital Image Processing  3 cr.
A course on two-dimensional signals and systems; image formation and perception; representation, coding, filtering restoration, and enhancements; feature extraction and scene analysis; introduction to computer vision.
EECE 694L Image Processing Lab 1 cr.
The EECE 694L graduate lab comprises a set of MATLAB/C++ based lab experiments in different image processing topics covering image pre and post processing techniques, image compression, morphological transformations, image restoration and enhancement techniques, color image processing, computer vision basics, and geographical image processing. In addition, students will be exposed to software optimizations for real time image processing using SIMD instructions. Prerequisite: EECE 694 or EECE 693, or consent of instructor.

EECE 695 Adaptive Filtering 3 cr.
A course that examines the fundamentals of optimal filtering and estimation, Wiener filters, linear prediction, steepest-descent and stochastic gradient algorithms; frequency-domain adaptive filters; method of least squares, recursive least squares, fast fixed order and order-recursive (lattice) filters; misadjustment, convergence and tracking analyses, stability issues, finite precision effects; connections with Kalman filtering; and nonlinear adaptive filters.

EECE 696 Applied Parallel Programming 3 cr.
This course is an introduction to parallel programming, and GPU computing. Topics include GPU as part of the PC architecture; CUDA, CUDA threads and CUDA memory; floating point performance; open CL, MPI, and reductions and their implementation. The course also includes application case studies, current topics and a course case study. Prerequisite: EECE 321; Senior or graduate standing.

EECE 697/MECH 646 Wheeled Mobile Robotics 3 cr.
A course that provides an in-depth coverage of wheeled mobile robots. The material covers: Nonholonomy and integrability of kinematic constraints. Modeling: kinematics, dynamics and state-space representation. Nonlinear control strategies (open-loop and closed-loop). Five case studies are covered during the course: car-like, cart-like, omni-directional wheeled, mobile wheeled pendulums and bike-like robots. Prerequisite: Senior or graduate standing.

EECE 698/MECH 650 Autonomous Mobile Robotics 3 cr.
This course is designed to provide engineering graduate and 4th year students with the opportunity to learn about autonomous mobile robotics. Topics include sensor modeling, vehicle state estimation, map-based localization, linear and nonlinear control, and simultaneous localization and mapping. Prerequisites: EECE 230, EECE 312, and MECH 435 or EECE 230 and EECE 460.

EECE 699/MECH 647 Hydraulic Servo Systems 3 cr.
A graduate lecture course which teaches the fundamentals of modeling and control of hydraulic servo-systems. It provides theoretical background and practical techniques for the modeling, identification and control of hydraulic servo-systems. Classical and advanced control algorithms are discussed. The use of Matlab/Simulink and DYMOLA will be an integral part in this course. Prerequisites: MECH 314 and MECH 435 or MECH 314 and EECE 460.

EECE 731 Advanced Topics in Complexity Theory 3 cr.
The course covers advanced topics in computational complexity theory. Topics include: hierarchy theorems; relativization; non-uniform models of computations: branching programs and circuits, relations, and lower bounds; alternation and the polynomial hierarchy; interactive proofs; probabilistically checkable proofs; pseudorandomness: hardness versus randomness paradigm, generators for space bounded computations, special purpose generators. Prerequisite: EECE 631 or consent of instructor.

EECE 732 Pseudorandomness 3 cr.
Pseudorandomness is a branch of computational complexity theory whose aim is to construct randomness generators which use little randomness, but still appear random to computations with limited time, space, or circuit resources. This course covers the basics of the area of pseudorandomness. Topics include: Randomized complexity classes review; Background material from coding theory; Computational indistinguishability and pseudorandom generators; Hardness versus randomness: Nisan-Wigderson generator, Impagliazzo-Wigderson theorem; Simple generators: k-wise independence, almost k-wise independence, and small-bias spaces; Unconditional generators for constant depth circuits, low-degree polynomials, and space-bounded computation; DNF counting algorithms; Weak random sources, randomness extractors, and Trevisan’s extractor. Prerequisite: EECE 631, or consent of the instructor.

Special Courses and Thesis

EECE 700 Approved Experience for EICT Students 0 cr.
EECE 796 Special Project 3 cr.
An assigned project of not more than 3-credit hours, supervised by a faculty member

EECE 797 Seminar 3 cr.

EECE 798 Special Topics Every semester

EECE 799 Thesis Every semester. Prerequisite: EECE 799T

EECE 799T Comprehensive Exam Every semester 0 cr.

EECE 898 Advanced Topics in Electrical and Computer Engineering 3 cr.

EECE 980 Qualifying Exam Part I: Comprehensive Exam 0 cr.

EECE 981 Qualifying Exam Part II: Defense of Thesis Proposal 0 cr.

EECE 982 PhD Thesis Every semester. Taken while total required credit hours have not been completed. 3 cr.

EECE 983 PhD Thesis Every semester. Taken while total required credit hours have not been completed. 6 cr.

EECE 984 PhD Thesis Every semester. Taken while total required credit hours have not been completed. 9 cr.

EECE 985 PhD Thesis Every semester. Taken while total required credit hours have not been completed. 12 cr.

EECE 986 PhD Thesis Every semester. Taken while total required credit hours have not been completed. 0 cr.

EECE 987 PhD Thesis Defense Every semester 0 cr.
Department of Mechanical Engineering

Chairperson: Abou Ghali, Kamel
Professors: Abou Ghali, Kamel; Azoury, Pierre; Darwish, Marwan; Ghaddar, Nesreen K. (Qatar Chair in Energy Studies); Hamade, Ramsey; Moukalled, Fadi; Shihadeh, Alan

Professor Emeritus: Sakkal, Fateh
Associate Professors: Kuran, Albert; Lakkis Issam
Assistant Professors: Al-Hindi, Mahmoud; Asmar, Daniel; Azizi, Fouad; Liermann, Matthias; Oweis, Ghanem; Saad, Walid; Safieddine, Salem; Chammas, Elie; Shehadeh, Mutasem; Zeaiter, Joseph
Lecturers: Abou Chakra, Hadi; Hassoun, Talal; Kasamani, Jihad; Najm, Wajih; Nasr eddine, Mohammad; Rouhana, Natalie
Instructors: Al Saidi, Abdul-Kader; El Chmeitelly, Rana; Jaigha, Bassam; Karaogklanian, Nareg; Kassis, Lina; Kablawi, Amer; Kfoury, Elie; Seif, Cherbel

General Information

The Department of Mechanical Engineering offers two graduate master's programs, one leading to the degree of master of engineering, with a major in mechanical engineering, the other leading to the degree of master of mechanical engineering, with a major in applied energy.

Master of Engineering (ME)
Major: Mechanical Engineering

In this program students may choose to concentrate in any of the following areas:
- Thermal and Fluid Sciences
- Design, Materials, and Manufacturing
- Mechatronics

The student is encouraged to select a concentration area of personal interest, the area of “major concentration.” The master's degree requires a minimum of 21 credit hours of course work and a thesis that equals nine credits. Research is a time consuming process, and between 20 and 24 months are usually required to complete the master’s degree. The student and the graduate adviser, in coordination with the thesis committee, develop a plan of study tailored to the student's specific interest and background. It is advisable that this plan be developed no later than the first month of the second semester of graduate work.

The required 21 course credit hours and thesis are distributed as follows:
- A mandatory three-credit course in applied mathematics. The math course or math-oriented course offered by other departments must be approved by the graduate student’s adviser. Acceptable courses include, but are not limited to the following:
  - MECH 630 Finite Element Methods in Mechanical Engineering
  - MECH 663 Computational Fluid Dynamics
  - MECH 764 Advanced Topics in Computational Fluid Dynamics
  - ENMG 604 Deterministic Optimization Models
  - MATH 307 Topics in Analysis

- At least two advanced fundamental (“core”) mechanical engineering three-credit courses from two concentrations other than the major concentration, and as approved by the student's graduate adviser.
- Four technical courses (12 credit hours). Of these a minimum of three courses (nine credit hours) must be completed in the area of major concentration, and as approved by the student's graduate adviser. It is advisable to make the selection in connection with the thesis topic. A maximum of three credit hours may be completed in other engineering graduate programs again subject to the approval of the graduate student's adviser. A student may register for one time in MECH 796, Special Projects in Mechanical Engineering. The following is a list of engineering technical courses by concentration.
- Seminar Course: MECH 797 (zero credit). Students must register for the course each time it is offered.
- Thesis: MECH 799 (equivalent to nine credit hours) based on independent research.

Master of Engineering
Major: Applied Energy

The objectives of the master's program leading to the Master of Engineering: Applied Energy degree are for its graduates to be able to:
- Design and manage efficient energy systems for buildings with high-quality indoor environments.
- Integrate renewable energy technologies with conventional energy systems to improve sustainability of energy supply systems.
- Understand the economic, policy and regulatory frameworks within which decisions on sustainable energy utilization practices are made.
- Assess and evaluate the impact of new technical developments in energy systems on society, the environment, and the economy.
Program Structure
The master’s degree with the thesis option will normally require between 20 to 24 months for completion.

The program consists of 30 credits distributed as follows:
- Nine credits of mandatory courses selected from the following list:
  - MECH 672 Modeling Energy Systems
  - MECH 673 Efficient Buildings with Good Indoor Air Quality
  - MECH 674 Energy Economics and Policy
- Six credits of lab and special courses, including a minimum of one graduate level lab course. Lab and special courses are defined as follows:
  - A graduate lab course corresponds to two credits. Suggested labs include but are not limited to:
    - MECH 670 Laboratory for Renewable Energy in Buildings
    - MECH 679 Energy Audit Lab
    - MECH 770 HVAC and Refrigeration Systems Lab

A special course is a block course or a seminar course that corresponds to one or two credits depending on its duration and content. Special courses could be offered by experts from local or international industry, or by visiting faculty members from partner universities.

- Nine credits of elective courses selected with the approval of the graduate student’s advisor in any of the following areas: sustainable energy production from renewable sources, hybrid systems, and sustainable energy utilization practices in the context of buildings. Three credits of the nine technical elective credits can be selected from outside the pool of graduate courses in an area related to the thesis topic as approved by the thesis advisor.

The pool of approved technical elective courses includes:
- MECH 603, MECH 675, MECH 676, MECH 677, MECH 678, MECH 701, MECH 771, MECH 772, MECH 773, MECH 778.
- The elective courses can be replaced by courses taken during an exchange semester at one of the energy program partner universities. A maximum of six credits can be counted from an exchange semester.
- Seminar Course: MECH 797 (zero credit). This is a pass fail course based on attendance and is offered at least once per year. Students must register for it each time it is offered.
- Thesis: MECH 799E (equivalent to six credit hours). The thesis must be based on independent research.

Requirements
A student applying for admission to a graduate program is only eligible if s/he has a bachelor of engineering degree with a mechanical engineering major or the equivalent. A student must also satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of the university catalogue (see pages 55, 62, 243–247).

Doctor of Philosophy (PhD), Specialization: Mechanical Engineering
The Faculty of Engineering and Architecture offers a graduate program of study leading to the PhD degree with specializations in mechanical engineering.

General Information
The graduate curriculum offers students opportunities to develop levels of expertise and knowledge consistent with a career of technical leadership. The doctoral program emphasizes the acquisition of advanced knowledge and the fostering of individual experience of significant intellectual exploration.

The educational objectives of the PhD program are to develop:
- Expertise in a core area of mechanical engineering;
- The ability to identify pertinent research problems, formulate and execute a research plan, and generate and analyze original research results;
- The ability to communicate those results through oral presentations and written publications; and
- The practice of independent learning and advancing knowledge.

Admission Requirements
Candidates for the doctoral degree program are expected to have an outstanding academic record demonstrated by a minimum undergraduate cumulative grade average of 80.0 according to AUB standards (3.0 GPA in a 4.0 grade system), and have completed a master’s degree in mechanical engineering or a related discipline with a cumulative grade average of 85.0 according to AUB standards (3.33 GPA in a 4.0 grade system).

The application to the doctoral program follows the deadlines set by the Admissions Office. All applicants are required to take the General Exam section of the Graduate Record Examination (GRE) and submit their scores. Students other than AUB graduates and graduates of recognized colleges or universities in North America, Great Britain, Australia, and New Zealand are required to take the Test of English as a Foreign Language (TOEFL). See ELPR requirements on page 37.

PhD Program Description
The PhD program in mechanical engineering requires a minimum of 18 credit hours of course work beyond the master’s degree. The student must pass a two-part PhD Qualification Examination. In addition, the student must submit an original thesis based on independent research that makes a significant contribution to his/her area of research. The thesis is the principal component of the doctoral program, and the part that will serve as the major indicator of a candidate’s abilities. A minimum of 30 credits registered as thesis work is required.

Advisers
After admission into the department, a general adviser will be assigned to the PhD student to guide her/him with the initial selection of courses and to introduce the student to the various
research areas in the department. The student must select a thesis adviser by the end of the first semester after admission to the program. The student must seek the faculty members that are in the student's area of interest, and discuss with them possible research topics for the PhD thesis. Once an adviser is identified, the student will develop a Proposed Program of Study that lists the courses the student intends to take and the proposed dates for the written and oral Doctoral Qualifying Examinations. The Proposed Program of Study must then be submitted to the ME Graduate Committee for approval.

Course Requirements

The PhD program requires a minimum of 18 credit hours of course work beyond the master’s degree. The program is composed of three credit hours of advanced study in mathematics, nine credit hours of technical graduate level courses of advanced study in the student’s area of research (major course area requirements), and six credit hours of courses in a minor specialization area of study, selected by the student, in a field different from the major field of study. The minor specialization, six credit hours of courses, must be taken outside of the Mechanical Engineering Department. The minor requirement could be satisfied through courses previously taken in the student’s master’s degree program. This however, will not reduce the required minimum of 18 credit hours of course work needed beyond the master’s degree.

Mathematics Course Requirements

A three credit advanced course in mathematics is required from all doctoral candidates. The course must be approved by the adviser of the candidate. The mathematics course requirement is satisfied if the student has completed at least six credits of advanced courses in math beyond the bachelor’s degree.

Major Course Area Requirements

At least nine credit hours of core courses of advanced study in mechanical engineering are needed to satisfy this requirement. The courses should be in the major research area of the student and must be approved by the student’s graduate thesis adviser. This will enable the doctoral candidate to pursue course work in direct support of his/her research. The course work must address all recommendations, made during the qualification period, by the student’s adviser and thesis committee.

The following major course areas are offered:

I. Thermal and Fluid Sciences
II. Mechatronics
III. Design, Materials, and Manufacturing

Minor Subject Requirements

The minor is a program of advanced study that will help the student to develop knowledge and some competence in an area other than the candidate’s major field of study that is related to his/her research area. Two graduate courses (not less than six credits) must be taken in a coherent field that is different from the major field of study. These six credit hours of courses must be taken outside of the Mechanical Engineering Department (i.e. in other engineering or basic science departments); some of this requirement could be satisfied through coursework done during the student’s master’s degree program. This, however, will not reduce the required minimum of 18 credit hours of course work needed beyond the master’s degree. All courses taken in this minor area must be at the graduate level and must be taken while the student is registered in a graduate program at the AUB. The minor subject must be approved in advance by the student’s thesis committee, and by the FEA Graduate Studies Committee. The approval of the department offering the minor should also be sought. If the student chooses mathematics as his minor then the course taken to fulfill the mathematics course requirement will count towards the minor subject requirements.

PhD Qualification Examination

The qualification examination for admission to PhD candidacy has two parts. Part 1: Comprehensive Exam must be completed before the end of the second semester of enrollment in the doctoral program. Part 2: Defense of Thesis Proposal must be completed within one year following the completion of Part 1.

The purpose of the qualifying examination is to determine whether the applicant possesses the attributes of a doctoral candidate: mastery of the core mechanical engineering disciplines, ingenuity and skill in solving unfamiliar problems.

The oral and written qualifying examinations will be held at end of the fall and the spring semester every year.

The mechanical engineering faculty will review each student’s performance in the qualifying examination and decide whether s/he passes or fails. Students who fail sections of Part 1 may be permitted to take that section of the examination again, in which case they must do so the next time it is offered. In no case will a student be allowed to repeat any section of this examination more than once.

Part 1: Comprehensive Exam

Students must demonstrate that they have mastered the concepts of advanced calculus, solution of differential equations, and computational methods.

The student must take four sections of the written qualification examination in four sub-disciplines that are normally selected from the list of topics below:

- Applied Mechanics
- Materials and Manufacturing Processes
- System Dynamics and Control
- Design
- Fluid Mechanics
- Thermodynamics
- Heat and Mass Transfer
Part 2: Defense of Thesis Proposal

Students must give a presentation on their proposed thesis research area to a committee comprised of the thesis adviser(s), the thesis committee members, and other interested faculty. The proposed oral examination will include questioning by the committee to assess whether the candidate has sufficient background to perform research in their chosen area. The oral examination may include a component in the student's major core area of studies. The criterion for passing requires that the research topic is of PhD standard, original, clear in its contribution to existing knowledge, and that the proposed methodology is appropriate. The student who fails the Thesis Proposal Defense (Part II of Qualifying Exam) should repeat it in a subsequent regular semester after addressing the comments of the thesis committee compiled by the thesis committee chair in the examination report.

PhD Thesis Requirements

Following successful completion of the first part of the qualifying examination, all PhD candidates must submit a thesis proposal summarizing their thesis problem and the planned approach. The purpose of the proposal is to inform the department and faculty, in a concise statement, of the candidate's research program and those involved in it. It should explain what the student intends to do and how s/he intends to go about it. The thesis proposal must provide sufficient literature citations to indicate an awareness of previous work, and enough detail to show how the work is expected to advance knowledge in the field.

Doctoral Thesis Committee

The thesis committee should be composed of at least five members, one of whom should be from outside the department/program and one from outside the university. The adviser and at least three of the committee members must be of professorial rank. All members of the committee must hold a doctoral degree in a relevant field. The chair of the committee must be a full professor who is not the PhD thesis adviser (requirement of the Lebanese Ministry of Higher Education).

Members of the doctoral thesis committee are recommended by the student’s adviser and approved by the department, the Faculty Graduate Studies Committee, and the Graduate Council.

The doctoral thesis committee approves the thesis topic, research plan, conducts the thesis proposal defense (Part II of the Qualifying Exam) and conducts the thesis defense. The thesis proposal and the selection of the thesis committee should be approved at least two semesters before the student defends his/her thesis. The PhD thesis topic, examining committee, and admission to candidacy require Graduate Council approval.

External Examiner

An external examiner of high standing from abroad will be nominated by the chair of the department in consultation with the thesis adviser, to review the thesis before the defense. Comments by the external examiner will be shared with the student. The student will then be given an opportunity to revise the thesis and incorporate revisions in the work in a timely manner. The external examiner may choose to attend the thesis defense and participate in the deliberations.

All PhD candidates must defend their thesis in an oral examination, open to the community, in which a candidate is examined by his/her committee.

Course Plan for PhD Students

All courses that are offered for credit in the master's program will also be offered as graduate courses for those in the PhD program.

Math Requirement Courses

At least one math course offered outside the ME department and approved by the graduate student's adviser. Acceptable courses include:

- **MATH 307** Topics in Analysis
- **CMPS 345** The Finite Element Method
- **CMPS 350** Discrete Models for Differential Equations
- **CMPS 373** Parallel Computing

Note that in the Faculty of Arts and Sciences, 300 level courses are graduate courses.

Major Area Courses

Thermal and Fluid Sciences:

- MECH 663, MECH 665, MECH 701, MECH 702, MECH 703, MECH 705, MECH 707, MECH 751, MECH 760, MECH 761, MECH 762, MECH 764, MECH 765, MECH 766, MECH 767, MECH 768, MECH 769, MECH 771, MECH 772, MECH 773, MECH 778, MECH 898.

Mechatronics:


Design, Materials, and Manufacturing:


Seminar Course

Seminar Course: MECH 797 (no credit). The student must register for the course once a year. This is a pass fall course.

PhD Thesis

MECH 899 PhD Thesis. The thesis is based on independent original research. A student is required to register for a minimum of 30 credits of thesis work. A student may register for a maximum of twelve credits in any given semester. The student must submit a thesis based on results of original, independent research. The PhD thesis is expected to make a significant contribution in mechanical engineering. Upon completion of the thesis and after its approval by the student's thesis adviser, a final oral examination will constitute the thesis defense.
Residence Requirements
The student must register for at least four semesters beyond the completion of the master’s degree. Requirements for the degree of Doctor of Philosophy must be completed within a period of five years after starting graduate work beyond the master’s degree. An extension will require the approval of the AUB Graduate Council.

Graduation Requirements
A student can graduate at the end of any academic semester in which s/he has satisfied the following requirements:

- Met the residence requirements and all pertinent AUB regulations
- Has at least one paper, based on his/her PhD thesis, accepted in a peer reviewed technical journal, in addition to one refereed conference paper
- Passed all the required courses and completed the research credit requirements
- Attained a minimum cumulative course average of 85 beyond the master’s degree and not be on probation
- Passed the Doctoral Qualifying Examinations
- Successfully defended a thesis of original scholarly work
- Deemed worthy by the Faculty

Course Descriptions

**MECH 600** Applied Reservoir Engineering I 3 cr.
This course introduces the concepts and principles needed to understand and analyze hydrocarbon reservoir fluid systems, and defines (with the help of geological and petrophysical principles) the size and contents of petroleum accumulations. Students will learn to organize programs for systematically collecting, recording, and analyzing data describing fundamental characteristics of individual well and reservoir performance (i.e. pressure, production, PVT data). The course covers topics on: fundamental concepts of fluid distribution, porosity distribution, trapping conditions; nature and type of primary drive mechanisms; production rates, ultimate recoveries, and reserves of reservoirs; supplementary recovery schemes to augment and improve primary recovery; economics analysis of developing and producing reservoirs, and conducting supplementary recovery operations. Prerequisite: MECH 314 or CIVE 340.

**MECH 602** Energy Conservation and Utilization 3 cr.
A course that deals with methods for reduction of losses and gains from a building envelope; energy conservation in cooling, heating, air-handling, and plumbing systems; and energy management programs. Prerequisites: MECH 310 and MECH 412.

**MECH 603** Solar Energy 3 cr.
A course discussing the fundamentals of solar radiation, collectors and concentrators, energy storage, estimation and conversion formulas for solar radiation. Prerequisite: MECH 412.

**MECH 604** Refrigeration 3 cr.
A course on fundamental concepts and principles: cold storage, functions and specifications of refrigeration equipment, applications. Prerequisite: MECH 412.

**MECH 606** Aerosol Dynamics 3 cr.
A course covering the physical and chemical principles that underlie the behavior of aerosols---collections of solid or liquid particles suspended in gases, such as clouds, smoke, and dust---and the instruments used to measure them. Topics include: aerosol particle characterization; transport properties and phenomena in quiescent, laminar, and turbulent flows; gas- and particle-particle interactions; and applications to human respiratory tract deposition and atmospheric pollution. Prerequisites: MECH 314, MECH 412, and MECH 414, or approval of instructor.

**MECH 607** Micro Flows Fundamentals and Applications 3 cr.

**MECH 608** Applied Reservoir Engineering II
This course introduces the advance concepts and principles needed to analyze hydrocarbon reservoir fluid systems, and defines the size and contents of petroleum accumulation. Students will learn to organize programs for collecting, recording, and analyzing data describing the advanced characteristics of individual well and reservoir performance. This course covers a variety of topics such as fluid flow in a porous medium; fluid distribution, fluid displacement; fractional flow equation; Buckley-Leverete equation; pressure draw-down and pressure buildup analysis; in addition to the nature and type of primary, secondary, and tertiary recovery, water influx and prediction of water-flood behavior, reservoir model simulation and history matching. Prerequisite: MECH 600.

**MECH 609** Experimental Methods in Fluid Dynamics 3 cr.
A graduate level course aimed at introducing students to experimental methods used to measure fluid flow quantities such as pressures, forces, and velocities. The course starts with an introduction to what and why we measure, and uncertainty analysis and measurement error estimation. Some basic techniques for data reduction and data post-processing are introduced. The available fluid measurement methods are surveyed briefly, with selected applications. Emphasis is on advance optical diagnostic techniques; namely particle image velocimetry (PIV), and laser induced fluorescence (LIF). The theoretical foundations of these techniques are established, and the discussion extended to practical considerations including software and hardware components. A few laboratory sessions are incorporated into the course to supplement the lectures, and make use of the instruments available in the ME department, including the open circuit wind tunnel and the PIV system. In addition to the lectures and lab sessions, emphasis is also on the available literature. Prior knowledge of the basic principles of fluid mechanics and fluid systems is required. MATLAB is needed for course work. Prerequisite: MECH 314.

**MECH 618** Enterprise Resource Planning (ERP) in Manufacturing Systems 3 cr.
This course will cover how today’s industries can cope with the challenges induced by global competition. The course will address: challenges of today’s industry, consequences of these challenges on product design and on the organizations; the role of the information systems, PLM, ERP, and APS; and practice of PLM and ERP systems on the SAP Business Suite and Business By Design solution.
MECH 619  Quality Control in Manufacturing Systems  3 cr.
The course covers the foundations of modern methods of quality control and improvement that may be applied to manufacturing industries. It aims to introduce students to the tools and techniques of quality control used in industrial applications, and develop their ability to apply the tools and techniques to develop solutions for industrial problems. Emphasis is given to the application of quality management techniques to solve industrial case problems. The course emphasizes the philosophy and fundamentals of quality control, the statistics foundations of quality control, statistical process control, acceptance sampling, and product and process design. Prerequisites: STAT 230 and MECH 421.

MECH 622  Modeling of Machining Processes and Machines  3 cr.
This course covers the principles and technology of metal machining; mechanics of orthogonal and 3D metal cutting; static deformations, forced and self-excited vibrations and chatter; and design principles of metal cutting CNC machines. Prerequisite: MECH 421.

MECH 624  Mechanics of Composite Materials  3 cr.
A course on anisotropic elasticity and laminate theory, analysis of various members of composite materials, energy methods, failure theories, and micromechanics. Materials and fabrication processes are introduced. Prerequisites: MECH 320 or CIVE 310, and MECH 340 or equivalent courses.

MECH 625  Fatigue of Materials  3 cr.
A course that deals with high cycle fatigue; low cycle fatigue; S-N curves; notched members; fatigue crack growth; cycling loading; Manson-Coffin curves; damage estimation; creep and damping. Prerequisite: MECH 320 or CIVE 310.

MECH 626  Metals and their Properties  3 cr.
A course that investigates ferrous and non-ferrous alloys; industrial equilibrium diagrams; heat treatment of metals; surface properties of metals; plastic deformation of metals; elements of fracture mechanics; process-structure-properties relations. Prerequisite: MECH 340.

MECH 627  Polymers and their Properties  3 cr.
A course on chemistry and nomenclature, polymerization and synthesis, characterization techniques, physical properties of polymers, viscoelasticity and mechanical properties and applications. Prerequisite: MECH 340.

MECH 628  Design of Mechanisms  3 cr.
A course involving graphical and analytical synthesis of single- and multi-loop linkage mechanisms for motion, path, and function generation through 2-3-4- and 5-precision positions; optimum synthesis of linkage mechanisms; synthesis of cam-follower mechanisms; synthesis of gear trains. Prerequisite: MECH 332.

MECH 630  Finite Element Methods in Mechanical Engineering  3 cr.
A course on the classification of machine components; displacement-based formulation; line elements and their applications in design of mechanical systems; isoparametric formulation; plane stress, plane strain, axi-symmetric, and solid elements and their applications; modeling considerations and error analysis; introduction to ALGOR general formulation and Galerkin approach; and the analysis of field problems. Prerequisites: MECH 431 and MECH 420.

MECH 631  Micro Electro Mechanical Systems (MEMS)  3 cr.
A course that deals with materials for micro-sensors and micro-actuators, materials for micro-structures, microfabrication techniques and processes for micromachining, computer-aided design and development of MEMS, commercial MEMS structures and systems, packaging for MEMS, future trends, and includes a team project. Prerequisite: MECH 430.

MECH 633  Biomechanics  3 cr.
A course on the study of the biomechanical principles underlying the kinetics and kinematics of normal and abnormal human motion. Emphasis is placed on the interaction between biomechanical and physiologic factors (bone, joint, connective tissue, and muscle physiology and structure) in skeletal-motor function and the application of such in testing and practice in rehabilitation. The course is designed for engineering students with no previous anatomy/physiology. Prerequisite: CIVE 210, MECH 320 or CIVE 310, or approval of instructor.

MECH 634  Biomaterial and Medical Devices  3 cr.
A course that examines the structure-property relationships for biomaterials and the medical applications of biomaterials and devices. The first part of the course focuses on the main classes of biomaterials, metal, ceramic, polymeric, and composite implant materials, as well as their interactions with the human body (biocompatibility). The second part of the course examines the various applications of biomaterials and devices in different tissue and organ systems such as orthopedic, cardiovascular, dermatology, and dental applications. Experts from the medical community will be invited to discuss the various applications. Prerequisite: MECH 340, or approval of instructor.

MECH 637  Micromechanics and Crystal Plasticity  3cr.
This course covers the theoretical knowledge of the deformation process in single and polycrystalline solids with an emphasis on the role of dislocations and other types of defects on the overall mechanical properties of materials. Topics will include an introduction to crystallography, defects in crystals, fundamentals of dislocations, strengthening mechanisms, microstructures, and yielding. Prerequisites: MECH 340 and MECH 320.

MECH 641/EECE 661  Robotics  3 cr.
A course discussing concepts and subsystems; robot architecture; mechanics of robots; kinematics and kinetics; sensors and intelligence; actuators; trajectory planning of end effector motion; motion and force control of manipulators; robot languages. Prerequisites: MECH 435 or EECE 460, or consent of instructor.

MECH 642/EECE 692  Computer Vision  3 cr.
An introductory course on the problems and solutions of modern computer vision. Topics covered include image acquisition, sampling and quantization; image segmentation; geometric framework for vision: single view and two-views; camera calibration; stereopsis; motion and optical flow; recognition; pose estimation in perspective images. Prerequisites: MATH 202 and EECE 230.

MECH 643  Mechatronics and Intelligent Machines Engineering II  3 cr.
A course on sensors, sensor noise and sensor fusion; actuators; system models and automated computer simulation; information, perception, and cognition; planning and control; architectures, design, and development; a team project is included. Prerequisites: MECH 340 and MECH 530.
MECH 644  Modal Analysis  3 cr.
A course reviewing MDOF system vibrations, frequency response functions, damping, mobility measurement, curve fitting and modal parameter extraction, derivation of mathematical models, laboratory experiments, and projects are included. Prerequisite: MECH 531.

MECH 645  Noise and Vibration Control  3 cr.
A course on fundamental concepts in noise and vibration, passive and active damping strategies, damping materials, control methods, and applications. Prerequisite: MECH 531.

MECH 646/ EECE 697  Wheeled Mobile Robotics  3cr.
A course that provides an in-depth coverage of wheeled mobile robots. The material covers: nonholonomy and integrability of kinematic constraints; modeling; kinematics, dynamics and state-space representation; and nonlinear control strategies (open-loop and closed-loop). Five case studies are covered all-over the course: car-like, cart-like, omni- directional wheeled, mobile wheeled pendulums and bike-like robots. Prerequisite: Senior or graduate standing.

MECH 647/ EECE 699  Hydraulic Servo Systems  3 cr.
A graduate lecture course which teaches the fundamentals of modeling and control of hydraulic servo-systems. It provides theoretical background and practical techniques for the modeling, identification and control of hydraulic servo-systems. Classical and advanced control algorithms are discussed. The use of Matlab/Simulink and DYMOILA will be an integral part in this course. Prerequisites: MECH 314 and MECH 435 or MECH 314 and EECE 460.

MECH 648  Nonlinear Systems: Analysis, Stability, and Control /EECE 669  3 cr.
A course that presents a comprehensive exposition of the theory of nonlinear dynamical systems and its control with particular emphasis on techniques applicable to mechanical systems. The course will be punctuated by a rich set of mechanical system examples, ranging from violin string vibration to jet engines, from heart beats to vehicle control, and from population growth to nonlinear flight control. Prerequisite: MECH 435 or EECE 460.

MECH 650/ EECE 698  Autonomous Mobile Robotics  3 cr.
This course is designed to provide engineering graduate and 4th year students with the opportunity to learn about autonomous mobile robotics. Topics include sensor modeling, vehicle state estimation, map-based localization, linear and nonlinear control, and simultaneous localization and mapping. Prerequisites: EECE 230, EECE 312, and MECH 435, or EECE 230 and EECE 460.

MECH 654/ EECE 660  System Analysis and Design  3cr.
A course that outlines state-space models of discrete and continuous, linear and nonlinear systems; controllability, observability; minimality; Eigenvector and transforms analysis of linear time invariant multi-input multi-output systems; pole shifting; computer control; design of controllers and observers. Prerequisite: Senior or graduate standing or consent of instructor.

MECH 655/ EECE 662  Optimal Control  3cr.
A course on optimization theory and performance measures, calculus of variations, the maximum principle, dynamic programming, numerical techniques, LQR control systems. Prerequisite: Senior or graduate standing or consent of instructor.

MECH 656/ EECE 663  System Identification  3cr.
This course introduces the fundamentals of system identification as the basic mathematical tools to fit models into empirical input-output data. While rooted in control theory, applications extend to general time-series modeling and forecasting, such as stock prices, biological data and others. Topics covered include nonparametric identification methods: time and frequency response analysis; parametric identification methods: prediction error methods, least squares, linear unbiased estimation and maximum likelihood; convergence, consistency and asymptotic distribution of estimates; properties and practical modeling issues: bias distribution, experiment design and model validation. Prerequisite: Senior or graduate standing or consent of instructor.

MECH 660  Advanced Fluid Mechanics  3 cr.
A course that examines fundamental concepts and principles in addition to basic relations for continuous fluids; Vorticity dynamics, Kelvin Helmholtz theorems; Navier-Stokes equations; Turbulence and Oscillating flows. Prerequisite: MECH 314.

MECH 663  Computational Fluid Dynamics  3 cr.
A course that deals with discretization process in fluid dynamics; numerical approaches and applications; iterative and direct matrix methods; numerical implementation of turbulence models. Prerequisites: MECH 314 and MECH 412.

MECH 665  Unsteady Gas Flow  3 cr.
A course examining equations of unsteady continuous adiabatic multidimensional flows, unsteady continuous one-dimensional flow of a perfect gas with and without discontinuity, applications, and pressure exchangers. Prerequisite: MECH 414.

MECH 670  Laboratory for Renewable Energy in Buildings  2 cr.
A laboratory course that will investigate means of reducing building energy consumption first through green building design, giving consideration to building orientation, thermal massing, wind- and buoyancy-driven flows, “urban heat island” effects, and second, by retrofitting existing buildings with energy saving materials and devices such as window films, solar water heaters, and green roofs. This course is offered because in Lebanon and the region, electricity consumption for building services accounts for a major portion of national energy use and greenhouse gas emissions. Students will measure and compare effects of various designs and retrofit interventions on the thermal performance, lighting and glare, and natural ventilation of model-scale buildings, and characterize performance of devices used in green building design. Lab assignments may vary by semester but will normally include mathematical modeling and experimental measurement components organized around aspects of building physics. Prerequisite: MECH 430.

A course that covers the principles and utilization of solar (thermal and photovoltaic), wind, and geothermal energy, as well as energy from biomass. Issues relevant to energy efficiency and energy storage are discussed (heat and power store and bio-tanks). The course distinguishes between energy sources for large-scale, industrial/ commercial settings and those intended for smaller structures. The potential of using renewable energy technologies as a complement to and, to the extent possible, replacement for conventional technologies, and the possibility of combining renewable and non-renewable energy technologies in hybrid systems are analyzed. Design aspects of active, passive, wind, bio-energy, and photovoltaic energy conversion systems for buildings; and strategies for enhancing the future use of renewable energy resources are presented. The course will include several demonstrations of concept experiments. Prerequisite: MECH 310. Students cannot receive credit for both MECH 671 and EECE 675.
MECH 672  Modeling Energy Systems  3 cr.
A course that covers indoor space thermal models. The course also deals with the analysis and modeling of building energy systems involving applications of thermodynamics, economics, heat transfer, fluid flow and optimization. The use of modern computational tools to model thermal performance characteristics of components of HVAC systems including chillers, recovery systems, flow control devices, heat exchanges, solar panels, dehumidification systems, boilers, condensers, cooling towers, fans, duct systems, piping systems and pumps. The course will use extensively modern simulation tools. Prerequisite: MECH 310.

MECH 673  Efficient Buildings with Good Indoor Air Quality  3 cr.
A course covering energy consumption standards and codes in buildings and energy conservation measures in built-in environment to enhance the building’s energy efficiency while maintaining space, thermal comfort and indoor air quality requirement. Fundamental ventilation, indoor-air-quality, infiltration, natural and mechanical ventilation, importance and impact of indoor air quality on human health and energy performance of the building air conditioning system, ASHRAE, and ASHRAE requirement for ventilation. Particular focus will be given to green energy alternative measures. An overview of the different heating, ventilation, and air conditioning system designs are also covered. Performance and energy consumption of the conventional air conditioning system (constant and variable air volume), as well as the hybrid integrated air conditioning systems, will be discussed and compared. The course will include several demonstrations of concept experiments. Pre- or corequisite: MECH 672 or equivalent.

MECH 674  Energy Economics and Policy  3 cr.
A course that aims at developing an understanding of practical analytical skills of energy economics and planning approaches taking into account the cost of impact on the environment. This course will provide fundamental concepts of economic issues and theories related to energy, such as economics of natural and energy resources, aggregate supply and demand analysis, and the interrelationship between energy, economics and the environment as well as some important issues in energy policy. The course will also demonstrate the use of economic tools for decision-making in energy and environment planning and policy. It will explore the terminology, conventions, procedures and planning policy applications. It will also cover a number of contemporary energy and environmental policy issues, including energy security, global warming, regulations of energy industries, energy research and development, and energy technology commercialization. Prerequisite: ENGM 400. Students cannot receive credit for both MECH 674 and ECON 333.

MECH 675  Building Energy Management Systems  3 cr.
A course that provides an opportunity for students to explore topics in energy management systems and management strategies for new and existing buildings; energy use in buildings; energy systems analysis and methods for evaluating the energy system efficiency; energy audit programs and practices for buildings and facilities; initiating energy management programs; guidelines for methods of reducing energy usage in each area in buildings; conservation of the energy in the planning, design, installation, utilization, maintenance; control and automation of the mechanical systems in existing and new buildings; air conditioning and ventilation systems in buildings; assessment and optimization of energy control strategies; prediction methods of economic and environmental impact of implemented control strategies and indoor settings. Prerequisites: MECH 310 and MECH 412.

MECH 676  Passive Building Design  3 cr.
A course that centers on issues surrounding the integration of sustainable and passive design principles, into conceptual and practical building design. Topics will include: solar geometry, climate/regional limitations, natural lighting, passive design and sustainability initiatives, insulating and energy storing material, and bioclimatic design and concepts. Case studies will be used extensively as a vehicle to discuss the success/failure of ideas and their physical applications. The course will focus on the use of energy auditing/modelling methods as means to both design and evaluate the relative "greenness" of buildings, as well as to understand the global implications of sustainable buildings. The course will include several demonstrations of concept experiments. Prerequisite: MECH 671.

MECH 677  Heat Pumps  3 cr.
A course that focuses on heat pumps in low energy and passive buildings as well as ground source heat pump fundamentals, loop systems, open systems, soil/rock classification and conductivity, grouting procedures, performance of ground source heat pumps in housing units. Water loop heat pumps, inside the building, bore holes, design and optimization of heat pump plants, including heat sources for such plants, and cost effective design options will also be considered. The course includes study visits and seminars given by industry experts. Prerequisite: MECH 310.

MECH 678  Solar Electricity  3 cr.
A course that focuses on the solar cell: photo generation of current, characteristic current-voltage (I-V) curve, equivalent circuit, effect of illumination intensity and temperature. The Photovoltaic (PV) generator: characteristic I-V curve of a PV generator, the PV module, connections of modules, support, safeguards, shadowing. The PV system: batteries, power conditioning. PV Systems: grid-connected and stand-alone systems, economics and sizing, reliability, applications. Manufacturing: preparation of crystalline silicon wafers, formation of contacts, coatings, construction of modules. The course will include several demonstrations of concept experiments. Prerequisite: EECE 210.

MECH 679  Energy Audit Lab  2 cr.
A course that is designed to give the students “hands-on” experience with carrying out energy audit measurements and studies on buildings to identify possible savings through selected energy conservation measures. The students will carry out measurements to investigate ventilation, air conditioning equipment, lighting and other office and lab equipment. The students will then be introduced to Visual DOE or E-Quest to perform energy simulation of buildings. Such tools will then be used to carry out a full building simulation taking into consideration occupancy data, equipment, lights, and building envelope. A base case of energy usage will thus be established and energy conservation is then applied to deduce possible savings and their economic value. Pre- or corequisite: MECH 672.

MECH 701  Principles of Combustion  3 cr.
A course on gas-phase reaction mechanisms and thermo-chemical kinetics; theory of ignition, flame propagation, and detonation; characteristics of premixed, diffusion, laminar, and turbulent flames; combustion aerodynamics; liquid and solid fuels in practical systems; pollutant formation and reduction mechanisms. Prerequisites: CHEM 202, MECH 412, MECH 414, or equivalent courses.
MECH 702  Pollutant Formation and Control in Combustion  3 cr.
A course that covers the fundamentals of gas and condensed phase pollutant formation, measurement, and control pertaining to practical combustion systems. Topics include heat and mass transfer in reacting systems, chemical reaction kinetics, particle coagulation kinetics, and flame structure and propagation. These fundamental subjects are applied in the study of pollutant formation and control in practical systems including internal combustion engines, jet engines, and industrial boilers. Removal of gaseous and particulate pollutants from effluent streams by use of adsorption, absorption, catalytic processes, inertial separation, and electrostatic precipitators. Prerequisites: MECH 310, MECH 410, MECH 412, CHEM 202, or approval of instructor. May be repeated for credit when topics vary.

MECH 729  Spatial Mechanisms  3 cr.
A course that covers position, velocity, and acceleration analysis of spherical and spatial mechanisms; isometry; geometry of rotation axes; finite position synthesis, the 4R spherical linkage; lines and screws; the RSSR, RSSP, 4C, and 5TS spatial linkages; platform manipulators. Prerequisite: MECH 628.

MECH 736  Modeling Solidification Processes  3 cr.
A course that seeks to impart a coherent view of solidification processes and how they are modeled. Topics for the first part of the course include: homogeneous and heterogeneous nucleation, with plane front, cellular and dendritic pattern, columnar and equiaxed grain growth. Phenomena affecting the quality of castings such as micro-segregation, constituent under-cooling, macro-segregation and porosity formation are also covered. In the second part solidification models are developed and applied in the context of casting operations. The course covers: heat flow in solidification processes; thermodynamics of solidification: nucleation and growth; binary phase diagrams, phase diagram computation; microstructure evolution, constitutional under-cooling; columnar and equiaxed solidification enthalpy method; mushy zone modeling; phase-field method; volume-averaging of conservation equations; multi-scale models; and modeling solidification defects. Prerequisites: MECH 340, and MECH 420, or approval of instructor.

MECH 722  Pollutant Formation and Control in Combustion  3 cr.
A course that covers position, velocity, and acceleration analysis of spherical and spatial mechanisms; isometry; geometry of rotation axes; finite position synthesis, the 4R spherical linkage; lines and screws; the RSSR, RSSP, 4C, and 5TS spatial linkages; platform manipulators. Prerequisite: MECH 628.

MECH 703  Combustion Modeling  3 cr.
A course that covers the following topics: chemical thermodynamics and chemical kinetics, conservation laws for reacting flow problems, diffusion controlled vs. chemistry controlled combustion, Laminar non-premixed and premixed flames and jets multi-phase combustion, detonations waves, turbulent combustion, and combustion stability. Prerequisites: CHEM 202, MECH 310, MECH 412, or equivalent courses.

MECH 705  Bioheat Modeling and Human Thermal Environments  3 cr.
This course is concerned with bioheat modeling of the human body and the human responses to hot, moderate, and cold thermal environments. A comprehensive and integrated approach is taken to mathematical modeling of heat transfer in the human body, heat and mass transfer from the human body while defining thermal environments in terms of air temperature, radiant temperature, humidity and air velocity of the environment, the clothing, and the activity of the person. Other topics covered are bioheat modeling; mathematical analysis and computer modeling of human response to the thermal environment; interaction of environment parameters with physiological and psychological responses and impact on the human health, comfort, and performance; evaluation of heat stress and cold stress; thermal properties of clothing under static and active conditions; models for estimation of ventilation of clothed active persons; and international standards for the assessment of thermal comfort in the indoor environment. Prerequisite: MECH 412.

MECH 707  Statistical Mechanics and Thermodynamics  3 cr.
A course that examines the basic principles of statistical mechanics and their relation to the laws of thermodynamics and the concepts of temperature, work, heat, and entropy; the microcanonical, canonical, and grand canonical distributions; the applications to lattice vibrations, ideal gas, photon gas, quantum statistical mechanics; the Fermi and Bose systems, and interacting and non-interacting systems. Prerequisite: MECH 310.

MECH 740  Advanced Dynamics  3 cr.
A course that examines three-dimensional kinetics and kinematics, theory of rotating axis, Hamilton’s equations, Lagrange’s equation, and Euler’s equations. Prerequisite: MECH 230 or equivalent.

MECH 747  Nonlinear Finite Element Analysis  3 cr.
A course that covers governing equations and geometric and material nonlinearities; formulation of nonlinear problems; solution algorithms; vector and matrix methods; direct and iterative equations solvers; FE methods for nonlinear mechanics; element technology; numerical implementation of constitutive models; pitfalls of nonlinear analysis. Prerequisite: MECH 630.

MECH 751  Simulation of Multiphase Flows  3 cr.
A course that is intended to give an overview of the fundamentals involved in dispersed multiphase flows, and develop a working knowledge which would allow the student to predict these flows numerically. Multiphase flows are important to many engineering and environmental applications. The course examines the conservation equations for multiphase systems; discretization using the finite-volume method; pressure-based algorithms for multi-fluid flow at all speeds; mass conservation based algorithms and geometric conservation based algorithms (SIMPLE, SIMPLEX, PISO, and so on); the partial elimination and SINCE algorithms; weighted pressure correction; mutual influence of volume fractions; implicit volume fraction equations; bounding the volume fractions; numerical implementation; and applications. Prerequisite: MECH 663.

MECH 729  Spatial Mechanisms  3 cr.
A course that covers position, velocity, and acceleration analysis of spherical and spatial mechanisms; isometry; geometry of rotation axes; finite position synthesis, the 4R spherical linkage; lines and screws; the RSSR, RSSP, 4C, and 5TS spatial linkages; platform manipulators. Prerequisite: MECH 628.

MECH 736  Modeling Solidification Processes  3 cr.
A course that seeks to impart a coherent view of solidification processes and how they are modeled. Topics for the first part of the course include: homogeneous and heterogeneous nucleation, with plane front, cellular and dendritic pattern, columnar and equiaxed grain growth. Phenomena affecting the quality of castings such as micro-segregation, constituent under-cooling, macro-segregation and porosity formation are also covered. In the second part solidification models are developed and applied in the context of casting operations. The course covers: heat flow in solidification processes; thermodynamics of solidification: nucleation and growth; binary phase diagrams, phase diagram computation; microstructure evolution, constitutional under-cooling; columnar and equiaxed solidification enthalpy method; mushy zone modeling; phase-field method; volume-averaging of conservation equations; multi-scale models; and modeling solidification defects. Prerequisites: MECH 340, and MECH 420, or approval of instructor.

MECH 740  Advanced Dynamics  3 cr.
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MECH 760 Advanced Fluid Mechanics 3 cr.
A course that examines fundamental concepts and principles, basic relations for continuous fluids, vorticity dynamics, Kelvin and Helmholtz theorems, Navier-Stokes equations, turbulent and oscillating flows. Prerequisite: MECH 314 or equivalent.

MECH 761 Convection Heat Transfer 3 cr.
A course that covers fundamental modes of heat transfer; similarity between heat, momentum, and mass transfer in forced and buoyancy-driven flows; simultaneous heat, momentum, and mass transfer with phase change. Prerequisites: MECH 314 and MECH 412.

MECH 762 Advanced Thermodynamics 3 cr.
A course on advanced thermodynamic concepts; gas mixtures and multi-phase systems; chemical reactions; thermodynamic property relations; chemical and phase equilibrium; applications. Prerequisite: MECH 414.

MECH 763 Radiative Heat Transfer 3 cr.
A course that deals with the principles of thermal radiation and their application to engineering heat and photon transfer problems. Quantum and classical models of radiative properties of materials, electromagnetic wave theory for thermal radiation, radiative transfer in absorbing, emitting, and scattering media, and coherent laser radiation. Applications cover infrared instrumentation, global warming, furnaces, and high temperature processing. Prerequisite: MECH 412.

MECH 764 Advanced Topics in Computational Fluid Dynamics 3 cr.
A course on numerical solution of compressible unsteady flows, advanced turbulence modeling, the segregated approach, the multigrid technique, and an introduction to multi-phase flows. Prerequisite: MECH 663.

MECH 765 Advanced Finite Volume Techniques 3 cr.
A course that focuses on linear multigrid; non-linear multigrid; mesh agglomeration; structured and unstructured grids; mesh generation: structured and unstructured grids; free surface simulation; and soliddification simulation. Prerequisite: MECH 633.

MECH 766 Turbulent Flow and Transport 3 cr.
A course that covers the methods of analysis of turbulent fluid flow; in-depth discussion of algebraic, one-equation, and two-equation turbulence models; the power and limitations of turbulence models; and numerical implementation. Prerequisite: MECH 660: Advanced Fluid Mechanics.

MECH 767 Heat Conduction 3 cr.
A course on solutions of steady and transient heat conduction problems with various boundary conditions; approximate analytical methods; application of numerical techniques; moving boundaries, problems in freezing and melting; anisotropic and composite materials. Prerequisite: MECH 412.

MECH 768 Transport through Porous Media 3 cr.
A course designed for graduate students interested in the flow of multi-phase, multi-component fluids through porous media. The course emphasizes physics of the momentum, heat and mass transport formulation and computations in multi-dimensional systems, including theoretical models of fluid flow, capillary effects, application of fractal and percolation concepts, characterization of porous materials, multiphase flow and heat transfer, turbulent flow and heat transfer, improved measurement techniques, and enhanced design correlations. Prerequisite: MECH 412.

MECH 769 Advanced Scientific Computing 3 cr.
A course where students will learn how to solve and visualize large-scale continuum type problems using high-performance cluster-type computing systems. Sections of the course will concentrate on discretization methods, multigrid methods in a parallel computing context. Different parallel computing paradigms are introduced with emphasis on domain decomposition methods, and the practical aspects of their implementations using MPI. Prerequisite: Prior knowledge of C programming and familiarity with the UNIX operating system.

MECH 770 HVAC and Refrigeration Systems Lab 2 cr.
A course designed to give the students “hands-on” experience with building energy systems and expose them to basic and advanced methods of measurements and data analysis to design, test, and evaluate indoor climate conditions and HVAC system performance under appropriate control strategies for comfort and indoor air quality. The students will learn how to use and develop test equipment and plan for assessing system’s performance according to ISO or ASHRAE standards. The students will be exposed to electrical HVAC instrumentation and hardware, IAQ testing equipment, tracer gas techniques for ventilation rates measurements, flow characterization measurements and air leakages and fenestration ratings. Experiments and lab projects will span a series of advanced modules on sustainable, energy-efficient HVAC and refrigeration systems as laboratory topics. Lab topics may vary every semester. Prereq. or corequisite: MECH 673.

MECH 771 HVAC System Control Strategies and Energy Efficiency 3 cr.
A course that deals with the most common control strategies based on temperature set point, PMV control, CO2 set-point; and equipment used to reduce the amount of energy consumed by heating, ventilating, and air conditioning (HVAC) systems using non-derivative optimization techniques. Control strategies and technologies related to gaseous indoor air pollutants. The control strategies analyzed in the course are: scheduled start-stop, day-night setback, optimum start-stop, dead band control, duty cycling, demand limiting and load shedding, economizer and enthalpy cycles, scheduled temperature reset, chiller control and chilled water reset, boiler control and hot water temperature reset, and condenser water temperature reset. Recent developments in HVAC control system hardware, such as pneumatic systems, electro-pneumatic systems, digital-electronic systems, and microcomputer-based control systems, are also discussed. The strategies are studied and compared to each other in terms of cost effectiveness using optimization techniques. Case studies are used to strengthen understanding. Prerequisites: MECH 431 and MECH 672.

MECH 772 Moisture and Control of Humidity Inside Buildings 3 cr.
A course focusing on the following topics: sources of moisture and factors affecting its entry and buildup inside buildings, such as construction practices and choice of building materials and furniture; impact of moisture on thermal comfort and energy performance of the air-conditioning system; solid/liquid desiccant dehumidification and hybrid air-conditioning systems; modeling of moisture transport; industrial need to control indoor humidity; and moisture-caused health issues including mold formation and growth. The course will include several demonstrations of concept experiments. Prerequisite: MECH 672.
MECH 773 Numerical Methods in Energy Technology 3 cr.
A course that introduces the fundamentals of numerical methodology in energy related areas (CFD, Heat and mass transfer). Topics include: basic conservations equations; boundary conditions; finite volume discretization of conservations equations; geometry and computational mesh discretization practices; turbulence modeling (k-two-equation model); SIMPLE and SIMPLEX algorithms; thermal and solar radiation; and dispersed multiphase flow. The course emphasizes how to apply this information to the design and testing of related equipment. Individual and group assignments are given throughout the course to act as training aid and to enhance understanding. A class project is included to provide supervised practice on course material using commercial software. Prerequisite: MECH 671 and MECH 672.

MECH 777 Special Projects on Renewable Energy Systems Design 3 cr.
A course that allows the student to take a given set of requirements and to select and design a complete renewable energy system to fully meet those requirements. The student will perform all aspects of the project design from cost-benefit analysis to systems specification to construction, control and final audit assessment of the completed energy system. The student is exposed to various commercially available design and simulation software for planning, specifying and simulation testing of renewable energy retro-fits and new installations. Prerequisites: MECH 671 and MECH 672.

Prerequisite MECH 799T or MECH 799TR.

MECH 796 Special Projects in Mechanical Engineering 3 cr.

MECH 797 Seminar 0 cr.
A seminar that consists of weekly presentations on current research or applied projects in mechanical engineering presented by faculty, students, and invited scholars. This is a pass fail course based on attendance.

MECH 798 Special Topics in Mechanical Engineering 3 cr.

MECH 798A Fundamentals of Energy and Resource Recovery 1 cr.
A course covering the following topics: combustion and the environmental impact of combustion; fundamentals in energy and material balances; basic knowledge of the kinetics and the influence of different flow models; and humidification and vapor liquid equilibrium. Prerequisite: MECH 310.

MECH 798B Energy Recovery 1 cr.
A course that aims to give the students extended knowledge on various techniques for energy recovery by combustion. Topics include combustion devices, fluidized bed boilers, grate boilers, biogas boilers, energy recuperation and recovery technology, effects of inorganic compounds in the fuel, fuel and ash treatment, fouling and agglomeration; and the fundamentals of metals, oxidation phenomena, high temperature corrosion, and erosion-corrosion. Prerequisites: MECH 310 and MECH 340.

MECH 798C Sustainable Materials 1 cr.
A course that aims to give the student knowledge regarding sustainable materials, and their use in the product development cycle in order to promote sustainability. The course covers the development and economy of industrial materials; the interaction between materials and environment; and materials and public health. Alternative strategies for material use are also covered such as: recycling and reuse, renewable materials and biodegradable materials. Finally the importance of legislation and governmental policies in promoting sustainability in society is reviewed. Assignments will be in the form of case studies. Prerequisite: MECH 340.

MECH 798D Moisture Transport in Building Envelopes 2 cr.
A course that deals with the sources of moisture affecting building envelopes; rain, water vapor in outside and inside air, condensation and water uptake from the foundation; factors affecting the entry and buildup of moisture such as construction practices, choice of building materials and surface treatments; impact of moisture on heat transport through the envelopes, modeling of moisture transport; and moisture-caused damages including mold growth, decay of construction materials paintings, and so on. Prerequisite: MECH 672.

MECH 798E Computer Modeling and Building Physics Applications 2 cr.
A course on computer modeling of temperature and moisture conditions in building materials and components is essential in order to evaluate the performance of the building envelope, which is decisive for the indoor climate, the consumption of energy, and the durability of the construction. These are important factors for low environmental impact and sustainable building technology. Focus will be put on understanding and using computer models for building physics applications. Theory of mathematical and numerical modeling of heat and mass transfer and an overview of existing calculation tools combined with practical exercises will be given. A simple calculation tool will also be developed within this course. Prerequisite: MECH 672.

MECH 798H Contemporary Topics in Energy Management 2 cr.
This course provides students with the basics of the interrelationships between energy, economy, and the environment. It highlights the global and regional energy scenes. The module provides students with the fundamentals of energy and carbon accounting, energy management, and energy efficiency. It will cover policies and measures to shift towards low carbon economy, and demonstrate approaches used in assessing these measures. Prerequisite: MECH 310.

MECH 799 (A-E) Thesis in Mechanical Engineering 9 cr.
Prerequisite: MECH 799T or MECH 799TR.

MECH 799T Master's Comprehensive Exam 0 cr.
Every semester. Taken while total required credit hours have not been completed.

MECH 799TR Master's Comprehensive Exam 0 cr.
MECH 980 PhD Thesis 3 cr.
Every Semester
MECH 981 PhD Thesis 3 cr.
Every Semester
MECH 982 PhD Thesis 3 cr.
Every semester. Taken while total required credit hours have not been completed.

MECH 983 PhD Thesis 6 cr.
Every semester. Taken while total required credit hours have not been completed.

MECH 984 PhD Thesis 9 cr.
Every semester. Taken while total required credit hours have not been completed.
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<th>Credits</th>
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<td>PhD Thesis</td>
<td>12 cr.</td>
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<td>MECH 986</td>
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<td>MECH 987</td>
<td>PhD Thesis Defense</td>
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### Chemical Engineering Courses

#### CHEN 612 Desalination
A course that will provide an in depth coverage of the commonly used thermal and membrane based desalination technologies. Fundamental thermodynamic and transport processes which govern desalination will be developed. Environmental, sustainability and economic factors which may influence the performance, affordability and more wide-spread use of desalination systems for freshwater production and reuse will be highlighted. Renewable energy technologies coupled with desalination processes will be reviewed. A team based student project will be assigned to design a reverse osmosis membrane desalination plant (brackish water, seawater, or treated sewage effluent) using conventional or alternative energy sources. **Prerequisites:** MECH 310, CHEN 411, or MECH 412.

#### CHEN 613 Membrane Separation Processes
The course will provide a general introduction to membrane science and technology: transport mechanisms, membrane preparation and boundary layer effects. The course will also cover the various types of membranes used in industry: microfiltration, ultrafiltration, reverse osmosis, electro-dialysis and pervaporation. **Prerequisites:** CHEN 312 and CHEN 411.

#### CHEN 614 Environmental Engineering Separation Processes
This course includes a discussion of the unit operations associated with environmental engineering separation processes of solid-liquid, liquid-liquid and gas-liquid systems; general use, principles of operation and design procedures for specific type of equipment. **Prerequisite:** approval of instructor.

#### CHEN 615 Advanced Mass Transfer
This course will cover a review of molecular and turbulent diffusion and mass transfer coefficients, mass transfer equipment design including absorption and cooling towers, adsorption and ion exchange. **Prerequisite:** CHEN 411.

#### CHEN 617 Chemical Reactor Analysis and Design
This course covers design for optimum selectivity; stability and transient behavior of the mixed flow reactor; non-ideal flow and balance models; fixed and fluidized bed reactors; and multiphase flow reactors. **Prerequisite:** CHEN 417.

#### CHEN 618 Colloid and Interface Science
This is a first course in colloid and interface science. The repulsive and attractive forces at interfaces are described along with the dynamics of the interfaces. Topics include the stability of macroemulsions, the formulation and properties of microemulsions, and surface metal-support interactions of catalysts. **Prerequisite:** CHEN 314.

#### CHEN 619 Reservoir Characterization: Carbonate Rocks
This course is an introduction to the common, modern approaches for the characterization of carbonate reservoirs. State of the art petrographic tools will be introduced. The major depositional environments of carbonate rocks and carbonate platform types as well as the principal controls on carbonate sedimentation will be highlighted. Diagenesis (modification of reservoir properties through time) will be discussed through related processes and products, including the process of dolomitization. An in depth coverage of secondary porosity evolution in carbonate reservoirs will be provided (including elements of appropriate rock-typing). A team based project to solve a case study in reservoir characterization and a field-trip to provide a practical view of carbonate reservoir rocks will be included. **Prerequisite:** CHEN 490.

#### CHEN 620 Engineering Literature Critique
This is a project based course, where students will be asked to conduct an extensive literature review of an assigned engineering topic and present, in both written and oral formats, a critical review of this literature.
Engineering Management Program

Coordinator: Yassine, Ali
Professors: Abdul Malak, M. Asem; Salameh, Moueen
Associate Professors: Maddah, Bacel; Nasrallah, Walid; Yassine, Ali
Assistant Professors: Naoum-Sawaya, Joe; Srour, Issam
Senior Lecturers Charif, Hassan; Noueihed, Nazim; Tannir, Akram; Trabulsi, Samir
Instructors: Itani, Mona; Saad, Youssef

General Information

The graduate program leading to the degree of Master of Engineering Management (MEM) provides professional training in engineering management, with emphasis on technically based organizations and applications to various engineering and related disciplines. This program addresses the specific area of the management of technical activities and enterprises.

A student may select his/her courses in a way that satisfies one of the three following areas of concentration:

• Financial and Industrial Engineering
• Projects and the Built Environment
• Management of Technology in Organizations

The requirements for the Master of Engineering Management degree can be fulfilled by pursuing one of the following two options:

Non-thesis Option: Under this option a student is required to complete a total of 33 credits, subdivided as follows:
- Four core courses (12 credits)
- Three electives from the student’s area of concentration (9 credits)
- Two area-related electives (6 credits)
- Two free electives (6 credits)
- Seminar (0 credit)

A student may opt to complete all seven elective courses in one area of concentration provided the courses are offered during the four year period of permitted enrollment.

Note 1: All students pursuing the Financial and Industrial Engineering concentration are required to take ENMG 623 (Stochastic Models and Applications) and ENMG 624 (Financial Engineering).

Note 2: The ENMG 797 Special Project course can be used to satisfy the 3-credit requirement of any elective depending on the nature of the topic addressed.

Thesis Option: Under this option, a student is required to complete a total of 30 credits, subdivided as follows:
- Four core courses (12 credits)
- Three electives from the student’s area of concentration (9 credits)
- One free elective (3 credits)
- Thesis (6 credits)
- Seminar (0 credit)

A flexible combination of courses not in fulfillment of either option stated above leads to no mention of an area of concentration on the student’s transcript.

Requirements for Admission

In order to be eligible for admission to the MEM program a student must have a bachelor’s degree in one of the engineering disciplines, in architecture, or in another related field. The student must also satisfy the requirements of the University and the Faculty of Engineering and Architecture for admission to graduate study, as specified in the relevant sections of this catalogue.

Graduates of universities other than AUB, or from majors other than engineering or architecture, may be required to take undergraduate prerequisite courses to make up for deficiencies.

A student is not allowed to register in the program for more than four calendar years beyond the date of his/her first registration, except with the approval of the Graduate Studies Committee of the Faculty.

Course Descriptions

Core Courses

ENMG 601 Management Theory 3 cr.

ENMG 602 Introduction to Financial Engineering 3 cr.

ENMG 603 Probability and Decision Analysis 3 cr.
ENMG 604 Deterministic Optimization Models 3 cr.

Elective Courses

Financial and Industrial Engineering Sequence

ENMG 611 Supply Chain Design and Management 3 cr.
Introduction to supply chain management and its key issues. Logistics, network configuration. Inventory management. Distribution strategies and strategic alliances. The value of information in supply chains. Information technology and decision support systems for supply chain management.

ENMG 612 Advanced Supply Chain Design and Management 3 cr.
This course concentrates on the advanced quantitative and qualitative techniques used in supply chain management to achieve competitive advantage. The focus is on planning models for production, inventory, and distribution in general multi-echelon multi-item systems. This course also deals with models for planning, information sharing, transportation, distribution, and site selection. The interactions with other functional areas, such as information systems, marketing, and finance, are also illustrated.

ENMG 613 Manufacturing Systems and Facilities Planning 3 cr.

ENMG 614 Human Factors Engineering 3 cr.

ENMG 615 Optimal Product Design and Development 3 cr.
The course aims at providing the student with an exposure to a rational integration of traditional design methodologies with concepts and techniques of modern optimization theory and practice. Students learn to create appropriate mathematical optimization models and to use analytical and computational techniques to solve them.

ENMG 616 Advanced Optimization Techniques 3 cr.
The course is divided into four parts covering integer programming, nonlinear programming, stochastic programming, and heuristic methods. Students will develop skills in modeling complex systems using mathematical programming, in analyzing the structure of mathematical programs, and in developing and applying the correct solution techniques. The students will also have a hands-on experience in using software packages for solving optimization problems.

ENMG 617 Engineering Management Statistics 3 cr.

ENMG 622 Simulation Modeling and Analysis 3 cr.

ENMG 623 Stochastic Models and Applications 3 cr.
Poisson process, renewal theory, queuing models, reliability theory, Markov chains, Brownian motion, random walks and Martingale, stochastic order relations.

ENMG 624 Financial Engineering I: Portfolios and Risk Management 3 cr.
Basic theory of interest. Fixed-income securities yield, duration convexity, and immunization. Term structure of interest rates. Expectation, liquidity, and market segmentation explanations of the term structure. Applied interest rate analysis: capital budgeting, optimal portfolios, dynamic cash flow processes, optimal management, the Harmony Theorem, valuation of a firm. Mean-variance portfolio theory. Introduction to expected utility theory. Introduction to general pricing theory. Prerequisite: ENMG 602 or ENMG 400, or approval of instructor.

ENMG 625 Financial Engineering II: Derivatives 3 cr.
Derivative securities: forwards, futures, and swaps; models of asset dynamics; options theory; interest rate derivatives. General cash flow streams; optimal portfolio growth, general investment evaluation. Prerequisite: ENMG 602 or ENMG 400, or approval of instructor.

Projects and the Built Environment Sequence

ENMG 631 Pre-Project Planning and Feasibility Analysis 3 cr.

ENMG 632 Engineering Project Management 3 cr.

ENMG 633 Advanced Topics in Project Management 3 cr.
Planning and scheduling under constraints. Trade-off analysis in a project environment. Project cost control from a client's perspective. Project risk management. Managing the international project. Determinants of project success. Lessons learned in project management. Strategic planning in project management. Modern developments in project management.
ENMG 634 Design Management for Large Projects 3 cr.

ENMG 635 Project Deliverance and Contracts 3 cr.

ENMG 636 Dispute Resolution on Projects 3 cr.

ENMG 637 Logistics, Technologies, and Productivity Concepts 3 cr.

ENMG 638 Advanced Topics in Construction Management 3 cr.

ENMG 639 Infrastructure and Facility Management 3 cr.

ENMG 640 Sustainable Development Management 3 cr.

ENMG 641 Environmental Strategies for Development Projects 3 cr.
Introduction to global environmental problems including air, water, solid, pesticides, and toxic substances. The impact of such problems on forests, species, coasts, and wetlands. From cradle to grave as applied to all types of development projects including industrial, construction, agriculture, and others. Latest techniques and tools available to management such as industrial ecology, environmental impact assessment, and so on.

ENMG 642 Lean Engineering Concepts 3 cr.
This course focuses on the emerging concept of lean performance in the construction industry. Topics covered include the origin of lean concepts, application to the design process, implementation in construction, contracting for lean performance, and value improving practices (e.g., benchmarking, constructability, and value management). Prerequisite: ENMG 502/CIVE 580.

ENMG 643 Mediation of Engineering Disputes 3 cr.
This course focuses on the use of mediation for resolving construction related disputes. Topics tackled include: dispute avoidance in construction, alternative dispute resolution techniques, and mechanics of mediation. Prerequisite: ENMG 502/CIVE 580.

Management of Technology in Organizations Sequence

ENMG 652 Custom Project Information System 3 cr.

ENMG 654 Technology-Based Entrepreneurship 3 cr.
Introduction to general theories, principles, concepts and practices of entrepreneurship and intrapreneurship. The entrepreneurial perspective, development the entrepreneurial plan, initiating entrepreneurial ventures, growth and development of entrepreneurial ventures, and contemporary challenges in entrepreneurship are discussed. The course includes case study analysis and group projects.

ENMG 655 Management of Technology 3 cr.
Management of technology at both the national and organizational level and its contribution to the generation of national wealth. Engineering, science, and management principles contributing to the development of a successful framework for managing technology within an organization, nationally or internationally. Introduction to technological innovations. Planning and forecasting. Socio-economic changes.

ENMG 656 Management of Technological Innovations 3 cr.

ENMG 658 Organizational Analysis and Design 3 cr.
Organization aspects such as form, centralization, formalization, differentiation, and culture. The Contingent Organization Design concept: different organizational forms for different situations (e.g., uncertainty, competition, size, strategy). Critiques from contemporary and classical organization science literature. Understanding how an organization can work or fail, from the purely descriptive process view to the purely reductionist view of the organization as an information processing mechanism.
ENMG 659  Introduction to System Dynamics  3 cr.
An introduction to the field of system dynamics as a discipline and a set of tools for understanding and dealing with complexity in systems. Students will learn how to collaboratively translate knowledge about a system or problem into a conceptual model, and to simulate the model in order to test hypotheses about system behavior.

ENMG 661  Strategic Management of Technology  3 cr.
The organization as a whole and its interaction with its environment. The corporation as it undergoes the process of a global transformation. Mergers, acquisitions, outsourcing, downsizing, and privatization. Framework of analysis for the identification of central issues and problems usually faced in strategic management. Understanding the effect of present and future environments on the corporation’s welfare.

ENMG 662  Engineering Workforce Management  3 cr.

ENMG 663  Product Design and Development  3 cr.
This class provides students with a holistic perspective that includes the design, analysis, and management of complex engineered systems/products. Topics covered include marketing research, integrated system/subsystem/component design, production planning, manufacturing strategy, supply chain management, innovation, and entrepreneurship.

ENMG 698  Special Topics in Engineering Management  3 cr.

ENMG 700  Seminar  0 cr.
All students are required to register for the seminar during each fall semester.

ENMG 797  Special Project in Engineering Management  3 cr.
A supervised study that may involve special research work in the student’s area of concentration.

ENMG 798  Comprehensive Exam  0 cr.
A capstone exam covering core engineering management concepts as well as major concepts in the student’s area of concentration.

ENMG 799  Thesis  6 cr.
Faculty of Health Sciences (FHS)
Faculty of Health Sciences (FHS)

Officers of the Faculty

Peter F. Dorman, President of the University
Ahmad Dallal, Provost, ex-officio
Iman Nuwayhid, Dean
Rima Affi, Associate Dean
Douane Salameh, Registrar, ex-officio
Salim Kanaan, Director of Admissions, ex-officio
Lokman Meho, University Librarian, ex-officio

Faculty Administrative Support

Mona Katul, Executive Officer
Amal Kassis, Student Services Officer
Ruba Ismail, Instructor (Grants)
Mitra Tauk, Instructor (Graduate Public Health Program Administration)
Hala Dimechkieh, Instructor of Public Health Practice (Communications)
Rabih El Khodr, Instructor of Public Health Practice (Communications)
Zeina Taha, IT Manager
Hilda Nassar, Interim Medical Librarian

Historical Background

The Faculty of Health Sciences (FHS) was first established in 1954 as an independent School of Public Health, the first of its kind in the region. The name of the school was changed to the Faculty of Health Sciences in 1978 to accommodate programs in allied health.

Currently, FHS hosts four departments: Epidemiology and Population Health (EPH), Environmental Health (EH), Health Promotion and Community Health (HPCH), Health Management and Policy (HMP), and a Medical Laboratory Sciences Program in collaboration with the Faculty of Medicine. FHS offers two BS degrees: in Environmental Health and in Medical Laboratory Sciences; a Master degree in Public Health (MPH) (concentrations in Epidemiology and Biostatistics-EPBS, Health Promotion and Community Health-HPCH or Health Management and Policy HMP); an MS in Epidemiology; an MS in Population Health; and an MS in Environmental Sciences (major in Environmental Health). FHS also provides courses in public health to students in the Faculty of Medicine.

Accreditation

The Graduate Public Health Program (GPHP) of the Faculty of Health Sciences became accredited by the Council on Education for Public Health (CEPH) in 2006 and was reaccredited in 2011 for seven years. CEPH is an independent agency in the United States which is recognized to accredit schools and programs of public health. The GPHP at FHS is the first graduate public health program to be accredited by CEPH outside the Americas. Accreditation indicates that the GPHP of the FHS meets standards for Public Health Education of leading schools and programs of public health in the World.

Mission

The Faculty of Health Sciences prepares professionals in the disciplines of public health and health sciences through graduate and undergraduate programs, and trains future physicians in public health. It contributes to knowledge and the improvement of the public’s health in the region by conducting scholarly and relevant interdisciplinary research and responding to priority health issues and training needs in collaboration with stakeholders. In all its functions, FHS promotes and adheres to the principles of ethics, social justice, and collective responsibility.

Vision

The vision of FHS is to contribute to the promotion of the health and well being of populations through the provision of quality higher education in public health and related disciplines. This is accomplished through state-of-the-art research that addresses public health problems particularly relevant to Lebanon, the region, and the developing world, as well as through transfer of that knowledge to policy makers, program managers, and other practitioners in relevant organizations and fields.

Graduate Programs

Graduate Public Health Program (GPHP)

Mission Statement

The Graduate Public Health Program at FHS provides advanced training in public health to prepare professionals, both practitioners and academicians, to competently assess, research, and respond to the health needs and public health issues in Lebanon and the region. The program applies multidisciplinary and community-based research as well as community service to improve instruction, to advance knowledge, and to address the public health issues and needs of the population served.

GPHP Value Statement

Our teaching, research, and service are guided by core values. These values derive from our context as a school of public health in a developing world setting and from basic principles of professional conduct and human rights. These values are translated by us as follows:

- We are committed to cultivating critical thinking that allows us and our graduates to question reality and tackle the root causes of health problems.
- We believe in equality among people and act to enhance health equity by focusing on underserved communities, and working for social justice.
- We believe that each of us has a role to play in advancing knowledge and improving health, and we work to instill a sense of civic responsibility.
- We focus our efforts on our region of the world to bring to light local/regional health issues and to enhance our relevance.
Selection Criteria
Applicants to the MPH program must specify the area of concentration of their choice by priority on the application form. Admission into the concentration areas within the MPH program is based on the following criteria:

- Choice of Faculty: Priority for consideration for admission goes to applicants who indicate FHS as their first choice.
- Choice of concentration: Priority for consideration for admission in a concentration area goes to applicants indicating that concentration as their first choice.
- Grade point average: Normally priority for consideration for admission goes to applicants with higher grade point average.

Other factors taken into consideration include diversity in background (prior degree and previous academic institution), geographic diversity, years and type of work experience, personal statement, recommendation letters, and interview when applicable.

Master of Science in Epidemiology
For full details on admission requirements to the Master of Science in Epidemiology, see the Admissions section of this catalogue. Mid-year admissions are only accepted for part-time students.

Master of Science in Population Health
For full details on admission requirements to the Master of Science in Population Health, see the Admissions section of this catalogue. Mid-year admissions are only accepted for part-time students.

Master of Science in Environmental Sciences (Major: Environmental Health)
For full details on the admission requirements for this interfaculty program, see the Admissions section of this catalogue and the admission policies for the Interfaculty Graduate Environmental Sciences Program (pages 435–450).

Graduation Requirements
All recommendations for graduation are made by vote of the faculty on the recommendation of the Graduate Studies Committee.

Master of Public Health (MPH)
To be eligible for graduation in the MPH program, a student must accomplish the following:

- Pass all required courses with a minimum grade of 70
- Earn a cumulative average of at least 80
- Successfully complete a minimum of 42 credit hours

Credit requirements for the MPH program are tabulated below:

- Our work is reinforced by our commitment to integrity and professional ethics.
- Recognizing the complexity of health, we value teamwork, interdisciplinary engagement, and partnerships with stakeholders.
- We believe in integrating our instruction, research, and service to bring theory and practice together for maximum impact.
- We believe that diversity in our faculty and students and in our practice sites enhances our ability to understand the perspectives and the circumstances that influence health, and thus create change.
- We are committed to excellence in all we do, and believe our faculty and alumni provide leadership and vision to improve the health of people and communities.

Admission

Master of Public Health (MPH)

Admission Requirements
A candidate is eligible to be considered for admission to the MPH program if s/he (a) holds a bachelor’s degree from AUB, or an equivalent degree from another recognized institution, with a cumulative average of at least 75 and an average of at least 80 or its equivalent in the major field of study, (b) holds a graduate degree from AUB or another recognized institution with a cumulative average of 80 or its equivalent.

A candidate with a major and cumulative average of at least 75, but less than 80, may be considered for admission on probation if s/he holds a bachelor’s degree from AUB, or an equivalent degree from another recognized institution. When only a cumulative average is available, the applicant will qualify for this category if his/her average is between 75 and 80.

On exceptional basis and upon the recommendation of the Department, an applicant with a cumulative average below 75 and with relevant and sufficient work experience can be considered for admission as a non-degree graduate student.

A student registered as a non-degree graduate student can register for a minimum of 5 and a maximum of 9 credits and must obtain an average of at least 80 in the registered courses to be considered for admission to the MPH program.

A student registered as a non-degree graduate student can register for less than 5 credits but not more than 9 credits if he/she is NOT intending to apply for admission to the MPH program.

Spring/Mid-year admissions are accepted on a case-by-case basis if places are available. Students admitted at mid-year may only register as part-timers.

Students entering the MPH program are evaluated on their previous experience in a health-related field and may be exempt from a 2-credit hour practicum. Applicants for exemption are assessed on a case-by-case basis (see policy on exemption). In the case exemption is granted, the course but not the credits are exempted.

Students who join the program as full-timers can complete requirements within a minimum of a year and a half. A candidate who wishes to enroll as a part-time student may do so provided s/he completes the requirements within a period of four years.
Academic Rules and Regulations

Master of Science in Epidemiology, Master of Science in Population Health and Master of Science in Environmental Sciences (Major: Environmental Health)

Credit Load

A full-time student must carry a minimum load of nine credits per semester. Students can register for up to 12 credits per semester. Students who wish to register for more than 12 credits must petition the Graduate Studies Committee for approval.

For full information on academic rules and regulations and general requirements for the Master of Science in Epidemiology, Master of Science in Population Health, and Master of Science in Environmental Sciences (Major: Environmental Health), refer to the General University Policy section in this catalogue.

Master of Public Health Program

Credit Load

A full-time student must carry a minimum load of 12 credits per semester. Students can register for up to 18 credits per semester. Students who wish to register for more than 18 credits must petition the Graduate Studies Committee for approval.

A part-time student must carry a minimum load of 5 credits per semester. Students who wish to register for less than 5 credits must petition the Graduate Studies Committee for approval.

Policy on Course Registration

All core courses are offered in the fall semester. Two of the core courses (ENHL 300 and HPCH 315) are also offered in the spring semester. All concentration courses are offered in the spring semester. Students can register for concentration courses only upon completion of the core course(s) in their concentration area. Students can register for the public health experience courses with only one core and/or one concentration course(s) along with the seminar course, as long as the course(s) not yet taken does not consist of material needed to effectively undertake activities of the practicum or the research project.

Policy on Changing Concentration

The MPH program has three options for concentration: Epidemiology and Biostatistics (EPBS), Health Promotion and Community Health (HPCH), and Health Management and Policy (HMP). Every year, a quota for admissions is set for each. Students are accepted into the program in a particular concentration area. Students may petition to transfer to another area of concentration. Petitions are reviewed in current and prospective departments in light of student academic performance, justification for transfer, and implications on the quota. Students cannot transfer to another concentration before the grades of the first semester of enrolment in the current concentration are out.
Policy on Exemption

Course Exemption
Exemption from an FHS course may only be considered when the student has proof that s/he has satisfactorily completed a comparable course in a recognized university, faculty, or program, normally with a minimum grade of 80 or the equivalent. The requirement of this particular course may be waived, but not its credits (i.e., the candidate has to replace the exempted course credits with another course or courses having the same number of credits). The course instructor may require that the petitioning student take an exam in order to demonstrate proficiency in the subject prior to the official registration period for the required course. In cases where students want to take a course in another faculty and equate it for a required course in the MPH program, the course instructor (or relevant department chairperson) must approve the petition for equating courses prior to the student registering in the course. Request for course exemption for MPH students is only possible if the student completed the course in which exemption is sought within 5 years from the date of exemption request. MPH students are allowed to be exempted from a maximum of 6 graduate credits.

Practicum Exemption
In cases where students are judged to have public health experience that is both relevant and sufficient to their chosen area of concentration, they may be exempted from the practicum. Decisions related to exemption are based on the submission of an exemption form to the FHS practicum coordinator, along with a two-page report describing the applicant’s previous work experience (responsibilities and duties) in fulfillment of departmental practicum competencies. Students seeking exemption must submit both the Practicum Exemption Form and the Report by November 15th of the academic year preceding the practicum. Decisions on practicum exemption must be made in the departments concerned prior to the advising week of the following semester. In cases where students are exempted from the practicum, they must still complete 42 credit hours to graduate from the MPH program. The practicum exemption must be in the student’s file prior to their registering for the Culminating Experience (CE).

Policy on Transfer of Credits

For courses taken outside FHS or outside AUB
• A transfer of credits may be considered when a course is satisfactorily completed with a minimum grade of 80, or equivalent, at a recognized university, faculty, or program. The transferred credits are accepted in lieu of credits earned in a comparable course in FHS. Request for transfer of credits for MPH students is only possible if the student completed the course in which transfer is sought within five years from the date of transfer request.
• The number of credits that can be transferred cannot exceed 12 credits of comparable courses at FHS.
• For courses taken within FHS, a transfer of credit may be considered for all passed courses.

Procedure for Exemption and Transfer of Credits
To exempt or transfer courses, the candidate should petition the Graduate Studies Committee and attach the following official documents after consulting with the advisor.
• a letter of request for exemption and/or transfer
• the official catalogue of the transferring institution
• a detailed description of course content and syllabus
• an official statement of records/grades earned for the course(s)

For both the exemption and transfer of credits, the transferring programs, departments, and universities must be considered to have comparable standards to those of AUB.

The chairperson of the department offering the course should seek the opinion of the course instructor(s) and the department faculty in writing, and then submit the recommendation of the department, along with the supporting documents, to the FHS Graduate Studies Committee for final approval.

Probation

Placement on Probation
A student is placed on probation if one of the following occurs:
• s/he fails in any graduate course taken for credit (passing grade is 70).
• s/he fails to obtain a minimum cumulative average of 80 in graduate courses.
Part timers are first evaluated after completion of at least 10 credits. Their cumulative average is evaluated every semester thereafter.

A student with an admission score of at least 75, but less than 80, will be admitted on probation.

Removal of Probation
• A student will be removed from probation at the end of a semester, if s/he has passed all courses and attained a cumulative average of 80.
• Part timers are first evaluated after completion of at least 10 credits. Their cumulative average is evaluated every semester thereafter.

Dismissal from the Program
A student on probation may be dismissed upon the recommendation of the Graduate Studies Committee if one of the following occurs:
• Failure to be removed from probation after one semester or its equivalent for part–timers (10 credit hours).
• Determination by the Graduate Studies Committee that the student has not made satisfactory academic progress, has not shown sufficient professional promise, or has behaved in contempt of the norms and values upheld by the Faculty.
• Placement on probation more than once (not counting the probation at admission time).
## Curricula

### Master of Public Health

#### I. Core Courses (Required of all MPH Students)

<table>
<thead>
<tr>
<th>Core Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPCH 310 Social and Behavioral Foundations of Public Health</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>ENHL 300 Introduction to Environmental Health</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>PBHL 310 Research Design</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 300 Principles of Epidemiology</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 310 Basic Biostatistics</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>HMPD 300 Health Care Systems</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>HPCH 315 Communication Skills for Health Professionals</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

#### II. Concentration Courses

##### A. Epidemiology and Biostatistics (EPBS)

<table>
<thead>
<tr>
<th>Required Concentration Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPHD 312 Analysis of Continuous Data</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 313 Analysis of Categorical Data</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 320 Design and Analysis of Epidemiological Studies</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 323 Epidemiology of Communicable and Non-communicable Diseases</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>EPHD 360 Seminar</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Required Public Health Experience Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPHD 345 Research Project</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>EPHD 365 Practicum</td>
<td>0</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>PBHL 355 Orientation to the Practicum Site</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBHL 398 Culminating Experience</td>
<td>2</td>
<td></td>
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</tr>
</tbody>
</table>

Students in this group should take at least five credits of electives to complete their credit requirements.

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### B. Health Promotion and Community Health (HPCH)

#### Required Concentration Courses

<table>
<thead>
<tr>
<th>Required Concentration Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPCH 331 Theory and Practice in Health Promotion</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>HPCH 332 Community Health and Development</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>HPCH 333 Health Communication</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>HPCH 334 Qualitative Health Research</td>
<td>2</td>
<td>0</td>
<td>2</td>
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<tr>
<td>HPCH 335 Evaluation of Health Programs</td>
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<tr>
<td>HPCH 336 Advocacy for Health</td>
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<tr>
<td>HPCH 340 Seminar</td>
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<tr>
<td>HPCH 344 Workshop Development</td>
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#### Required Public Health Experience Courses

<table>
<thead>
<tr>
<th>Required Public Health Experience Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
</tr>
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<tbody>
<tr>
<td>HPCH 345 Research Project</td>
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<tr>
<td>HMPD 365 Practicum</td>
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<tr>
<td>PBHL 355 Orientation to the Practicum Site</td>
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<tr>
<td>PBHL 398 Culminating Experience</td>
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</table>

Students in this group should take at least four credits of electives to complete their credit requirements.

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### C. Health Management and Policy (HMP)

#### C1. Health Service Management Track

#### Required Concentration Courses

<table>
<thead>
<tr>
<th>Required Concentration Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
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<tr>
<td>HMPD 311 Health Information Systems</td>
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<tr>
<td>HMPD 315 Performance Improvement</td>
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<td>HMPD 318 Policy and Decision Making in Health Care</td>
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<td>HMPD 342 Financial Management and Accounting</td>
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<td>HMPD 351 Healthcare Economics and Finance</td>
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<td>HMPD 340 Seminar</td>
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#### Required Public Health Experience Courses

<table>
<thead>
<tr>
<th>Required Public Health Experience Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
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<tbody>
<tr>
<td>HMPD 345 Research Project</td>
<td>1</td>
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<td>2</td>
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<tr>
<td>HMPD 365 Practicum</td>
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<tr>
<td>PBHL 355 Orientation to the Practicum Site</td>
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</tr>
<tr>
<td>PBHL 398 Culminating Experience</td>
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<td></td>
</tr>
</tbody>
</table>

Students in this group should take at least four credits of electives to complete their credit requirements.

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1 Students who hold a BS degree in EH from FHS are automatically exempted from EH 300. The course credits should be replaced by an elective in EH.
2 Students who have taken EPHD 203/226 may be exempted from EPHD 300 provided they take an exam before the end of the drop and add period. The course credits should be replaced by an elective.
3 Students who have taken EPHD 310 provided they take an exam before the end of the drop and add period. The course credits should be replaced by an elective.
4 Students who have taken HBED/HPCH 203 are automatically exempted from HPCH 315. The course should be replaced by HPCH 333.
### Master of Science in Epidemiology

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
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<tbody>
<tr>
<td>PBHL 300</td>
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<td>PBHL 310</td>
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<tr>
<td>EPHD 300</td>
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<td>3</td>
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<tr>
<td>EPHD 310</td>
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<tr>
<td>EPHD 313</td>
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</tr>
<tr>
<td>EPHD 320</td>
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<tr>
<td>EPHD 323</td>
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<tr>
<td>EPHD 340</td>
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<tr>
<td>EPHD 395</td>
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<tr>
<th>Electives</th>
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<td>EPHD 312</td>
</tr>
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<td>EPHD 321</td>
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<tr>
<td>EPHD 322</td>
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<tr>
<td>EPHD 324</td>
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</table>

Students should take at least three credits of electives.

**Thesis**

| EPHD 399 | Thesis | 6 |

### Master of Science in Population Health

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Lecture Hrs./Week</th>
<th>Lab Hrs./Week</th>
<th>Credit Hrs.</th>
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<td>EPHD 300</td>
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<tr>
<td>EPHD 310</td>
<td>3</td>
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<td>EPHD 320</td>
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<td>EPHD 395</td>
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<tr>
<td>EPHD 332</td>
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<td>EPHD 333</td>
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</table>

Students should take at least three credits of electives.

**Thesis**

| EPHD 399 | Thesis | 6 |

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11 Students may be exempted from doing the practicum if they have sufficient health related experience in their health related area
12 Not required for students exempted from practicum
13 This course replaces the comprehensive exam requirement
Master of Science in Environmental Sciences (Major: Environmental Health)

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Credits</th>
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<tbody>
<tr>
<td>A. Core Courses Inside the Faculty</td>
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</tr>
<tr>
<td>ENHL 300 Introduction to Environmental Health</td>
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<tr>
<td>ENHL 310 Toxicology and Environmental Health Hazards</td>
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</tr>
<tr>
<td>EPHD 300 Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PBHL 300 Foundations of Public Health</td>
<td>3</td>
</tr>
<tr>
<td>B. Core Courses Outside the Faculty</td>
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<tr>
<td>ENSC 630 Natural Resources Management</td>
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<tr>
<td>ENSC 650/PSPA 316 International Environmental Policy</td>
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<tr>
<td>ENSC 660 Environmental Technology</td>
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<tr>
<td>ENSC 660 Environmental Technology is replaced by one of the following courses:</td>
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<tr>
<td>ENSC 600 Air Pollution and Control I</td>
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</tr>
<tr>
<td>ENSC 610 Solid Waste Management I</td>
<td>3</td>
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<tr>
<td>ENSC 620 Water and Wastewater Treatment Technology</td>
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<tr>
<td>ENSC 690 Seminar in Environmental Sciences</td>
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<tr>
<td>C. Electives</td>
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<tr>
<td>D. Thesis or Project</td>
<td>3-6</td>
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<td>ENSC 699 Thesis</td>
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<tr>
<td>ENSC 697 Project</td>
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</table>

Total number of credits required for graduation 30

Interdisciplinary Courses

PBHL 300 Foundations of Public Health 2.2; 3 cr.
This course explores the field of public health, its foundations, disciplines, values and ethics. The course develops students’ analytical thinking through cooperative learning techniques and case studies. Case studies of global and regional public health issues will be analyzed. Students in this course will be required to analyze problems in relation to each of the core disciplines of public health (biostatistics, environmental health, epidemiology, health management and policy, health promotion). Prerequisite: EPHD 300.

PBHL 310 Research Design 2.2; 3 cr.
This course discusses principles of research design and the methods used in both quantitative and qualitative social research methodologies. Topics include formulation of research questions, literature review, sampling issues, methods of data collection and analysis. Practical ethical issues are also discussed.

PBHL 320 Special Topics in Public Health 1-3 cr.
A course that explores special topics, contexts, populations, or skills that influence public health practice and research. The course is focused on applied experiences, dialogue and discussion, and critical thinking. Repeated for credit under different topics. Offered occasionally.

PBHL 335 Orientation to the Practicum Site 0 cr.
This course orients students to the health program or health care facility where they will be conducting their practicum. Students rotate among divisions within the health care organization they choose, get insight into the philosophical underpinnings of the program or facility, understand the mission and objectives of the program or organization, and interact with staff and clients in an informal or more structured manner.

PBHL 398 Culminating Experience 2 cr.
The seminar is a venue where students and faculty discuss and reflect upon the practicum (or work) experiences of students. Through this interaction, the interdisciplinary nature of public health is emphasized. Issues discussed include the public health significance, impact, and relevance of all the practicum projects (or related work experiences for those exempt from practicum). Students should be prepared to receive and give feedback on each other’s work. The culminating experience process is intended to develop each student’s project, as well as to continue to develop and demonstrate students’ ability to think broadly, not only about their own work, but also about the work of others. This course replaces the comprehensive exam required for MS graduate studies. Prerequisites: PBHL 355 and completion of all, or all but one, of the core and/or concentration courses.

Interdepartmental Courses

IDTH 206–207 Social and Preventive Medicine14 34.46; 4 cr.
A course that explores the inter-relationships among the patient, physician, and society. It is divided into two parts. The first is a lecture and discussion series (2 credits) that examines health and disease, the social and individual determinants of health, health care systems, and the patient–physician relationship. The second part (2 credits) is a field project during which students investigate a health issue at the level of the community.

IDTH 268 Clerkship in Preventive Medicine and Public Health14 10.80
A clerkship in which teams of senior medical students assess, critique, and propose solutions to problems of public health or clinical significance. The students examine policy, organizational, social, and individual challenges to these problems, addressing issues such as equity in health and setting public health programs, and identifying opportunities for change. Data collection and statistical analysis are secondary objectives.

14 Public Health courses taught by FHS in the Faculty of Medicine

14 Recommended for students who do not have an Environmental Health background.

15 ENSC 690 course should be registered twice by the program’s students during their residency at AUB. Otherwise, they are equally encouraged to attend the seminar when offered.
Department of Environmental Health

Chairperson: Jurdi, Mey
Professors: Jurdi, Mey; Nuwayhid, Iman
Associate Professors: Habib, Rima; Massoud, May
Assistant Professor: Kamleh, Rabih
Instructors: El Helou, Nida; Nasr, Joumana

The mission of the Department of Environmental Health is to sustain excellence in teaching, research and community service relevant to environmental issues and their impact on human health.

The department offers a graduate program leading to the MS degree in Environmental Sciences (Major: Environmental Health). For details regarding the MS degree, refer to the Admissions section of this catalogue and the section of the Interfaculty Graduate Environmental Sciences Program (pages 435–450).

In view of the increasing interest in development and its impact on the human environment, a variety of courses offered by this department are made available to students in other fields.

Graduates of the Environmental Health program may occupy senior or intermediate posts in:

- Government agencies such as the Ministry of Health, Ministry of the Environment, municipalities, or health centers
- The private sector, which offers a variety of job opportunities in industry, research institutions, universities, schools, and private business
- International agencies

**ENHL 300 Introduction to Environmental Health** 2.0; 2 cr.
A course that introduces students to the physical life support system and interactions with the socio-economic context. Emphasis is placed on assessing, preventing, and controlling environmental hazards affecting human health and ecological wellbeing. The role of local and global regulatory systems in impacting change and sustaining a healthy environment is highlighted. Enabling communities through this process of sustainable development is critically assessed.

**ENHL 302 Principles of Environmental Assessment** 2.0; 2 cr.
A course that provides a critical understanding of the nature and extent of ecosystem degradation resulting from developmental projects. This course introduces ecological and socio-economic methodologies for environmental impact-assessment of projects of public health importance.

**ENHL 304 Advanced Water and Wastewater Quality and Treatment** 3.0; 3 cr.
A course that covers water source characteristics, factors influencing water quality and consequent public health impacts, regulatory protection of source waters, source water and wastewater control techniques, and public health concerns of wastewater reclamation and reuse.

**ENHL 306 Management of Hazardous Wastes** 3.0; 3 cr.
A course that covers sources and types of hazardous wastes, treatment and disposal technologies, hazardous waste management: components and priorities, risk assessment and risk management, and site remediation and public health concerns.

**ENHL 307 Food Safety and Health** 3.0; 3 cr.
The course will focus on the safety and management of processed food products. It will address the advantages and limitations of food processing techniques and in specific the application of food additives. Areas covered will relate mainly to food safety and quality control, health impacts, types and limitations of food processing methods, use of food additives, exposure estimation, toxicological implications, risks and benefits governing use and quality control measures and applications both at the national and international levels.

**ENHL 308 Tutorial** 1–3 cr.
A tutorial on special environmental health projects of interest to the students. A written report is required.

**ENHL 310 Toxicology and Environmental Health Hazards** 3.0; 3 cr.
A course that reviews the essentials of toxicology: dose response, toxicokinetics (absorption, distribution, metabolic conversion, elimination), and the molecular basis for toxic action, target organ toxicity, mutagenesis, teratogenesis, and carcinogenesis. Selected chemical and biological agents that adversely affect man and environmental quality are introduced as case studies.

**ENHL 312 Occupational Health** 2.3; 3 cr.
An introduction to the general principles relating to occupational health. Issues related to work, work environment and organization, and their impact on the physical and mental well-being of employees. Principles of recognizing, evaluating, and controlling work hazards with an emphasis on the multidisciplinary nature of the field of occupational health. Various disciplines involved in occupational health and used by occupational health professionals to safeguard the health of employees, including toxicology, safety, hygiene, epidemiology, ergonomics, occupational medicine, psychology, and sociology. This course is designed for students of multiple educational and training backgrounds and does not require prerequisite knowledge.

**ENHL 320A Special Topics in Environmental Risk Analysis** 3.0; 3 cr.
This course introduces the principles of environmental risk analysis, including: 1. risk characterization (dose-response relationships, threshold concept and no-observed-adverse health effect, margins of safety, allowable intakes); 2. risk management (exposure assessment methodology of different environmental agents and chemicals, and their potential hazard to health and the environment, extrapolation of toxicological data to humans and sensitive groups, analysis of the different risk prediction models [probit, logit, multi-stage models], and their applications and limitations); and 3. risk communication (health and safety guidelines of chemicals and margins of safety and standard setting needs and processes).
ENHL 314/ ENSC 642
Environmental Management Systems 3.0; 3 cr.
This course provides an overview of the most common international standards for environmental management systems, primarily the International Standards Organization (ISO) harmonized management systems, and its implications for different firms. It provides students with the skills to design, implement and assess such management systems. Though the first part of the course is mainly lecture based, student participation in the form of questions and discussion is always welcomed and encouraged. Critical thinking will be promoted throughout the course. Students will be expected to prepare a technical report on a firm or industry of their choice and to communicate project findings to their colleagues through verbal presentation. Emphasis is placed on solving environmental problems using an integrated approach in order to achieve an optimized management performance. *Alternate years.*

ENSC 695
Comprehensive Exam 0cr.

ENSC 699
Thesis 6cr.

ENSC 697
Project 3cr.
The project must be undertaken, in partial fulfillment of the requirements for the degree, upon the completion of at least 27 credits of core and elective courses.

A student who is unable to finish the project in one semester can register for one additional time.
Department of Epidemiology and Population Health

Chairperson: Chaaya, Monique
Professors: Chaaya, Monique; DeJong, Jocelyn; Sibai, Abla; Huda Zurayk
Professor of Public Health Practice: Myntti, Cynthia
Visiting Research Professor: Makhlouf Obermeyer, Carla
Assistant Professors: Al-Dewachi, Omar; Ghandour, Lilian; Jaffa, Miran
Visiting Assistant Professor: Fares, Souha
Visiting Assistant Professor of Public Health Practice: Fouad, Fouad
Instructor: El Khalil, Asmar

The Department of Epidemiology and Population Health offers courses in epidemiology, biostatistics, and population health to graduate students in the Faculty of Health Sciences and the Faculty of Medicine. The course offerings to students in the Master of Public Health (MPH) program, the Master of Science (MS) in Epidemiology program, and the Master of Science (MS) in Population Health program are given as core, required, and elective courses. In addition, members of the department offer courses in statistics and epidemiology to students in the Medical Degree program, and coordinate and participate in teaching courses in preventive medicine and public health programs in the Faculty of Medicine.

EPHD 225 Medical Statistics 1.2; 2 cr.
An introductory course for Medicine I students to the study of biostatistics applied to medicine. Topics include introduction to biostatistics in medicine; methods of describing data; statistical inference for means and proportions, both parametric and non-parametric; and multiple linear regression and logistic regression.

EPHD 226 Epidemiology 2.2; 3 cr.
A course required of Medicine II students which consists of lectures and complementary practical sessions that provide students with basic epidemiological tools relevant to both clinical and public health practice. This course also covers issues in design, conduct, and analysis of epidemiological studies, in addition to critical appraisals of scientific literature.

EPHD 300 Principles of Epidemiology 2.2; 3 cr.
A course in principles, concepts and application of epidemiology in the public health field. The course consists of lectures, assigned readings and complementary practical sessions that provide students with basic epidemiological knowledge and tools relevant to public health practice. Students are given the opportunity to acquire an understanding of the vocabulary of epidemiology and methods of epidemiological research, investigation and control. Topics covered include rubrics of epidemiology, morbidity and mortality measures, sources of epidemiological data, outbreak investigation, epidemiological study designs, causal inference and causation in epidemiology. This course also covers an overview of the major biological agents associated with infectious and communicable diseases with a focus on disease ecology, etiology, transmission and contagion modes.

* Part-time
EPHD 310 Basic Biostatistics 2.2; 3 cr.
An introductory Biostatistics course that covers basic concepts in statistical methods. The course demonstrates methods of exploring, organizing, and presenting data. The course presents the foundation of statistical inference from estimation, to confidence interval and testing of hypothesis. Applications include comparing population means or proportions via data obtained from paired or independent samples, one way ANOVA. Also, it introduces simple linear regression, correlations, logistic regression and nonparametric methods for data analysis.

EPHD 311 Analysis of Continuous Data 2.2; 3 cr.
A course that deals with concepts and methods for the analysis of continuous outcomes. Main focus is on multiple regression analysis. Analytical means to control for confounding and effect modification while maximizing precision is explored. The methods of regression diagnostics are explained. Basic theory is considered; however, the emphasis is on application. Applications of the statistical techniques are carried out using the statistical package STATA. Prerequisite: EPHD 310, or consent of instructor.

EPHD 312 Analysis of Categorical Data 2.2; 3 cr.
A course that covers univariate and multivariate statistical techniques for categorical data. Topics include distributions, measures of association and inference for categorical data, log-linear models for multi-contingency tables, and logistic regression for binary, polytomous, and ordinal responses. In addition, the concept of maximum likelihood estimation is introduced. Applications of the statistical techniques are carried out using the statistical package STATA. Prerequisite: EPHD 310, or consent of instructor.

EPHD 313 Analysis of Categorical Data 2.2; 3 cr.
A course that covers univariate and multivariate statistical techniques for categorical data. Topics include distributions, measures of association and inference for categorical data, log-linear models for multi-contingency tables, and logistic regression for binary, polytomous, and ordinal responses. In addition, the concept of maximum likelihood estimation is introduced. Applications of the statistical techniques are carried out using the statistical package STATA. Prerequisite: EPHD 310, or consent of instructor.

EPHD 320 Design and Analysis of Epidemiological Studies 2.2; 3 cr.
This course is offered to graduate students who have already been exposed to basic epidemiological and biostatistical concepts. It covers in detail methodological issues concerning the design and analysis of epidemiological studies with particular emphasis on case control and cohort studies, and the interpretation of results. Prerequisites: EPHD 300 and EPHD 310, or consent of instructor.

EPHD 321 Design and Analysis of Clinical Trials 1.2; 2 cr.
A course that focuses on issues in the design and organization of randomized controlled clinical trials: ethical and legal issues, patient selection, recruitment, masking and randomization, endpoint definition, protocol development, and statistical analysis. Designs such as crossover designs, factorial designs, and meta-analysis are discussed. Prerequisites: EPHD 300 and EPHD 310, or consent of instructor.

EPHD 322 Special Topics in Epidemiology 2.0; 2 cr.
A course that covers selected topics of special interest to trainees in epidemiology. Examples include assessment of disease burden using epidemiological studies, occupational epidemiology, epidemiology of aging, epidemiology of maternal-child problems, or nutritional epidemiology.

EPHD 323 Epidemiology of Communicable and Non-communicable Diseases 3.0; 3 cr.
The course examines a number of selected communicable and non-communicable diseases, given their burden on morbidity and mortality, at the local, regional and international level. The course provides an overview of their public health importance, epidemiology, associated risk and protective factors, and strategies for prevention and control. The main methodological issues pertaining to the measurement, control and/or prevention of communicable and non-communicable diseases are also discussed. Prerequisite: EPHD 300 or any undergraduate or graduate basic epidemiology course.

EPHD 324 Special Topics in Biostatistics 1–3 cr.
A course that covers selected topics in biostatistics of special interest to researchers and trainees in epidemiology and population health. Prerequisite: EPHD 310 or consent of instructor.

EPHD 325 Medical Statistics Similar to EPHD 225. Offered to graduate students. 1.2; 2 cr.

EPHD 326 Epidemiology Similar to EPHD 226. Offered to graduate students. 2.2; 3 cr.

EPHD 330 Demographic Methods for Public Health Decision-Making 2.0; 2 cr.
An introductory course on selected demographic methods and population health. The emphasis is on conceptual issues, measurement and hands-on experience with basic techniques, as well as inequalities in health over the life course. Topics covered include sources and quality of population data; rates and ratios; standardization and decomposition; mortality measures and the life-table; perceived versus actual morbidity; the burden of disease; period and cohort measures of fertility; migration rates; and marriage indices.

EPHD 331 Population Change and Health 3.0; 3 cr.
Population change is central to public health. This course provides a broad introduction to the field of population. It identifies core topics in population, discusses their relation to development and health, and emphasizes measurement issues. Topics covered include population size and growth as they relate to resources and to population health; components of population change including fertility and mortality, their links to development and consequences for health; population composition by age and gender and by socioeconomic status, and related inequalities; and population movements including forced, internal and international migration as factors of population change and health. Special focus is given to the Arab World and the Middle East Region.

EPHD 332 Population and Health Policy 3.0; 3 cr.
A course designed to explore the links between population, health, and development issues, with a focus on population policies and programs in the Middle East and North Africa. Topics include demographic trends and their implications for health policies; family planning programs and policies; the reproductive health paradigm; HIV/AIDS and population policies; special health needs posed by the youth 'bulge' and population aging; political dimensions of population policies; and debates between the policy objectives of reducing population growth at the macro level and promoting individual well-being.

EPHD 333 Special Topics in Population Health 1–3 cr.
An examination of specific topics in population health such as aging, burden of disease, reproductive health, fertility of adolescents, social determinants of population health, and the demography of refugee populations.

EPHD 334 Reproductive Health 3.0; 3 cr.
A course that examines selected issues in reproductive health with a focus on developing countries. Topics covered include pregnancy and childbirth, unintended pregnancy, maternal mortality, infertility, gynecological morbidity including sexually transmitted infections, sexuality, birth spacing and family planning, and reproductive rights. Particular emphasis is placed on conceptual issues and recent debates about reproductive health within the context of the international agenda on reproductive rights established at the 1994 Cairo Conference on Population and Development.
EPHD 336 Tutorial in Epidemiology 1–3 cr.

EPHD 337 Tutorial in Biostatistics 1–3 cr.

EPHD 338 Tutorial in Population Health 1–3 cr.

EPHD 340 Seminar 1.0; cr.
A seminar that provides students with an opportunity to review, critique, and orally present their evaluation of either peer-reviewed articles or other literature in epidemiology or population health, and/or their research projects/theses that are in progress for feedback. Major methodological and conceptual issues in epidemiology are highlighted and discussed. Prerequisites: EPHD 300 and EPHD 310; or consent of the instructor.

EPHD 345 Research Project 1.2; 2 cr.
The course involves a research project that the student carries out within his/her area of concentration or interest, as an individual or as part of a group. This research may focus on one or more of the qualitative and quantitative methodologies introduced in Research Design, Principles of Epidemiology and Basic Biostatistics. This course gives the student the chance to apply background knowledge and master research skills in an area of interest. Prerequisites: PBHL 310, EPHD 300, EPHD 310 and completion of all, or all but one, of the core and concentration courses.

EPHD 365 Practicum in Epidemiology and Biostatistics 0.30; 2 cr.
The practicum offers students the opportunity to practice their obtained knowledge and gain research experience in epidemiology and biostatistics mainly through the design of epidemiological studies or data collection and analyses of various types of data. Students are advised internally by a faculty member and externally by an outside preceptor in the practicum site. Practicum sites may include the Ministry of Public Health, Ministry of Social Affairs, non-governmental agencies, UN agencies (UNICEF, ESCWA, UNFPA), and health services organizations. Prerequisites: PBHL 355 and completion of all, or all but one, of the core and/or concentration courses.

EPHD 395 Comprehensive Exam 0 cr.

EPHD 399 Thesis 6 cr.
Department of Health Promotion and Community Health

Chairperson: Makhoul, Jihad
Professor: Afifi, Rima
Associate Professors: Abdulrahim, Sawsan; Kabakian-Khasholian, Tamar; Makhoul, Jihad
Assistant Professor: Nakkash, Rima.
Senior Lecturer: El Kak, Faysal
Lecturer: Kallash-El-Khoury, Michel
Instructors of Public Health Practice: Kalot, Joumana; Najem, Martine
Instructor: Kanj, Mayada

Departmental courses are designed to introduce students to the field of health promotion and community health. Health promotion is the process of enabling people to increase control over, and to improve, their health through a wide range of social and health related interventions. Community health is concerned with the improvement or maintaining the health characteristics of communities. Emphasis is placed on the role of health promotion specialists to design, implement and evaluate health promoting interventions with the participation of the communities and groups. Ethical issues in health promotion and community health are emphasized in all courses.

The following courses are offered by the department:

**HPCH 310 **Social and Behavioral Foundations of Public Health **3.0: 3 cr**
A course that focuses on the social and behavioral influences on health. Students will learn how to challenge the assumptions used in defining, addressing and evaluating health issues. Students will be introduced to a selection of social-science theories and the way in which they guide contemporary public health practice and policy. The course also covers the effects of globalization and global environmental issues on health. Throughout the course students use case studies, apply theory, learn analytical and critical thinking, and discuss ethical issues in public health.

**HPCH 315 **Communication Skills for Health Professionals **1.2; 2 cr.**
A course on interpersonal and group communication theory and practice. This course aims to enhance the student’s ability to interact effectively in work settings, as well as to prepare and carry out effective presentations using appropriate audiovisuals.

* Part-time
HPCH 331 Theory and Practice in Health Promotion 3.0; 3 cr.
A course that focuses on the factors and circumstances influencing health promoting behaviors and community health. Students explore the theoretical perspectives on health behavior change at the personal, interpersonal, organizational, community, and policy levels, through an ecological approach. In accordance with the philosophical and theoretical foundations of health promotion theory, students develop a theory-based intervention that spans social organization from the personal to the national level. Prerequisite: HPCH 310.

HPCH 332 Community Health and Development 2.0; 2 cr.
A course in which students learn concepts and acquire skills that are necessary for successful community health promotion and development programs. Students look critically at current trends of community development practices using relevant literature on development and community organization. Students also investigate alternative approaches necessary to improve community development practices through applications in the field. Prerequisite: HPCH 310 or consent of instructor.

HPCH 333 Health Communication 2.0; 2 cr.
A course in which students gain skills to analyze critically a range of technologies, methods, and media for health communication for use with diverse groups. Students will demonstrate proficiency in identifying an at-risk population and tailoring a culturally sensitive message to meet their specific needs, solicited through the population's participation in all stages of the health communication campaign. Prerequisite: HPCH 315 or consent of instructor.

HPCH 334 Qualitative Research Health 2.0; 2 cr.
A course in which students advance their qualitative social research methodology and methods for public health research. Students revisit the underlying paradigms and use of qualitative methodology. Throughout this course students refine their interviewing skills, train on how to manage qualitative data, apply systematic data analysis, and produce a rigorous account of qualitative research findings through practical applications in Arabic and English. Prerequisite: PBHL 310 or similar research design course or consent of instructor.

HPCH 335 Evaluation of Health Programs 2.0; 2 cr.
A course in which students learn how to plan, implement, and evaluate a health program, starting with the health-related needs assessment in the community to determine priority areas for health education. Based on these areas, students go through the process of developing objectives, selecting appropriate strategies, obtaining support from decision makers, and implementing a program by applying conceptual models from health education and related disciplines. Students are also introduced to the fundamentals of health program evaluation and exposed to various evaluation approaches. Emphasis is placed on the importance of involving participants in the different phases of program planning, implementation, and evaluation. Prerequisite: HPCH 310 or consent of instructor.

HPCH 336 Advocacy for Health 1.1; 1 cr.
In this course, students will be exposed to the art and science of advocacy in public health. The course will cover the basic elements of an effective evidence-based advocacy process, including defining the issue, defining the audiences and crafting advocacy messages. Field trips will expose students to the context of decision making and case studies from Lebanon will provide tangible examples of advocacy processes. Students will work in groups to develop an advocacy tool, such as a newspaper article, a letter of complaint, or a policy statement for an advocacy project addressing a public health issue of relevance to Lebanon or a country of the region. Prerequisite: HPCH 310.

HPCH 338 Advanced Qualitative Methods 2 cr.
A course that provides students with hands-on experience in a variety of meaning-centered qualitative data gathering and analysis techniques, and provides students with local practical experience in several computerized data analysis techniques suitable for Arabic and English texts. The course builds on the core understanding of qualitative research design and execution gained in HPCH 334. Students will apply critical thinking in their choice of qualitative research design, apply a variety of theoretical approaches to text analysis, and analyze a qualitative interview text using computer-based techniques. Prerequisite: HPCH 334.

HPCH 339 Tutorial in Health Promotion and Community Health 1–3 cr.
A guided study in particular topics in health behavior and health education as defined by instructor and student.

HPCH 340 Seminar 1.0; 0 cr.
A seminar that serves as a forum for discussion among all faculty and students in the Department of Health Promotion and Community Health regarding current issues in the field. In this seminar students critique state-of-the-art education programs in Health Promotion and Community Health. Students also discuss their professional role in policy formation, as well as the importance of a code of ethics in professional practice. Finally, each student will develop a personal plan for professional growth. Prerequisite: HPCH 310.

HPCH 341 Special Topics in Health Promotion and Community Health—Special Populations 1.2; 2 cr.
A course in which students explore the personal, social, and community determinants that influence the health of special populations such as women, children, and adolescents, or an aging population. Issues of assessment as well as design, implementation, and evaluation of interventions at a variety of levels to promote the health of such special populations are discussed.

HPCH 342 Special Topics in Health Promotion and Community Health—Exploring the Context of Intervention 1.2; 2 cr.
A course in which students explore social and political determinants affecting health and health behavior in Lebanon generally, and in rural and urban contexts, among others. Through group projects and investigations students learn how culture, laws, policies, economics, kinship, and communal ties interact and produce health inequalities in Lebanon today. By the end of this course students will have built up case studies analyzing social and political forces surrounding a contemporary health issue of their choice within a particular context.

HPCH 344 Workshop Development 1.0; 1 cr.
A course in which students gain skills in the planning, implementation, and evaluation of continuing education workshops for professionals working in health and development. Corequisite: HPCH 315.

HPCH 345 Research Project in Health Promotion and Community Health 1.2; 2 cr.
A project in which the student carries out research within his/her area of concentration or interest, as an individual or as part of a group. This research may focus on one or more of the qualitative and quantitative methodologies introduced in Research Design, Principles of Epidemiology and Basic Biostatistics. This course provides the student with a chance to apply background knowledge and master research skills in an area of interest. Prerequisites: PBHL 310, EPHD 300, EPHD 310 and completion of all, or all but one, of the core and concentration courses.
HPCH 365  Practicum in Health Promotion and Community Health  0.30; 2 cr.
A practicum in which students gain field experience in the assessment, development, implementation, and/or evaluation of interventions for health promotion at the individual, interpersonal, organizational, community, or policy levels. Students will integrate knowledge and theory learned in the classroom setting with the realities of public health practice. Sites for practicum can include community health centers, hospitals, local or international NGOs, governmental organizations, schools, or academic field projects. Prerequisites: PBHL 355, and completion of all, or all but one, of the core and/or concentration courses.
Department of Health Management and Policy

Chairperson: Saleh, Shadi
Associate Professors: El Jardali, Fadi; Saleh, Shadi
Associate Professors of Public Health Practice: Jabbour, Samer; Kassak, Kassem
Assistant Professors: Alameddine, Mohamad; Yassin, Nasser; Tanzi, Vito
Instructor of Public Health Practice: Kambris, Mona
Instructor: Germani, Aline

Departmental courses are designed to introduce students to principles and practices in the field of health management and policy, with an emphasis on managerial functioning in healthcare organizations. The Department offers a track in health management within the Masters of Public Health program in the Faculty of Health Sciences. The Department also offers graduate courses in health management and policy for advanced graduate students in health sciences and related fields.

The following courses are offered by the department:

HMPD 300  Health Care Systems  2.2; 3 cr.
This course deals with all the main components, resources and functions of health care systems. It is designed for graduate students to identify organizational and health system problems and apply systems thinking in resolving them. The course also introduces graduate students to the policy making and analysis of health system issues with particular focus on Lebanon and the Middle East region.

HMPD 310  Management and Organization Theory  3.0; 3 cr.
A course that focuses on an application of theories of organization to the health system, and the development of the capacity to influence the behavior of others in present-day health organizations. Emphasis is placed on small group relationships, communication networks, and the human side of the organization.

HMPD 311  Health Information Systems  2.0; 2 cr.
A Health Information Systems (HIS) course is designed for graduate students to identify and examine the various technological tools and approaches that are used in healthcare settings to support decision making processes, management, and quality of care. Prerequisite: HMPD 300.

HMPD 312  Health Planning and Project Management  3.0; 3 cr.
A course in which students learn to apply the concepts and tools of planning and evaluation to real situations facing agencies, hospitals, and ministries of health.

\* Part-time
HMPD 314  Project Management  2.0; 2 cr.
A course that exposes students to current project management trends, best practices, and strategies that can aid in better management of projects and programs in health care settings.

HMPD 315  Performance Improvement  3.0; 3 cr.
A course that examines the two dimensions of the service delivery process, the provider and the service. In this context this course consists of two inter-related modules emphasizing the role of human resources management and service excellence in improving performance within health care settings. Prerequisite: HMPD 300.

HMPD 316  Marketing in Healthcare  2.0; 2 cr.
A course that provides students with the fundamentals of marketing for health care and of developing a marketing plan, with an emphasis on customer service, and how to organize value, branding, and image for a successful health care institution.

HMPD 317  Materials Management in Health Services Organizations  2.0; 2 cr.
A course that provides students with the skills and knowledge required for the planning, organization, and control of all aspects of materials management in health care settings, including purchasing, capacity planning, inventory, vendor evaluation, traffic, logistics, and value analysis.

HMPD 318  Policy and Decision Making in Health Care  3.0; 3 cr.
A course that examines the theory and practice of policy and decision making in health care. Its purpose is to assist students in understanding the various theories, approaches, dynamics, and challenges to health policy making and analysis. It includes case studies application including health policy issues at the national, regional, and international levels. Prerequisite: HMPD 300.

HMPD 319  Strategic Management of Health Care Organizations  2.0; 2 cr.
A course that provides knowledge of fundamental strategic management skills applicable in health care organizations. Its purpose is to prepare students to think strategically and build knowledge to develop, implement, and evaluate effective strategies in health care organization.

HMPD 320  Governance in Health Care  2.0; 2 cr.
A course that examines the multiple levels of governance in health care systems, including theory, dynamics, approaches, dysfunctions and challenges. Its objectives are to introduce students to governance and accountability at the organizational, local, national, regional, and global levels; convey an understanding of governance and accountability of different healthcare structures; and examine challenges.

HMPD 321  Foundations of Health Administration II  3.0; 3 cr.
A course that deals with current issues in health care, such as primary health care, health care reform, and integration of social sciences in health sciences.

HMPD 325  Quality Management and Accreditation in Health Care  2.0; 2 cr.
A course that examines at multiple levels the theory and practice of quality management and accreditation in health care organizations. The objectives of the course are to: (1) convey an understanding of quality of care, with particular attention to conceptual framework for continuous quality improvement, quality assessment, improvement and patient safety including approaches, methods and tools, (2) explain how to develop a quality improvement plan, performance indicators and measurement systems for quality and accreditation; and (3) address ethical issues related to quality management, risk management and patient safety with particular attention to Lebanon and the region.

HMPD 330  Clinical Laboratory Management: Principles and Applications  3.0; 3 cr.
A course that discusses the nature of management in a clinical laboratory and defines its function, role, ethics, services, and types in multiple laboratory settings (consulting, references, POL, POCT), as well as methods for marketing its services. This course also assists students in designing workflow, physical layouts, and organizational communication systems. Prerequisite: HMPD 300.

HMPD 332  Quality Assurance Practices in Health Care Laboratories  3.0; 3 cr.
A course that discusses the implementation of quality management in different areas of the clinical laboratory. This course helps students design a cost-effective quality system by introducing them to various international quality standards and benchmarking. This course also incorporates concepts of effective laboratory utilization and automation as components for an overall laboratory strategy for quality. Prerequisite: HMPD 330.

HMPD 339  Tutorial in Health Management and Policy  1–3 cr.
A seminar course that is intended to give MPH students an opportunity to learn about issues and methods related to health management, health policy, and health services research. It involves weekly presentations that address current topics of importance within the health care field. Prerequisite: HMPD 300.

HMPD 340  Seminar  1.0; 0 cr.
A seminar course that is intended to give MPH students an opportunity to learn about issues and methods related to health management, health policy, and health services research. It involves weekly presentations that address current topics of importance within the health care field. Prerequisite: HMPD 300.

HMPD 342  Financial Management and Accounting  3.0; 3 cr.
A course that covers the basic skills of modern financial management and accounting, and the utilization of its concepts and tools to make decisions in health care organizations. Prerequisite: HMPD 300.

HMPD 345  Research Project  1.2; 2 cr.
A project in which the student carries out research within his/her area of concentration or interest, as an individual or as part of a group. This research may focus on one or more of the qualitative and quantitative methodologies introduced in Research Design, Principles of Epidemiology and Basic Biostatistics. This course gives students a chance to apply background knowledge and master research skills in an area of interest. Prerequisites: PBHL 310, EPHD 300, EPHD 310 and completion of all, or all but one, of the core and/or concentration courses.

HMPD 351  Health Care Economics and Finance  2.0; 2 cr.
A course that covers the application of the principles of microeconomics to the health field, utilization of the techniques of microeconomics to the study of prices and markets in the health field, and developing competence in cost analysis and cost projections. Prerequisites: HMPD 251 or any undergraduate course in economics and HMPD 300.

HMPD 354  Special Topics in Health Management and Policy  1.0; 1 cr.
A course that presents students with analytical tools for an in-depth understanding of current or emerging health policies that are debated in the health care industry, as well as tools for generating health policy documents.
HMPD 365A  Practicum in Hospital Management  0.30; 2 cr.
A course that constitutes an administrative residency program in a health care setting such as a hospital, an insurance facility, a government or non-governmental agency, or any other health care facility. Through hands-on experience, this practicum prepares students to assume increasing levels of responsibility with competence in these settings. Prerequisites: PBHL 355 and completion of all, or all but one, of the core and/or concentration courses.

HMPD 365B  Practicum in Laboratory Management  0.30; 3 cr.
A course that constitutes an administrative residency program in a clinical laboratory setting. This practicum prepares students with knowledge of the fundamental administration of a clinical laboratory, including technical, personnel, and financial management areas. Prerequisites: PBHL 355 and completion of all, or all but one, of the core and/or concentration courses.
Center for Research on Population and Health (CRPH)

Director: Carla Makhlof Obermeyer

The mission of the Center for Research on Population and Health is to support research on issues at the intersection of population and health in Lebanon, the region, and internationally, and to disseminate findings to scientists, policymakers, and the public. The Center has led a multidisciplinary research program on reproductive health, childbirth, youth, tobacco control, and mental health, and seeks to expand to new areas, and to strengthen comparative research in the Arab region and beyond. Members and affiliates of the Center are epidemiologists, physicians, social scientists and public health professionals who combine expertise in particular public health issues with a concern for how new evidence can contribute to policies and interventions to improve health.

Research Activities

The Center’s research activities are undertaken by interdisciplinary research working groups formed through collaboration among FHS faculty, graduate students, and colleagues in the Arab region and beyond. Current regional working groups include the Choices and Challenges in Changing Childbirth Group, the Women’s Reproductive Health Working Group, the Youth Working Group, the Youth Sexual and Reproductive Health Group, the Tobacco Control Group, the Social Inequalities in Health Group, and the MATCH (Multi-country African HIV Testing and Counselling for HIV) study.

The Center provides researchers at FHS with resources and technical assistance for data management and analyses; access to regional data sets; proposal development, and support for new areas of research.

Research Collaborations

Ongoing collaborations with research institutions and groups in the region include the Social Research Center at the American University in Cairo, the Institute of Community and Public Health at Birzeit University in Palestine, the Department of Community Medicine at Damascus University, and the regional Reproductive Health Working Group.

CRPH also hosts researchers who wish to visit the Faculty of Health Sciences with the goal of collaborating with FHS faculty or of pursuing innovative research or writing activities.
Outreach and Practice Unit (OPU)

Coordinator: Germani, Aline
Instructors of Public Health Practice: Kalot, Joumana; Najem, Martine
Instructor: Kanj, Mayada

The mission of the Outreach and Practice Unit (OPU) is to advance public health practice at the Faculty of Health Sciences to impact the health of populations in Lebanon and the region. The OPU aims to facilitate the transfer of knowledge and skills in the field of public health, build community partnerships, develop human capabilities, advance service learning, and enhance the culture of collective responsibility.

The OPU fulfills its mission through the following activities:

- Evidence-based community interventions: OPU develops and implements community partnerships to promote individual and community health.
- Effective workforce development and continuing education: OPU offers diverse, multidisciplinary and financially sustainable training programs.
- Service learning: OPU facilitates service learning courses and provides students with venues to practice the knowledge learned in the classroom while providing a service to community.

The Unit Coordinator reports to the Dean of FHS. The OPU is supported by the academic departments at FHS and external resource persons.

OPU works closely with different local, national, regional, and international entities including but not limited to academic institutions, hospitals, UN agencies, NGOs, ministries and governmental agencies, professional associations, municipalities, and local communities in Lebanon and across the Arab World.
Faculty of Medicine and Medical Center (FM/AUBMC)
Faculty of Medicine and Medical Center (FM/AUBMC)

Historical Background

Since 1867, the date of the founding of the Faculty of Medicine, both the Faculty of Medicine and the Medical Center have been providing services in the realms of medical education, training, and health care to their immediate constituencies in Lebanon and the Middle East region continuously. To date the Faculty of Medicine has graduated 4,225 physicians and there is a large postgraduate training program of over 280 residents in most of the departments. The Faculty of Medicine programs have been approved by and registered in the Education Department of the State of New York on a continual basis since 1867. In 1957 the faculty became an institutional member of the Association of American Medical Colleges. It enjoyed this status until 1988, when the new rules of the association precluded membership of institutions outside the confines of the North American continent.

The AUB Medical Center has been accredited by the Joint Commission International (JCI) as of October 2007. Previously, the Medical Center was accredited by the US-based Joint Commission on Accreditation of Healthcare Organizations (JCAHO) from 1965 until 1983, when the civil war in Lebanon prevented review teams from continuing with their periodic site visits. The JCI is the international arm of the JCAHO. The National Board Examinations were administered to the faculty’s undergraduate students for credit between 1966 and 1982. The faculty was a regional center for the administration of the examinations of the Educational Commission for Foreign Medical Graduates between 1959 and 1993. In addition, the faculty takes pride in having had very close links with prestigious American medical schools and centers including Columbia University from 1945 to 1955, Harvard School of Medicine from 1955 to 1965, and a formal affiliation with the Johns Hopkins School of Medicine from 1965 to 1975 which was supported by the Commonwealth Fund.

The Faculty of Medicine and the Medical Center have revived and established a number of links and affiliations with the following:

- Columbia University College of Physicians and Surgeons for student elective exchange (since 2002)
- University of George Washington School of Medicine in Washington, DC (as of September 8, 2004)
- Medical University of South Carolina (MUSC) (as of April 1, 2003) for an MD–PhD program that admits up to three medical students annually from AUB/FM
- Johns Hopkins University School of Medicine (as of May 10, 2004) for collaboration in research, education, and the provision of medical services training
- University of Paris 7 Denis Diderot for cooperative cancer research (as of December 8, 2004)
- University of Poitiers (France) for cooperative neurosciences research (as of February 3, 2006)
- St. Jude Children’s Research Hospital (as of April 19, 2000)
- Laval University in Quebec, Canada
- M.D. Anderson Cancer Center (as of June 6, 2007)
- Palermo University (as of April 23, 2007) for cooperation in research and higher education
The Faculty of Medicine and the Medical Center (FM/AUBMC) are currently accredited by the following American-based accreditation bodies:

- The Middle States Commission on Higher Education
- The Joint Commission International (JCI) for hospital accreditation
- Accreditation of AUBMC by the Lebanese Ministry of Public Health
- Accreditation of the School of Nursing by the Commission on Collegiate Nursing Education (CCNE)
- Accreditation of the Nursing Services at AUBMC by the American Nurses Credentialing Center (ANCC)
- The College of American Pathologists (CAP)

In addition, the Faculty of Medicine with its Medical Center is a member of the following organizations:

- Alpha Omega Alpha (AOA) - Honor Medical Society (The Faculty of Medicine is the only member of the AOA outside North America since 1958)
- The American Medical College Application Service
- The American College of Physicians/American Society of Internal Medicine
- The Association of Program Directors in Internal Medicine

**Mission**

The mission of the Faculty of Medicine is to provide optimum, advanced, state-of-the-art, comprehensive, timely, and cost-effective medical education for each student. The faculty aims to reach this objective by implementing innovative teaching techniques, and by recruiting and retaining outstanding faculty and students. The faculty also strives for improved student performance and career opportunities, as well as improved basic and clinical research, more effective patient management, and new and innovative medical approaches. The faculty focuses on enhancing the regional and global reputation of the AUB Medical Center (AUBMC) by encouraging the development of additional centers of excellence, and developing more effective uses of physical resources and funds.

**Vision**

The vision of the Faculty of Medicine is to continuously upgrade the quality of education provided to its medical students and postgraduate physicians in the various medical and surgical subspecialties. This vision is implemented by the strong commitment of the faculty to educate young men and women to become excellent physicians with humane and high ethical standards, as well as technical expertise. The faculty also aims at providing a better environment for personal growth and recognition for all its students by inspiring them to become leaders in their fields. The Faculty of Medicine will always endeavor to provide opportunities for its students to develop individual initiative, creative ability, and professional leadership through participation in extracurricular seminars, discussion groups, research projects, and student organizations.

**Program Outline**

**Admission**

The Faculty of Medicine was established to give properly qualified candidates, particularly from Lebanon and the Near East, the opportunity for sound education in both the art and science of medicine. All applicants must hold a Bachelor’s degree and must have completed the premedical requirements as well as the Medical College Admission Test (MCAT). Applicants in their senior year expecting to graduate with a Bachelor’s degree in June are eligible to apply provided they have completed the premedical requirements and have taken the MCAT by the end of the first semester of their senior year. For applicants holding (or expecting) a Bachelors degree, consideration for acceptance is limited to students with a minimum cumulative general average of 75 percent in each of the following: 1) all courses, 2) the required premedical core courses, and 3) the major courses. For applicants from North American colleges, a minimum GPA of 3.2 is required. Applications from individuals holding (or expecting by June of the same year) a Master or a doctoral degree are encouraged. These applicants will be considered based upon their academic performance and their research productivity; in these cases, some of the premedical requirements may be waived depending on the field of study.

Interviews are granted to a selected group of applicants based on their MCAT scores and their academic achievement. Granting an interview does not necessarily imply that the applicant will be accepted. Students are accepted to medical school on the basis of their academic qualifications, their MCAT score, and the results of their interviews. In addition, due consideration is given to the applicants’ letters of recommendation from their teachers and mentors, their curriculum vitae, as well as their personal statements. Among the traits that the successful applicant will demonstrate are humanistic and ethical attitudes, good communication and interpersonal skills, emotional maturity and personal integrity. Previous experience in research, community service and volunteer work are considered positive attributes.

The Faculty of Medicine at AUB does not discriminate on the basis of age, gender, nationality, ethnic origin or religion.

The minimal premedical requirements are summarized below:

**A bachelor’s degree in any field of study.** Historically, the vast majority of applicants to the Faculty of Medicine have been holders of bachelor degrees in biology or chemistry. In an effort to diversify the pool of applicants, graduates from other majors are strongly encouraged to apply as long as they complete the premedical core courses required for admission to the Faculty of Medicine. Students can take some of the premedical courses as electives in their respective majors.

**Premedical core course requirements.** The minimal premedical requirements include biology with laboratory (7 credits), chemistry with laboratory (15 credits including 8 credits of organic chemistry), physics and basic electronics with laboratory (8 credits), English (6 credits at AUB or exemption), social sciences and/or the humanities (6 credits). To facilitate applications by non-science majors and from diverse fields of study, some courses taken in the Lebanese Baccalaureate Program may count towards fulfillment of the premedical core course requirements as detailed in Table 1. Table 2 presents the recommended courses depending on the major of study at AUB.
Biology 200 is a very general course that does not prepare students well for the MCAT. Biology 201 and 202 provide better preparation.

The new MCAT to be implemented in 2015 places significant emphasis on psychological and sociological concepts and on critical analysis and reasoning. Students planning to apply to medical school are advised to take PSYC 201 and SOAN 201, any two CS courses and PHIL 210.

Table 1: Premedical core course requirements and credit equivalents according to Lebanese Baccalaureate Program Subject

<table>
<thead>
<tr>
<th>Premedical Requirements</th>
<th>Required premedical credits</th>
<th>Lebanese Baccalaureate Credit Equivalents according to Program</th>
<th>Remaining credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Life Sciences</td>
<td>General Sciences</td>
<td>Economics and Sociology</td>
</tr>
<tr>
<td>Biology</td>
<td>7</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Chemistry</td>
<td>15</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Physics</td>
<td>8</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>English</td>
<td>8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CS/Humanities</td>
<td>6</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>12</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 2: Recommended premedical core courses according to field of study at AUB

<table>
<thead>
<tr>
<th>Premedical</th>
<th>AUB Courses</th>
<th>Biology Major</th>
<th>Chemistry Major</th>
<th>Physics Major</th>
<th>Other Majors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities</td>
<td>ENGL 203 (3 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>ENGL204 (3 Cr)</td>
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<tr>
<td>Biology</td>
<td>BIOL 101 (5 Cr) or equivalent</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>BIOL 201 (4 Cr)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>BIOL 200 (4 Cr) or BIOL 201 (4 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PHYS 103 (1 Cr) or PHYS 105 (1 Cr) or equivalent</td>
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<tr>
<td></td>
<td>PHYS 204 (1 Cr) + PHYS 204L (1 Cr)</td>
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<tr>
<td></td>
<td>PHYS 205 (1 Cr) or PHYS 205L (1 Cr)</td>
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<tr>
<td></td>
<td>PHYS 211 (1 Cr) + PHYS 211L (1 Cr)</td>
<td>X</td>
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<td>CHEM 211 (3 Cr)</td>
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<td>CHEM 212 (3 Cr)</td>
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<td>CHEM 225 (6 Cr)</td>
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</tbody>
</table>

MCAT. A competitive score in the MCAT, which may be taken twice only, is required. If taken twice, the higher score is considered. The MCAT score must be available at the time the application is submitted. Starting in 2015, a new MCAT will be implemented which contains, in addition to the biological and physical sciences, a whole new section on the social and behavioral sciences. Students are encouraged to review the content of the new MCAT and plan their studies accordingly, e.g., by taking additional courses in psychology, sociology and anthropology, and in biology, chemistry and physics, after consultation with their advisors.

Applicants expecting to receive a Bachelor degree after the deadline for application should be aware of the following:

Applicants must be in their senior year.
- The cumulative average of 70 credits or more (at the time of application) should be equal to or higher than 75 percent for students from AUB, or its equivalent for those from other universities. All required core courses must have been completed by the end of the fall semester of the senior year with an average of at least 75 percent or its equivalent. The cumulative average in the major courses completed by the end of the fall semester of the senior year must also be equal to or greater than 75 percent.
- Admission to medical school is contingent upon completion of graduation requirements and obtaining the Bachelor degree, which should be achieved by the end of the spring semester of the students’ senior year.

Applicants expecting to receive a Master or doctoral degree after the deadline for application should be aware of the following:
- A minimum cumulative grade average of 80 percent or its equivalent is required.
- Admission to medical school is contingent upon completion of graduation requirements and obtaining the Master or doctoral degree, which should be achieved by the end of the spring semester.

Conditional acceptance to the faculty is issued by the middle of April of the senior year and is finalized upon completion of the requirements for the Bachelor, Master or doctoral degree.

Graduation Requirements
To be eligible for the degree of Doctor of Medicine a student must satisfactorily complete the curriculum of the Faculty of Medicine and must be recommended by the Academic Committee. The degree may be granted with distinction to students who attain a grade of excellent in at least 50 percent of their credits, and with a grade of pass in no more than 20 percent of credits during the four years of the program.

The Faculty of Medicine offers post-graduate training positions in the various academic departments at AUBMC to AUB and non-AUB medical graduates. However, these positions are limited and are granted on a highly competitive basis.

Dean’s Honor List
To be placed on the dean’s honor list a student must be full-time and must not be repeating the year. The dean’s honor list is limited to the upper 15 percent of the class.
Academic Rules and Regulations

Also see General University Academic Information on pages 47–71.

Attendance

Regular attendance is required at lectures, laboratories, clerkships, examinations, and other assigned duties. Credit is not given for work not performed. Students absent on account of illness or other valid reasons are requested to confer with the chairmen of the departments concerned. Prolonged or repeated absences are reviewed by the committees concerned which will decide on the appropriate action to take.

Language Requirement

The language of instruction is English. However, students must have a speaking knowledge of Arabic before entering the third year. This requirement may be waived by special vote of the academic committee.

Promotions and Deficiencies

In the first year, the performance of students is normally evaluated as either Pass or Fail or as Excellent/Pass/Fail, based on absolute standards of grading. In later years, a student’s performance is evaluated as Excellent (E), Good (G), Pass (P), or Fail (F), based on normative grading. In the latter, the distribution of grades in a class is as follows: the top 10-15 percent E, the following 35-40 percent G, and the remaining 50 percent P. A student whose score falls distinctly below the class distribution will receive a grade of Fail. The evaluation of the student in each subject is based on total performance and not solely on the results of examinations.

The student’s performance is evaluated by appropriate class teaching committees, which make recommendations to the Academic Committee. The action of the Academic Committee is final. The class teaching committees and the Academic Committee give due consideration to a general evaluation of fitness for a career in medicine. Only those students who, in the opinion of the committees, give promise of being a credit to themselves, the faculty, and the medical profession are advanced.

To be promoted a student must attain a grade of pass or better in all courses or clerkships, and must be recommended by the committees concerned. However, with a grade of pass in all courses or clerkships may, at the discretion of the committees, be promoted on probation, be asked to do remedial work and pass the re-examinations in designated courses or clerkships, or repeat the year.

A student in the first or second year who fails 25 percent or more credits in that year may be asked to repeat the year or withdraw from the faculty. A student who fails less than 25 percent of credits may be asked to do remedial work and pass the re-examination, repeat the year, or leave the faculty. At the discretion of the committees concerned, and in exceptional cases, a student repeating the year may be asked to repeat all or some of the clerkships.

A student who is repeating a year and fails any course or does not attain a grade of good or better in 50 percent of credits will be asked to withdraw from the faculty.

A student who is placed on probation cannot graduate unless probation has been removed.

A student who fails less than 50 percent of credits may be asked to do remedial work and pass the re-examinations, repeat the year, or leave the faculty. At the discretion of the committees concerned, and in exceptional cases, a student repeating the year may be asked to repeat all or some of the clerkships.

Graduate Study in the Basic Medical Sciences

PhD in Biomedical Science

For general requirements about graduate study at AUB refer to the Admissions section on pages 33–46 of this catalogue.

In addition to the AUB general requirements for graduate study, the Faculty of Medicine graduate study requirements and regulations are as follows:

• Application and Notification of Acceptance. For application submission deadlines, please refer to page 36 Admissions section Application Procedures. For Admissions Decision Notification, please refer to page 36 Admissions section Application Procedures.

• Acceptance. The letters of acceptance are sent in duplicate and contain the category of the position offered, the registration period set during the last week of August, the date of the start of classes set at September 1, and a statement of acceptance or rejection of the position offered. Candidates must sign a copy of the above letter, indicating acceptance, and return it to the Office of Admissions no later than the second week in August. If acceptance letters are not signed and sent back by this deadline, positions will be re-assigned to candidates on the waiting list.

• Periods of Study. The graduate program, once initiated, proceeds without interruption through the first semester, the second semester, and the summer session.

• Transfer Students. Applicants who started a graduate program in other AUB faculties or at another recognized university can be accepted as transfer graduate students, subject to evaluation and approval of the departments and the Faculty of Medicine graduate committee. No more than a total of 9 credits of graduate course work from the previously covered program can be transferred. These courses are evaluated as satisfactory, are not assigned a numerical grade, and are not counted as part of the accrued average after the transfer.

• Membership of the Examining Committee. In addition to the university provisions outlined under Graduate Studies, the examining committee should include three members from the department concerned, one being the chairperson and one a member of the Faculty of Medicine graduate committee, selected by the student’s adviser who will be the third member of the committee.

• Categories of Graduate Students. The categories applicable at the University in general are also applicable in the Faculty of Medicine with the following modifications: regular graduate student status, applicable to students with a cumulative undergraduate average in the major field of study of at least 80 or its equivalent; graduate on special status, applicable to students with a cumulative undergraduate average in the major field of study or an overall average of 75 or higher but lower than 80 or equivalent. Graduates on probation status are transferred to regular status upon achieving an overall average of at least 80 in 9 credits of graduate courses within two semesters.

• Course and Thesis Requirements. Students must complete a minimum of 21 credits of graduate course work with a minimum general average of 80. Graduate students who intend
to apply to the medical program should complete 21 credits of graduate courses, 10 credits of which are not integral to the structured medical curriculum. Medical students and medical graduates who wish to join the MD–MS program are required to complete a minimum of 10 credits of graduate courses not integral to the structured medical curriculum, with a minimum general average of 80. Those with a degree in dental or veterinary medicine are required to complete a minimum of 15 credits of graduate course work. In addition, all students must pass a comprehensive examination and complete a thesis project equivalent to 9 credits. The thesis must be presented and defended to the satisfaction of the examining committee.

- **Approval for Graduation.** For graduation with the degree of Master of Science, a student’s performance must be approved by the advisor, the examining committee, the graduate committee, the academic committee, the Faculty of Medicine Assembly, and the University Senate.

- **Visiting Graduate Students:** visiting students accepted for training, applicable to students who pay a fee; and exchange students, applicable to students who participate in the graduate program in accordance with formal agreements between the Faculty of Medicine and other institutions. In all instances candidates must submit applications which are reviewed and acted upon by the graduate committee.

### Leave of Absence

All graduate students are expected to make steady and satisfactory progress toward the completion of degrees. Students who are not enrolled for a period of more than 12 months will be considered to have withdrawn from the program unless they apply for a leave of absence and secure approval from the department, Faculty/School Graduate Studies Committee, and Graduate Council.

The leave of absence application can be up to one year at a time. The maximum period of approved leave of absence is for two years. An approved leave of absence does not count towards maximum residency. Non-enrollment by the student for one semester without securing leave of absence will count towards maximum residency.

Students who seek to return without having secured leave of absence approval after non-enrollment period of 12 months must reapply and will be considered for readmission following regular AUB application/admission procedures.

If re-admitted into the same graduate program then their earlier status as graduate student will count towards maximum residency.

The Leave of Absence Application Form should normally be submitted to the respective department/faculty at least one month prior to beginning of the semester in which absence is planned.

### Courses

#### Numbers Preceding Course Titles

Courses required for the Doctor of Medicine degree are numbered 200 to 299 as follows:

- 200 to 219 indicate courses given in first year medicine
- 222 to 239 indicate courses given in second year medicine
- 240 to 259 indicate courses given in third year medicine
- 260 to 279 indicate courses given in fourth year medicine
- 280 to 299 are reserved for clinical clerkships during the year of internship

For the first and second years, odd numbers refer to first semester courses and even numbers to second semester courses. Year courses are indicated by a hyphen between the two numbers.

- Graduate courses leading to the Master’s and Doctor of Philosophy degrees are numbered 300 to 399.
- Regular medical courses approved for graduate work (MS and PhD program) have two numbers.
- Numbers preceded by the letters ID (Interdepartmental) or FM (Faculty of Medicine) indicate integrated courses taught by two or more departments together.

### Numbers Following Course Titles

- The first number following the title of a course indicates the total number of lectures, conferences, and discussion hours given, except where otherwise stated.
- The second number indicates the total laboratory or clinical practice hours, except where otherwise stated.
- The third number indicates the number of semester credit hours. Credit hours are used in conjunction with first and second year courses only.

### Course Descriptions

All the following courses, except those listed as electives, are required of students working toward the degree of Doctor of Medicine. The electives designated may be chosen with the consent of the instructor. Detailed course descriptions are available under individual departments.

### Curricula

<table>
<thead>
<tr>
<th>First Year</th>
<th>No. of Weeks</th>
<th>Lecture and Clinical Recitation</th>
<th>Laboratory or Clerkship Hrs.</th>
<th>Total Hrs.</th>
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<th>No. of Weeks</th>
<th>Lecture and Clinical Recitation Hrs.</th>
<th>Clerkship Hrs.</th>
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<td>INMD 262</td>
<td>Clinical Clerkship</td>
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<td>NEUR 262</td>
<td>Clinical Clerkship</td>
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<tr>
<td>PEDT 267</td>
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<td>-</td>
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<td>2 selectives in any of the following: Dermatology, Radiology, Ophthalmology, Otolaryngology or Surgical Specialty</td>
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<td>360</td>
<td>360</td>
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</table>

### Interdepartmental Teaching

#### First Year

**IDTH 201**  Cellular and Molecular Basis of Medicine  90.40; 7 cr.

An interdisciplinary course that presents the cellular and molecular concepts and principles that underlie the normal structure and function of the human body. It covers cellular structure and function, including mechanisms and regulation of gene expression, protein synthesis, structure and function, signaling mechanisms, membrane transport, energy metabolism, contractility, and excitability, and the basic principles of drug action. Clinical examples and correlations are presented to illustrate the relevance of cellular and molecular function to medicine.

**IDTH 202**  Clinical Anatomy  38.110; 6 cr.

A regional dissection of the entire human body supplemented by embryology, clinical lectures, and discussions. The student is also introduced to radiographic anatomy based on various imaging modalities, in addition to computer-assisted instruction.

**IDTH 203**  The Immune System in Health and Disease  37.28; 3 cr.

Deals with the immune system’s responses in states of normalcy and disease, from the molecular to the clinical level, and covers the pathophysiology, clinical manifestations, diagnosis and management of major rheumatologic diseases.

**IDTH 204**  Basic Pathological Mechanisms  29.14; 2 cr.

Covers the basic pathological mechanisms of disease at the cellular and molecular levels, their microscopic, gross and clinical manifestation, and some pharmacological interventions that apply to them.
IDTH 205 Microbiology and Infectious Diseases 56.44; 5 cr.
Provides the principles and concepts of basic and medical microbiology. Emphasis is placed on the basic properties, pathogenesis, preventive measures and laboratory diagnosis of bacteria, viruses, parasites and fungi, and the clinical outcome, management and treatment of patients infected by these etiologic agents.

IDTH 210 Fundamentals of Medical Research 40.10; 3 cr.
Provides first year medical students with their first exposure to research methodology. Fundamental principles and concepts of evidence-based medicine, epidemiology and biostatistics are presented and discussed.

IDTH 211 The Blood 30.30; 3 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the blood and lymphatic systems. Concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of the blood.

IDTH 212 Endocrinology and Reproduction 46.36; 4 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the endocrine and reproductive systems. Concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of the endocrine and reproductive systems.

IDTH 213 Becoming a Doctor-1: Clinical Skills - I 20.80; 4 cr.
Introduces students to the art of medicine: communication skills, history taking, physical examination and clinical reasoning.

IDTH 214 Becoming a Doctor-2: Physicians Patients and Society - I 19.19; 2 cr.
Explores the place of medicine, illness, suffering and the human body in human culture expressed through art, literature and history of medicine, and through close encounters with patients.

IDTH 215 Becoming a Doctor-3: Global Health and Social Medicine 21.21; 2 cr.
Introduces students to central issues in the practice of social medicine and global health and the connection between them. It examines how social forces become embodied as pathologies, how political, economic, and historic trends influence the distribution of disease among different populations, and how new trends in the organization of care affect the most vulnerable members of society.

IDTH 216 Becoming a Doctor-4: Learning Communities 0.36; 1 cr.
Covers topics and issues important for the personal and professional development of students, with emphasis on reflection. Students are encouraged to make use of experiences for shared learning, and to develop a sense of community and belonging, thus promoting well-being.

IDTH 206/207 Social and Preventive Medicine 34.46; 4 cr.
A course that explores the inter–relationships among the patient, the physician, and society. This course is divided into two parts. The first is a lecture and discussion series (2 credits) that examines health and disease, the social and individual determinants of health, healthcare systems, and the patient–physician relationship. The second part (2 credits) is a field project during which students investigate a health issue at the level of the community.

IDTH 208 Basic Neuroscience 62.54; 6 cr.
A course that covers the study of structure and function of the human nervous system. Six weeks. Annually.

IDTH 209 Problem Based Learning 0.56; 2 cr.
Problem based multi-disciplinary seminars in which students interactively discuss clinical problems in small groups under the supervision of a facilitator.

Second Year

IDTH 221/222 Introduction to Medicine 108.72; 9 cr.
See Department of Internal Medicine. Annually.

IDTH 223/224 Physical Diagnosis 36.108; 3 cr.
See Department of Internal Medicine. Annually.

Fourth Year

IDTH 268 Clerkship in Preventive Medicine and Public Health 10.80
In this clerkship, teams of senior medical students assess, critique, and propose solutions to problems of public health or clinical significance. The students examine policy, organizational, social, and individual challenges to these problems, addressing issues such as equity in health and setting public health programs, and identifying opportunities for change. Data collection and statistical analysis are secondary objectives.

IDTH 264 Capstone Course 10.70
The two-week course aims to provide students with an opportunity to reflect on their undergraduate experience and the personal, social, emotional and practical issues of transition beyond medical school and graduate training or professional career. It deals with issues of ethics, law, insurance, social medicine, professionalism, life-long learning among many others.

Graduate

IDTH 301 Introduction to Medical Science Literature 16.32; 2 cr.
A multidisciplinary approach to the use of medical science publications (open to beginning graduate students in the Faculty of Medicine).

IDTH 302 Methods 16.64; 3 cr.
Theory and practice of techniques used in the various disciplines of medical sciences.

IDTH 303/ 304/305/306 Integrated Graduate Course I–IV 32 0; 2 cr. (each)
An integrated lecture seminar course introducing graduate students to the thinking in various medical science disciplines (required of all PhD students in the Faculty of Medicine). Four semesters. One two–hour session a week each.

IDTH 307 Biomedical Electronics 32.16; 3 cr.
An introductory course in electricity and electronics as applied to biology and medicine. Alternate years.

IDTH 308A Neuroanatomy 31.27; 3 cr.
A course similar to the first part of 208, offered to graduate students, covering the normal structure of the human nervous system. See Department of Human Morphology. Three weeks.
IDTH 308B  Neurophysiology  31.27; 3 cr.
A course similar to the second part of 208, offered to graduate students, covering the function of the human nervous system. See Department of Physiology. Three weeks.

IDTH 309  Biology of Nerve and Muscle  48.0; 3 cr.
A multi–disciplinary study of anatomy, physiology, biochemistry, pharmacology, and pathology of nerve and muscle. Alternate years.

IDTH 310  Basic Pathological Mechanisms  29.14; 2 cr.
Covers the basic pathological mechanisms of disease at the cellular and molecular levels, their microscopic, gross and clinical manifestation, and some pharmacological interventions that apply to them.

IDTH 311  Foundations of Biomedical Science  90.40; 7 cr
An interdisciplinary course that presents the cellular and molecular concepts and principles that underlie the normal structure and function of the human body. It covers cellular structure and function, including mechanisms and regulation of gene expression, protein synthesis, structure and function, signaling mechanisms, membrane transport, energy metabolism, contractility, and excitability, and the basic principles of drug action.

IDTH 317  Perspectives in Medical Sciences  32.0; 2 cr.
A course of selected readings and seminars in the history, philosophy, and methodology of medical and related sciences.

IDTH 319/320  Integrated Research Seminars  16.0; 1 cr. (each)
Participation of all PhD students and professors.

IDTH 330  Medical Pedagogy  3 cr.
A tutorial in teaching methods and practical experience under supervision. Open to PhD candidates only.

IDTH 333/334  Projects  2 cr. (each)
Two months half-time in a department other than the student’s major occurring toward the end of the PhD candidate’s residency.
Department of Anatomy, Cell Biology and Physiological Sciences

Chairperson: Saadé, Nayef
Professors: Bikhazi, Anwar; Birbari, Adel; El-Sabban, Marwan; Jurjus, Abdo; Mourad, Fadi; Saadé, Nayef
Assistant Professors: Abou-Kheir, Wassim; Daoud, Georges; Eid, Assaad; Nasr, Rihab; Zeidan, Asad;
Visiting Associate Professor: Khouri, Nabil
Visiting Lecturer: Oueidat, Doureid
Associates: Barada, Kassem; Bazarbachi, Ali; Chidiac, Jose; Kibbi, Abdul-Ghani; Rebeiz Abdallah; Saab, Raya

The Department offers three programs of study: Anatomy and Cell Biology, Physiology, and Basic Neuroscience. Each program provides courses to medical students, graduates, paramedical and undergraduate students.

The graduate program is a broad one leading to the MS degree in Human Morphology (Anatomy and Cell Biology), Physiology and in Neuroscience. Students with a BS degree or its equivalent, in mathematics, biology, physics, and chemistry, as well as advanced courses in physiology and other medical science disciplines, are eligible to apply. The department may ask for specific prerequisites in certain disciplines such as biology and chemistry as deemed necessary.

Anatomy and Cell Biology

**HUMR 207  Gross Anatomy 24.198; 7 cr.**
A regional dissection of the entire human body supplemented by embryology, clinical lectures, and discussions. The student is also introduced to radiographic anatomy based on various imaging modalities, in addition to computer-assisted instruction. *Required of all medical students.*

**HUMR 208  Neuroanatomy 32.30; 3 cr.**
A functional study of the anatomical organization of the human central nervous system.

**HUMR 209  Basic Histology 58.69; 6 cr.**
A study of the cells, tissues, and organs of the human body at the level of the light and electron microscopes, utilizing traditional and advanced methodologies. Structure is related to function with some clinical application. *Required of all medical students.*

**HUMR 246  Human Morphology for Paramedical and Undergraduate Students 32.32; 3 cr.**
An introduction to basic gross anatomy and histology. Offered to Nurses and other undergraduate students.
### Department of Anatomy, Cell Biology and Physiological Sciences

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUMR 305</td>
<td>Cell and Tissue Biology</td>
<td>30.33; 3 cr.</td>
<td>A course that consists of the first half of Basic Histology, HUMR 209, covering basically cells and tissues. Open to graduate students outside the department.</td>
</tr>
<tr>
<td>HUMR 306</td>
<td>Organ Histology</td>
<td>28.36; 3 cr.</td>
<td>A course that consists of the second half of Basic Histology, HUMR 209, covering organs and systems. Open to graduate students. Prerequisite: HUMR 305 or its equivalent.</td>
</tr>
<tr>
<td>HUMR 307</td>
<td>Gross Anatomy</td>
<td>28.39; 3 cr.</td>
<td>The neuroanatomy component of Neuroscience, IDTH 208. Offered to graduate students.</td>
</tr>
<tr>
<td>HUMR 308A</td>
<td>Neuroanatomy</td>
<td>58.69; 6 cr.</td>
<td>Similar to HUMR 209. Offered to all graduate students in the department.</td>
</tr>
<tr>
<td>HUMR 309</td>
<td>Basic Histology</td>
<td>28.46; 3 cr.</td>
<td>A guided laboratory course in research methods used in cell biology and physiology. Open to graduate students. The course is made up of three modules that can be selected all or as one module per speciality as follows:</td>
</tr>
<tr>
<td>HUMR 310 A</td>
<td>Cell Biology Techniques</td>
<td>10.15; 1 cr.</td>
<td></td>
</tr>
<tr>
<td>HUMR 310 B</td>
<td>Genomics and Proteomics</td>
<td>10.15; 1 cr.</td>
<td></td>
</tr>
<tr>
<td>HUMR 310 C</td>
<td>Mouse Models and in vivo Studies</td>
<td>8.16; 1 cr.</td>
<td></td>
</tr>
<tr>
<td>HUMR 312</td>
<td>Anatomy Tutorial</td>
<td>0.64; 2 cr.</td>
<td>A guided literature review of special research topics.</td>
</tr>
<tr>
<td>HUMR 313</td>
<td>Directed Reading and Research</td>
<td>0.32-66; 2 cr.</td>
<td>Specific reading and research assignments under supervision of an adviser. At the discretion of the thesis supervisor.</td>
</tr>
<tr>
<td>HUMR 314/315</td>
<td>Research Seminar</td>
<td>0.32; 1 cr.</td>
<td>Presentation and discussion of timely research topics designated by members of the department.</td>
</tr>
<tr>
<td>HUMR 316</td>
<td>Principles of Electron Microscopy</td>
<td>32.0; 2 cr.</td>
<td>Lectures, on, and demonstration of, basic techniques of electron microscopy. Alternate years.</td>
</tr>
<tr>
<td>HUMR 318</td>
<td>Principles of Histochemistry</td>
<td>16.48; 3 cr.</td>
<td>Lectures, demonstrations, and laboratory work related to the principal techniques of histochemistry, including immuno-histochemistry. Prerequisite: HUMR 305 or HUMR 309.</td>
</tr>
<tr>
<td>HUMR 319</td>
<td>Biology of Nerve and Muscle</td>
<td>48.32; 4 cr.</td>
<td>Equivalent to IDTH 309. See Interdepartmental Teaching. A course that includes the embryology component of HUMR 207, the whole of HUMR 246, and an experimental anatomy part.</td>
</tr>
<tr>
<td>HUMR 346</td>
<td>Human Morphology for graduate students</td>
<td>48.32; 4 cr.</td>
<td>A course that includes the embryology component of HUMR 207, the whole of HUMR 246, and an experimental anatomy part.</td>
</tr>
</tbody>
</table>

### Physiology

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYL 200</td>
<td>Homeostasis</td>
<td>32.6; 2 cr.</td>
<td>A course that studies the internal environment and its physiological regulation by two homeostatic organs: the lungs and the kidneys. Didactic lectures cover the physiology of the topic, treating internal environment, homeostasis and feedback mechanisms, the lung, the kidney, and electrolytes.</td>
</tr>
<tr>
<td>PHYL 202</td>
<td>Cardiovascular Physiology</td>
<td>31.6; 2 cr.</td>
<td>A course in which the cardiovascular system is presented with clear reference to pathophysiological and clinical events. Didactic lectures and seminar sessions define physiological concepts and emphasize structure-function relationships. Laboratory sessions familiarize the student with instrumentation and techniques in the cardiovascular field.</td>
</tr>
<tr>
<td>PHYL 204</td>
<td>Metabolism</td>
<td>32.12; 3 cr.</td>
<td>A course that covers the physiology of the gastrointestinal tract, metabolism and its regulation by the endocrine system, and reproduction. This course consists of lectures, conferences, and discussion sessions.</td>
</tr>
<tr>
<td>PHYL 208</td>
<td>Neurophysiology</td>
<td>31.27; 3 cr.</td>
<td>A course that investigates the physiology and various functions of the human nervous system.</td>
</tr>
<tr>
<td>PHYL 210</td>
<td>General Physiology: Cellular Mechanisms</td>
<td>32.16; 3 cr.</td>
<td>A course on aspects of membrane transport processes across symmetrical and asymmetrical cell membranes, electrophysiology, membrane potentials, action potentials in excitable cells, synaptic transmissions, and excitation-contraction coupling in muscles.</td>
</tr>
<tr>
<td>PHYL 246</td>
<td>Human Physiology for Paramedical and Undergraduate Students</td>
<td>48; 4 cr.</td>
<td>A course that outlines fundamental principles of human physiology and the mechanisms governing the function of different body organs. Prerequisites: BIOL 246 and, BIOL 201 (or BIOL 210).</td>
</tr>
<tr>
<td>PHYL 300</td>
<td>Homeostasis</td>
<td>32.6; 2 cr.</td>
<td>Similar to PHYL 200. Offered to graduate students.</td>
</tr>
<tr>
<td>PHYL 302</td>
<td>Cardiovascular Physiology</td>
<td>32.6; 2 cr.</td>
<td>Similar to PHYL 202. Offered to graduate students.</td>
</tr>
</tbody>
</table>
Neuroscience

**IDTH 208  Basic Neuroscience**  
See Interdepartmental Teaching.

**HUMR 308A  Neuroanatomy**  
The neuroanatomy component of Neuroscience, IDTH 208. Offered to graduate students.

**PHYL 308B  Neurophysiology**  
Similar to PHYL 208 and to IDTH 308B. Offered to graduate students.

**HUMR 261 or PHYL 261  Elective in Basic Neuroscience**  
0.180-360  
Open to Medicine III and IV students, graduate students in the combined MS-MD program and visiting medical students. The objective of this elective is to involve the students in a basic research project as part of the on-going studies in the neuroscience research laboratories of the Department.

**IDTH 395A/B  Comprehensive Exam**  
Prerequisite: Consent of Adviser.

---

**PHYL 304  Metabolism**  
Similar to PHYL 204. Offered to graduate students.

**PHYL 308  Neurophysiology**  
Similar to PHYL 208 and to IDTH 308B. Offered to graduate students.

**PHYL 310  Cell Physiology and Biophysics**  
Similar to PHYL 210. Offered to graduate students.

**PHYL 311-312  Advanced Physiology**  
A guided study (experimental and theoretical) of the literature of the major topics in physiology. This course is conducted as a seminar.

**PHYL 313-314  Physical Methods in Physiological Research**  
A guided laboratory course of the physical methods used in the major branches of physiology.

**PHYL 317  Perspectives in the Physiological Sciences**  
A course on the study of selected readings and seminars in the history, philosophy, and methodology of the physiological sciences designed to give the student a broad view of the field of biology and its implications in everyday life.

**PHYL 324  Electrophysiology of Excitable Cells**  
A course on the study of the basic mechanisms of membrane cable property and resting potentials in all cells, action potential initiation and propagation in excitable cells, receptor physiology, central synaptic transmission, neuromuscular transmission, and muscular contraction.

**PHYL 390  Directed Reading and Research**  
Assignments based on the research interests of the graduate student and the adviser, aimed at formulating an original research project.

**PHYL 391-392  Projects in Physiology**  
A physiological literature survey covering a given subject in the field.

**PHYL 395A/B  Comprehensive Exam**  
Prerequisite: Consent of Adviser.

**PHYL 399  MS Thesis**  
A/B/C/D/E  
Original research under staff supervision, leading to the MS degree.

**PHYL 260  Elective in Physiology**  
An elective that covers one or more areas of physiology such as special physiologic techniques, general physiology, experimental gastroenterology, experimental neuroscience, and the physiology of cardiac and vascular smooth muscles. One to two months.
Department of Anesthesiology

Chairperson: Kanazi, Ghassan
Professors Emeriti: Baraka, Anis; Muallem, Musa
Professors: Aouad-Maroun, Marie; Ayoub, Chakib; Jabbour-Khoury, Samar; Kanazi, Ghassan; Khatib, Mohammad; Sibai, Abdel-Nour; Siddik-Sayyid, Sahar;
Associate Professors: Louis, Faek; Lteif, Antoine; Taha, Samar
Assistant Professors: Dabbous, Aliya; Kaddoum, Roland; Nauphal, Maud
Instructors: Rizk, Marwan; Zeeni, Carine
Clinical Associates: Aghadjanian-Karam, Anne Marie; Rouhana, Corine

The Department of Anesthesiology offers a clinical clerkship to fourth year medical students. At the graduate level it offers a four-year residency program, and a 1 year clinical fellowship in cardiovascular anesthesia.

**ANES 267 Clinical Clerkship**
A clinical clerkship offered to fourth year medical students, consisting of instructive lectures given by attending on practical aspects of anesthesiology and pain, as well as, cardiopulmonary resuscitation training along with a BLS certificate by AHA and two simulation sessions on intraoperative complications. In addition, there is a clinical training on airway control, intravenous line insertion and different types of anesthesia in the operating room, as well as training in pain management in the acute postoperative period and postoperative complications.

**ANES 268 Elective in the Subspecialties of Anesthesia**
Residents rotate in one or more of the subspecialties of anesthesia. Students rotate in the operating room focusing on airway control, intravenous insertion and general patient management during general anesthesia along with the different types of anesthesia administered to patients.

**ANES 269 Elective in Respiratory Therapy**
Rotation through the various fields covered by respiratory therapy.
Department of Biochemistry and Molecular Genetics

Chairperson: Jaffa, Ayad
Professors: Al-Aqeel, Aida (Adjunct); Boustany, Rose-Mary; Darwiche, Nadine; Habib-Abdul Karim, Aida; Jaffa, Ayad; Usta, Julnar; Ziyadeh, Fuad
Associate Professor: Nemer, Georges
Assistant Professors: Kobeissy, Firas; Kurban, Mazen
Associates Karam, Pascale; Melhem, Nada; Yazbek, Soha

The Department of Biochemistry offers undergraduate courses to nursing students and graduate courses to medical students and graduate students in the graduate program leading to a master's degree (MSc).

The requirements for admission to the graduate program are a BA or BS degree from a university and an academic record with a cumulative grade average of 80 and above in major courses. Students should have a background in chemistry, biology, or a related medical science. The graduate program consists of a minimum of two years including didactic, interactive, and practical training leading to the Master of Science degree. Students must finish 21 credits of graduate courses; pass a comprehensive exam; and submit a thesis based on independent research. The 21 credits of graduate courses include a total of 15 credits of required courses and 6 credits of elective courses.

Required courses include: BIOC 300 (6 cr.); BIOC 302 (3 cr.); BIOC 325 (2 cr.); HUMR 305 (3 cr.) and MBIM 310 (3 cr.).

BIOC 246 Biochemistry for Nursing 60.0; 4 cr.
A course that provides an introduction to basic concepts in biochemistry. It discusses the main biochemical pathways in the cell and defines the interrelations between the different metabolic pathways. The course is composed of three units: (a) general chemistry (b) organic chemistry (c) biochemistry. Offered to BS Nursing and is open to undergraduates in related sciences. Prerequisite: none. First semester.

BIOC 255 Biochemistry for MLTP 45.0; 3 cr.
A course that provides an overview of structure, function, and metabolism of basic biological micro/macro molecules; a general review of the genetic makeup; and emphasizes the clinical relevance by correlating disease to basic information. The course is an introductory biochemistry course, offered to undergraduate students in the Medical Lab Technology Program and related fields. Second semester.

BIOC 300 Basic Biochemistry 72.44; 6 cr.
A course that provides students with a coherent account of biochemistry and molecular biology, correlating clinical disorders with basic concepts. This course describes the living cell as a physiochemical, highly organized system that is precisely controlled, self-reproducing, and energy-generating. Homeostatic mechanisms, steady state, and molecular biology are fully described. Offered to medical students and graduate students. First semester.
BIOC 302  Developmental Biochemistry 48.0; 3 cr.
A course that discusses the pre- and post-natal development of cardiac and skeletal muscles as well as hemopoiesis. This course is a mix of didactic lectures and interactive teaching. Each topic is presented by a faculty member and further illustrated by an article discussed by the students. The course is required by all graduates in biochemistry. Open to graduate students from other departments. Prerequisite: BIOC 300 or the consent of the coordinator. Second semester.

BIOC 303  Molecular Biology of Cancer 48.0; 3 cr.
A course that deals with the regulatory mechanisms of tumor cell growth and cancer formation at the cellular, molecular, genetic, and epigenetic levels. This course includes a discussion of recent developments in the intra- and/or inter-cellular mechanisms involved in cellular proliferation, cell death, invasion, and metastasis. Open to all graduate students in basic sciences and biology. Second semester.

BIOC 305  Biochemical Research 48.0; 3 cr.
An elective course that discusses the theoretical basis of ongoing research projects. This course consists of didactic lectures, student presentation, and written assignments on novel aspects related to each topic. The course is open to all graduate students. Prerequisite: Basic Biochemistry (BIOC 300) or consent of coordinator. Summer.

BIOC 306  Mediators in Vascular Biology and Inflammation 32.0; 2 cr.
An elective course that describes the different eicosanoids and their role in vascular biology and in mediating inflammation. Open to graduate students in basic medical sciences, biology, and to medical doctors who want to enhance their knowledge in the field. Second semester or summer.

BIOC 307/308  Biochemical Methods 0.128; 4 cr. (each)
A course that focuses on the basic principles and applications of the techniques of molecular biology, spectrophotometry, and chromatography. Open to all graduate students. Prerequisite: BIOC 300, or a background in biology. Summer, alternate years.

BIOC 309  Proteins and Enzymes 22.20; 2 cr.
An elective course open to all graduate students either as 2 credits or as 1 credit as 309A/309B, respectively. This course is composed of two units. Unit I: Protein Architecture discusses the stabilizing forces directing protein folding and thus conformation, introducing students to the various existing protein data banks. Unit II: Discusses the different kinetic approaches that may be used in studying the kinetic analysis of complex biological systems. Prerequisite: a biochemistry course and/or consent of coordinator. Summer, alternate years.

BIOC 310  Molecular Basis of Genetic and Metabolic Disorders 16.32; 2 cr.
A course that deals with the molecular basis of genetic and metabolic disorders. This course presents a detailed overview of the molecular basis of known genetic diseases. Students also learn the methods used to map chromosomal aberrations or DNA mutations implicated in congenital diseases. Elective. Open to non-biochemistry majors. Prerequisite: Basic Biochemistry or a background in biology. Second semester, alternate years.

BIOC 311/312  Biochemistry Tutorial 32.0; 2 cr. (each)
Students are assigned special topics (2) of current interest and are required to write a report evaluating the current status of the chosen subject. Open to biochemistry graduate students. First and second semesters and summer.

BIOC 313  Advanced Biochemistry 30.36; 3 cr.
A course that deals with the latest developments in molecular biology techniques and troubleshooting with hands-on bench experience. Elective. Open to all graduate students. Prerequisite: Basic Biochemistry or a background in biology. Second semester and summer.

BIOC 314  Mitochondria: Genetics, Protein, and Disease 32.0; 2 cr.
A course that provides a clear understanding of the biochemistry, molecular genetics, and bioenergetics of the mitochondria. It emphasizes the role of the mitochondrial dysfunction (mt-DNA mutations, environmental toxins) in the pathogenesis of mitochondrial diseases. Elective. Open to all graduate students in basic sciences and biology graduates. Second semester, summer.

BIOC 315  Microscopic Biochemistry 20.40; 3 cr.
A course that introduces students to histochemical techniques and microscopic analysis. This includes embryonic dissection, antibody staining, in situ hybridization and whole mount hybridization. The course is composed of lectures and lab sessions. Open to all graduate students in basic sciences and related fields. Second semester, alternate years.

BIOC 316  Bioinformatics 0.30; 1 cr.
A course that introduces students to the latest bioinformatics literature. The format is a journal club in which recent journal articles are circulated and discussed. Guest lecturers are invited to present research related to the field. Students are also given an orientation on software currently available in the Computational Science and Bioinformatics Lab. Open to both basic medical science, and arts and sciences graduate students. Prerequisite: graduate standing.

BIOC 317 (a-k)  Selected Topics in Biochemistry 16.0; 1 cr.
A series of elective courses (a-i), each 1 credit. Each course emphasizes the basic concepts and introduces recent developments in the fields of (a) proteins; (b) carbohydrates (c) lipids (d) molecular biology; (e) cancer; (f) apoptosis; (g) cyclooxygenase and lipooxygenase; (h) Biochemical Toxicology; (i) congenital heart problems; (j) special techniques in biochemistry: PCR, sequencing, transfection, Elisa, FPLC, SDS-PAGE, western blotting; (k) Copper metabolism: Wilson's Disease. The course is open to medical doctors, graduates in medical and related fields. The consent of the coordinator is required. No prerequisite offered during the second semester and summer session.

BIOC 395A/B  Comprehensive Exam 0 cr.
Prerequisite: Consent of Adviser.

BIOC 399  MS Thesis 9 cr.
A 9 credit hour course in which students conduct original research under staff supervision. The projects center around enzymology of ATPase, molecular mechanisms of inflammation, congenital heart problems, Wilson's disease, epilepsy, apoptosis, and cyclooxygenase.

BIOC 311  Nucleic Acids and Basic Genetics 15.0; 1 cr.
This course discusses the principles of nucleic acids structure and function in eukaryotes. It includes the information for basic genetics in terms of genome structure as well as the diversity of gene regulation. Open to all MS and PhD students in biomedical sciences. Requires coordinator approval for other graduate disciplines. First semester.
BIOC 322  Protein Biochemistry  10, 10; 1 cr.
This course deals with the biochemistry of proteins including their basic units, different structures, folding process and protein-protein interactions. It focuses on how changes at the structural level modify function. The course also covers the principles of protein purification and sequencing and introduces students to protein database, molecular modeling and systems biology. Open to all MS and PhD students in biomedical sciences. Requires coordinator approval for other graduate disciplines.  First semester.

BIOC 323  Cellular Metabolism and Regulation  25,10; 2 cr.
The course provides a coherent account of structural and metabolic biochemistry. It emphasizes basic concepts of dynamic state and regulatory mechanisms that allow conflicting pathways and reactions to occur while maintaining homeostasis at the organ and interorgan levels. Open to all MS and PhD students in biomedical sciences. Requires coordinator approval for other graduate disciplines.  First semester.

BIOC 325  Receptors and Signal Transduction  25, 10; 2 cr.
This course covers classical pathways involved in receptor signaling and activation of downstream targets and the molecular mechanisms involved. It deals with the inter- and intracellular communication, from the generation of signaling molecules through the cellular responses. Requires coordinator approval for other graduate disciplines.  First semester.

BIOM 491  PhD Laboratory Rotations  0, 30; 1 cr.
During the first year of study, PhD students in Biomedical Sciences must take a minimum of two laboratory rotations (1 credit each) in different faculty research laboratories within the Faculty of Medicine. Students may also enroll in the summer in a third elective laboratory rotation (1 credit). This course aims to familiarize students with potential thesis mentors and to expose them to different research environments. Open to PhD students in Biomedical Sciences.  First and second semesters and summer.
Department of Dermatology

Chairperson: Kibbi, Abdul-Ghani
Professors: Kibbi, Abdul-Ghani; Rubeiz, Nelly; Zaynoun, Shukrallah (Clinical)
Associate Professors: Ghosn, Samer; Malak, Johnny (Clinical); Matta-Muallem, Muna (Clinical)
Assistant Professors: Abbas, Ossama; El-Tal, Abdel Kader; Kurban, Mazen
Clinical Associates: Abd-el-Baki, Jasmin; Dahdah, Maurice; El-Saad-Debahy, Nada; Salman, Salah

The Department of Dermatology participates in the courses of Basic Histology (HUMR 209) given to Medicine I students as well as Introduction to Medicine (IDTH 221/222) given to Medicine II students. Elective clerkships are also available for Medicine IV students, interns, and housestaff, as well as for foreign medical students and graduates. A three-year residency training program in dermatology, accredited by the Arab Board of Medical Specializations and its Scientific Council of Dermatology and Venereology, is offered to MD graduates following one year of internship. The goal of the training program is to produce fully competent dermatologists capable of providing a broad spectrum of quality care to patients. Residents in training are involved in daily general and specialty clinics, including phototherapy, contact dermatitis, dermatologic surgery, skin oncology, hair and nail, and connective tissue clinics.

An equivalent tuition fee-based residency training program is also open to foreign medical graduates. All candidates must be holders of the MD or its equivalent from a recognized university. The DEAN’S EXAM, administered by the Faculty of Medicine’s office at the American University of Beirut during the month of March, is a prerequisite before applications are considered. Candidates are exempted from this exam if they have successfully passed the clinical part of USMLE.

DERM 267  Elective in Dermatology 9.90-180.
Students participate in the morning clinics (general dermatology) and afternoon clinics (specialty clinics including hair and nail and genodermatoses clinics), as well as seminars, conferences, journal club, and assignments of audio-visual teaching material. Students can participate in on-going clinical research programs. At the end of the one-month rotation, a final examination is offered to students. One month.

DERM 287  House staff 9.131-262.
Same as DERM 267, offered to straight and rotating interns and residents of other departments on an elective basis. One month.

Weekly Conferences

Monthly Conferences
Consultation review, attending staff lecture, research meeting, and basic science journal club. For further details go to the Department of Dermatology web site at www.aub.edu.lb/~webderm.
Department of Diagnostic Radiology

Interim Chairperson: Hourani, Mukbil
Professors: Al-Kutoubi, Aghiad; Haddad, Maurice; Hourani, Mukbil
Associate Professors: Birjawi Ghina; Hourany-Rizk, Roula; Khoury, Nabil
Assistant Professors: El-Merhi, Fadi; El-Zein, Youssef; Haydar, Ali
Instructor: Nassar, Lara
Clinical Associates: Abi Fakher-Saab, Faysal; El-Zein, Chirine

The Department of Diagnostic Radiology offers elective clerkships to medical students, interns and residents and a four-year residency training program.

DGRG 267  Introduction to Diagnostic Radiology  22.158.
Tutorials within department and attendance of scientific activities. Open to third and fourth year medical students. Four weeks.

DGRG 268  Advanced Elective in Diagnostic Radiology  0.180.
A further concentration on special disciplines within diagnostic radiology. Open to fourth year medical students. Prerequisite: DGRG 267. Four weeks.

DGRG 287  Student Internship  0.262-1048.
Daily tutorials, weekly seminars, and group discussion. Open to interns. Elective clerkship. One to four months.

Weekly Conferences
Neuro-Surgical-Radiological, Neuro-imaging, Medical, Surgical, and Gastrointestinal Grand Rounds; Medical, Pediatric, Tumor Clinic, ENT, Family Medicine, Vascular; Orthopedic-Radiology-Pathology, Uro-radiology, St. Jude’s Tumor Board, and Breast Tumor Clinic Conferences; GYN Radiology Conference, Emergency Medicine and Radiology teaching conferences.
Department of Emergency Medicine

Chairperson (Interim): Eveline Hitti
Associate Professor: Kazzi, Amin
Assistant Professors: Abou Dagher, Gilbert; Batley, Nicholas; El Sayed, Mazen; Hitti, Eveline; Mufarrij, Afif
Clinical Associates: Alameddine, Kawsar; Amaneddine, David; Farah, Karim; Ghanem, Mario; Hoballah, Hassan; Itani, Ziad; Khaddaj, Wajdi; Khodor, Ozoor; Rammal, Abdallah; Romani, Maya; Sawaya, Rasha; Skoury, Assaad

The Department of Emergency Medicine (EM) at AUBMC is one of the busiest Emergency Departments (ED) in Lebanon seeing an annual volume of 48,000 patients. ED physicians, nursing, and ancillary staff are highly experienced and trained in emergency medical care and provide timely, high quality care to patients with acute illnesses or injuries. The ED has full-time, round-the-clock, attending level physician coverage by physicians trained in the treatment of all acute care illnesses from medical and surgical cases to pediatric and obstetrics acute care.

Educational Programs

The Department of EM is proud to announce the establishment of the first properly supervised EM training program in Lebanon that was set to welcome its first trainees starting June 2012. The program is a four-year curriculum with four categorical spots. All core faculty are American Board of Emergency Medicine certified physicians. Trainees are exposed to the spectrum of acute care illnesses in adult and pediatric patients, have structured didactic sessions and hands-on workshops. In addition to a robust clinical experience, the program offers integrated research and administrative rotations that are meant to develop skills required to become leaders in the field.

Medical Students Rotated in ED

The third year and fourth year medical students rotate in ED.

In their third year, medical students spend three weeks in the low acuity section of the ED, where they are exposed to various surgical emergencies and procedures, including fractures, splinting, wound dressings, wound suturing, as well as urologic emergencies.

In their fourth year, the medical students spend around four weeks in the high acuity section of the ED. They are exposed to various medical emergencies, as well as high acuity trauma cases.
EMMD 246  Clinical Clerkship in Emergency Medicine
A clinical clerkship in which third year medical students spend three weeks in the low acuity section of the Emergency Department (ED2). Throughout the rotation, students will be responsible for taking the history, performing the physical examination, following up laboratory and radiology studies, and writing notes in the charts of assigned patients under the supervision of senior residents and faculty. Students will be expected to complete a range of procedures throughout their rotation. Students will be required to attend mandatory teaching sessions and departmental conferences and to sit for an in-house Emergency Medicine examination at the end of their third year.

EMMD 262  Clinical Clerkship in Emergency Medicine
A clinical clerkship in which fourth year medical students will work and learn in the high acuity section of the Emergency Department (ED1). Students will play an active role in the ongoing care of the complex ED patient and will be responsible for the initial evaluation of assigned patients, history and physical exam, formulating a differential diagnosis, treatment plan, and determining a disposition for each of their assigned patients under the direction of senior residents and faculty. They will be required to complete 4 weeks of clinical rotation during which they are expected to be present for up to 20 shifts and to attend and contribute to the educational sessions taking place in the department. Students will acquire important procedural skills by being exposed to and encouraged to participate in the supervised performance of a wide variety of procedures in the ED. Students will sit for the NBME examination for Emergency Medicine at the end of their fourth medical year.
Department of Experimental Pathology, Immunology and Microbiology

Acting Chairperson: Abdelnoor, Alexander
Professor Emeritus: Nabbut, Nassim
Professors: Abdelnoor, Alexander; Khouri, Samia; Matar, Ghassan; Sayegh, Mohamed
Assistant Professors: Al-Awar, Ghassan; Rahal, Elias
Instructor: Fawaz, Lama

The Department of Experimental Pathology, Immunology and Microbiology offers courses to medical laboratory sciences (MLSP) students as well as nursing, medical, and graduate students. It offers a graduate program leading to the MS degree in microbiology and immunology. The requirements for admission to the graduate program are stated on pages 33–72 of this catalogue.

**MBIM 223**  Parasitology for MLSP Students  
*Second semester.*  
39.39; 4 cr.

**MBIM 227**  Microbiology and Immunology for Medicine II  
*First semester.*  
108.72; 9 cr.

A course on the fundamental aspects of basic and medical microbiology and immunology presented in four separate but interrelated divisions: immunology, bacteriology, parasitology-mycology, and virology. *First semester.*

**MBIM 237**  Microbiology and Immunology for Nursing Degree Students  
*Second semester.*  
32.64; 3 cr.

A course on the fundamental aspects of medical microbiology and immunology for nursing students. *Second semester.*

**MBIM 260**  Elective in Infectious Diseases for Medicine III and IV  
*One month.*  
0.180.

A course on basic evaluation, diagnosis, and management of infectious diseases.

**MBIM 261**  Elective in Immunology for Medicine III and IV  
*One month.*  
0.180.

A course that is an introduction to immunological research and its application to clinical practice.

**MBIM 310**  Basic Immunology  
*Second semester.*  
32.32; 3 cr.

A course on innate and adaptive immune mechanisms, infection and immunity, vaccination, immune mechanisms in tissue injury and therapeutic immunology.

**MBIM 311**  Bacteriology  
*Second semester.*  
32.32; 3 cr.

A course on the characteristics and classification of medically important bacteria, diseases caused by bacteria, anti-bacterial agents, susceptibility testing, prophylaxis and therapy.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBIM 312</td>
<td>Parasitology-Mycology</td>
<td>16.32; 2 cr.</td>
<td>A course on the characteristics of medically important parasites and fungi, diseases caused by parasites and fungi, anti-parasitic and anti-fungal agents, prophylaxis and therapy. <em>Second semester.</em></td>
</tr>
<tr>
<td>MBIM 313</td>
<td>Virology</td>
<td>16.32; 2 cr.</td>
<td>A course on the characteristics and classification of medically important viruses, diseases caused by viruses, anti-viral agents, prophylaxis and therapy. <em>Second semester.</em></td>
</tr>
<tr>
<td>MBIM 314</td>
<td>Tutorial in Immunology</td>
<td>32.0; 2 cr.</td>
<td></td>
</tr>
<tr>
<td>MBIM 315</td>
<td>Tutorial in Bacteriology</td>
<td>32.0; 2 cr.</td>
<td></td>
</tr>
<tr>
<td>MBIM 316</td>
<td>Tutorial in Virology</td>
<td>32.0; 2 cr.</td>
<td></td>
</tr>
<tr>
<td>MBIM 317</td>
<td>Tutorial in Parasitology-Mycology</td>
<td>32.0; 2 cr.</td>
<td></td>
</tr>
<tr>
<td>MBIM 326</td>
<td>Applied and Advanced Immunology</td>
<td>32.64; 3 cr.</td>
<td>A course on immunological diseases and their laboratory diagnosis. <em>Second semester. Alternate years.</em></td>
</tr>
<tr>
<td>MBIM 327</td>
<td>Applied and Advanced Medical Bacteriology</td>
<td>32.64; 3 cr.</td>
<td>A course on the epidemiology, pathogenesis, immune response, diagnosis and prevention of bacterial infections. <em>Second semester. Alternate years.</em></td>
</tr>
<tr>
<td>MBIM 328</td>
<td>Applied and Advanced Parasitology</td>
<td>32.64; 3 cr.</td>
<td>A treatise on epidemiology, pathogenesis, immune response, diagnosis and prevention of parasitic infections. <em>Second semester. Alternate years.</em></td>
</tr>
<tr>
<td>MBIM 330</td>
<td>Molecular Microbiology</td>
<td>32.64; 3 cr.</td>
<td>A course on molecular applications on the identification of infectious agents. <em>Second semester. Alternate years.</em></td>
</tr>
<tr>
<td>MBIM 331</td>
<td>Infection Control</td>
<td>16.0; 1 cr.</td>
<td>A treatise on the prevention of infections in the laboratory. <em>Second semester.</em></td>
</tr>
<tr>
<td>MBIM 390</td>
<td>Seminar</td>
<td>0.32; 1 cr.</td>
<td></td>
</tr>
<tr>
<td>MBIM 394</td>
<td>Journal Club</td>
<td>0 cr.</td>
<td>Yearly.</td>
</tr>
<tr>
<td>MBIM 399</td>
<td>MS Thesis</td>
<td>9 cr.</td>
<td>A/B/C/D/E</td>
</tr>
<tr>
<td>MBIM 395A/B</td>
<td>Comprehensive Exam</td>
<td>0 credit</td>
<td><em>Prerequisite: Consent of Adviser.</em></td>
</tr>
</tbody>
</table>
Department of Family Medicine

Chairperson: Hamadeh, Ghassan
Professors: Hamadeh, Ghassan; Saab, Bassem
Associate Professors: Musharrafieh, Umayya; Usta, Jinan
Assistant Professors: Antoun, Jumana; Batley, Nicholas; Shararah, Nabil (Clinical)
Instructors: Osman, Mona; Romani, Maya
Clinical Instructors: Rahme-Ballan, Diana; Khaddaj, Wajdi; Khater, Beatrice; Khattar, Joe; Moukheiber, Sami; Razzouk, Jibrayil
Clinical Associates: Badr, Samia; El Ashkar, Khalil; Ghanem, Mario; Hleis, Sani; Lakkis, Najla; Maalouf, Grace; Makhlouf-Akel, Madeleine; Naja, Maha; Omari, Ibrahim; Rahimi, Rose Maria; Toufeili, Zeinab; Zeidan, Randa

The Department of Family Medicine offers a clinical clerkship and specialty electives to fourth year medical students. It also offers a postgraduate training program to physicians at the end of which they are eligible to sit for the Arab Board of Family Medicine.

Residency Program

The training program for the family medicine specialty is a four-year program including the internship. The goal of training is to produce competent, community-oriented family physicians capable of providing high-quality care to their patients. The program consists of rotations in the different clinical departments of the Faculty of Medicine, as well as ambulatory primary health care experience in the Family Medicine Clinics, satellite centers, and emergency services at AUBMC. All residents are required to sit for the In-training Examination of the American Board of Family Medicine.

FMMD 262  Clinical Clerkship  0.180.
The purpose of this clerkship is to expose the students to the philosophy, principles, and practice of family medicine, emphasizing the bio-psychosocial model. It upgrades the medical students’ knowledge of common problems and their skills in the application of preventive medicine in the ambulatory care setting. Students see patients under supervision in the Family Medicine Clinics and other centers inside and outside AUB and shadow clinical preceptors in the community. They also conduct site visits to community based health programs to gain exposure to the various resources available in the community. Offered to fourth year students. One block (4 weeks).

FMMD 267  Elective  0.180.
An elective in family medicine which can be tailored to the needs of the resident/student and their program requirements.

Teaching Activities
The department holds topic conferences, core content lectures, Journal Club, morning report, research forum, and guest lectures.
University Health Services (UHS)

The Department of Family Medicine is responsible for providing comprehensive primary care services to the AUB community including students, faculty, staff and their dependents at the Family Medicine Clinics and AREC (Bekaa) clinic.

Faculty Development

The Department provides faculty development courses to primary care physicians from Lebanon and the region. Subjects covered include: Train the trainer, Evidence Based Practice, Health Information Systems, Communication Skills, Primary Care Centers Practice Management, Employee Health and Travel Medicine.

Satellite Clinics

The Department of Family Medicine assists various NGOs, government and private organizations in managing their primary care clinics. It has operated the Family Medicine Clinic of the Lebanese army hospital for more than a decade and is currently sending residents to two different community based NGO clinics.
Department of Internal Medicine

Chairperson: Ziyadeh, Fuad
Professors Emeriti: Shammaa, Munir; Shwayri, Edmond
Professors: Abu-Alfa, Ali; Alam, Samir; Azar, Sami; Badr, Kamal; Barada, Kassem; Bazarbachi, Ali; Berbari, Adel; Dakik, Habib; El-Hajj Fuleihan, Ghada; Eloubeidi, Mohamad; Ghazzal, Ziyad; Kanj-Sharara, Souha; Mourad, Fadi; Saghir, Naji; Salti, Ibrahim; Sawaya, Jaber (Clinical); Sayegh, Mohamed; Shamseddine, Ali; Sharara, Alaa; Taher, Ali; Uthman, Imad; Ziyadeh, Fuad

Associate Professor Emeritus: Rubeiz, George
Associate Professors: Abchee, Antoine; Abu Haydar, Fadlo (Clinical); Akl, Elie; Arayssi, Thurayya (Adjunct); Arnaout, Samir; Bou Khalil, Pierre; Daouk, Majida; Habib, Robert; Hajjar, Ramzi; Hubayter, Rafic (Clinical); Husari, Ahmad; Kaidbey, Sami (Clinical); Khoury, Maurice; Mallat, Samir; Medawar, Walid; Nasr, Fuad (Clinical); Rebeiz, Abdallah; Salem, Ziad (Clinical); Soweid, Assaad; Tabbarah, Zuhayr (Clinical); Tamim, Hani; Tfayli, Arafat

Assistant Professors: Abi-Saleh, Bernard; Al-Awar, Ghassan; Al Jaroudi, Wael; Arabi, Asma; Arawi, Thalia; Badreddine, Rami; Bizri, Abdel-Rahman; Chami, Hassan; Choucair, Mahmoud; El Hajj, Hiba; Ghazzuddine, Walid; Ghunni, Hussam (Adjunct, Clinical); Isma’eeel, Hussain; Jaber, Raif (Clinical); Kanafani, Zeina; Kanj, Nadim; Khalil, A.; Masri, Abdul-Fattah (Clinical); Mukherji, Deborah; Nasrallah, Mona; Refaat, Marwan; Skouri, Hadi; Zeineldine, Salah

Instructors: Bouakl, Imad; Rizk, Nesrine; Temraz, Sally
Clinical Associates: Azar, Cecilio; El-Imad, Zuhayr; Saleh, Munzer; Salem, Antoun; Sukkarieh, Ismail

The Department of Internal Medicine offers courses, clinical clerkships, and specialty electives to medical students. It also offers clinical post-graduate training to MD graduates including residency and subspecialty fellowships. The Residency Program offers two tracks; a 1-year training (Preliminary Track) and a 3-year training (Categorical Track). The Fellowship training following the residency period is offered in the following subspecialties: cardiology, endocrinology, neurology, gastroenterology, nephrology-hypertension, hematology-oncology, infectious diseases, rheumatology, and pulmonary medicine and critical care.

**IDTH 221/222 Introduction to Medicine 108.72; 9 cr.**

An introductory course given to Med II students annually over a 36-week period. A multidisciplinary and integrated approach to mechanisms of disease based on the organ systems, stressing pathophysiology and introducing the clinical presentation of diseases. This course is given in the form of lectures, discussion sessions, and Moodle-based learning. Students are introduced to clinical cases in the light of pathophysiology.
Another program with the Makassed General Hospital (MGH) was inaugurated in the fall of 2012, whereby interns, residents and Med. IV students rotate through the clinical program as part of their in-patient training in Internal Medicine.

IDTH 223/224  **Physical Diagnosis**  36.72; 3 cr.
An introduction to the principles of history taking and physical examination. This course is given over a 36-week period to Med II students in the form of lectures, practical sessions, and physician shadowing in which history and physical examination are demonstrated on actual patients at AUBMC.

INMD 246  **Clinical Clerkship in Internal Medicine**  120.540.
A clinical clerkship in which third year medical students spend two months on the ward and one month in the outpatient department (OPD). On the ward, students work-up and follow patients under the supervision of senior residents and faculty. They are responsible for taking the history, performing the physical examination, following laboratory work, and writing supervised notes in the charts on assigned hospital patients. Throughout their rotations students are required to attend clinical conferences, including a course on clinical pharmacology, and to prepare and participate in clinical discussions.

INMD 254  **Infection Control**  6.34; 1 cr.
A course given to Med III students to increase their awareness and expertise in infection control as it relates to the protection of patients as well as the health-care worker from iatrogenic infection. The course aims to ensure that the students understand their responsibility in infection control and apply scientifically acceptable infection control principles. This course is given as an online presentation followed by a series of questions. Students should also pass a written examination.

INMD 262  **Clinical Clerkship in Internal Medicine**  0.540.
A clinical clerkship in which fourth year medical students work in their capacity as junior interns (subinternship) on the medical floors of the hospital. They are responsible for admission work-up of patients, and their follow-up under the supervision of the attending physician and the team resident. They are also required to attend clinical conferences, present at the student report activity, and prepare and participate in clinical discussions.

INMD 267  **Elective in Internal Medicine Subspecialties**  0.180-360.
An elective offered to fourth year medical students in one or more of the subspecialties of internal medicine, including cardiology, endocrinology and metabolism, nephrology, neurology, pulmonary and critical care medicine, rheumatology, gastroenterology, hematology-oncology, and infectious diseases.

**Weekly Conferences**
The Department of Internal Medicine organizes general Internal Medicine conferences including Mortality and Morbidity conferences, Core Curriculum Lectures, Morning Report, a series of lectures on pathophysiology in Internal Medicine as well as weekly Medical Grand Rounds. In addition to the general Internal Medicine conferences, Med III students are also required to attend lectures during their OPD outpatient rotations and Med IV students are required to attend Chairman’s Rounds. The residents attend other conferences such as ICU Conference, Journal Club, Ambulatory Report, Joint Internal Medicine/Radiology Rounds, and a Board Review course. In addition, each division runs a weekly or bi-weekly conference and journal review session in their subspecialty.

**Agreements**
A joint program of academic cooperation between the Department of Internal Medicine at AUBMC and Ayn Wa Zein community hospital in the Shouf mountains began June 15, 2002, whereby residents serve during a rotation through the program as part of their training in Geriatrics.
The Department of Obstetrics and Gynecology offers clinical clerkships and specialty electives to medical students. It also offers clinical postgraduate training to MD graduates. The residency program is a four-year specialty training in obstetrics and gynecology. Five categorical postgraduate year 1 (PGY1) and 2-3 preliminary PGY1 are accepted yearly. All residents sit for a yearly examination of the Council for Resident Education in Obstetrics and Gynecology administered by the American College of Obstetrics and Gynecology. The training is recognized by the Arab Board of Medical Specialties.

**OBGY 247  Clinical Clerkship  47–360.**
A clerkship offered to third year students consisting of daily seminars in normal and abnormal obstetrics and gynecology, weekly grand rounds, and a clinical clerkship in the delivery suite, hospital wards, and outpatient clinics. Other activities include specialty clinics in reproductive endocrinology and assisted reproductive technology, family planning, gynecologic oncology, maternal fetal medicine and urogynecology. *Eight weeks.*

**OBGY 248  Elective in Obstetrics and Gynecology  0.180–360.**
Exposure to selected general Obstetrics and Gynecology or subspecialties in the field. *Offered to third and fourth year medical students. Two to four weeks.*

**Educational Activities**

- **Daily:** Rounds with the attending
- **Weekly:** Morbidity and Mortality Conference  
  Grand Round  
  Chairman’s Round  
  Resident Education Conference  
  Core Curriculum Lecture  
  Journal Club
- **Monthly:** Video Club  
  Joint Perinatal Neonatal Conference
The Department of Ophthalmology offers clinical clerkships and specialty electives to medical students. It also offers clinical postgraduate training to MD graduates, including internship and residency programs. The internship program is a one or two month rotation offered to categorical interns in other disciplines or to family medicine residents. The residency program is a three-year specialty training in ophthalmology, including rotations in cornea, glaucoma, oculoplastics, pediatrics, neuro-ophthalmology, vitreo-retinal, intra-ocular and refractive surgery. The residency training in ophthalmology is recognized by the International Council of Ophthalmology (ICO). The primary part of the “Royal College of Ophthalmologists” examination can be taken at the beginning of the second year of residency, while the final part can be taken any time after that. The same recognition is also granted by the Arab Board of Ophthalmology under similar terms. In addition, a one year medical retina fellowship is offered. This is a 12 months training with clinical exposure to a variety of pathologies of the posterior segment from diabetic retinopathy to age related macular degeneration, also comprising all posterior uveitic conditions.

Finally, the Department offers a Pre-Residency Research Fellowship. Twelve months are spent in actively contributing to, and running the ongoing clinical research projects in the Department.

**OPHT 267  Clinical Clerkship 0.120.**
Clinical training and seminars. The students are clinically required to master the use of the direct ophthalmoscope and identify optic nerve abnormalities through the pupillary light reflex, identifying problems which need referral for ophthalmic assessment. *Offered to fourth year medical students. Three weeks.*

**OPHT 268  Elective in Ophthalmology 0.180.**
Exposure to ophthalmology. (Same as OPHT 267). Students and interns are required to get acquainted with the use of the different diagnostic ophthalmic tests. *Open to interns and fourth year medical students. One month.*

**OPHT 287  Internship 0.262-524.**
An elective in the Outpatient Department (OPD), hospital wards, and seminars. *Same as OPHT 268. One to two months.*
Department of Otolaryngology and Head and Neck Surgery

Acting Chairperson: Sabri, Alain
Professors: Fuleihan, Nabil (Adjunct); Ghafari, Joseph; Hadi, Usamah (Clinical); Hamdan, Abdul Latif; Zaytoun, George (Clinical)
Associate Professors: Abouchacra, Kim; El-Bitar, Mohammad; Sabri, Alain
Assistant Professors: Bassim, Marc; Macari, Anthony; Moukarbel, Roger; Natout, Mohammad Ali (Clinical)
Instructors: Abou Chebel, Naji (Clinical); Haddad, Ramzi
Clinical Associates: Anhoury, Patrick; Barakat, Nabil; Bou Assi, Samar; Chalala, Chimene; Chedid, Nada; Chidiac, Jose; Feghali, Roland; Gha, Hassem; Ghogassian, Soro; Itani, Mohammad; Rezk-Lega, Felipe; Saadeh, Maria; Sabri, Roy

The Department of Otolaryngology—Head and Neck Surgery offers clinical clerkship to medical students and specialty electives to interns and residents. It also offers clinical postgraduate resident training to MD graduates.

The Internship program is usually one year of straight surgery, during which interns interested in Otolaryngology—Head and Neck Surgery cultivate their medical knowledge in general and particularly in the field of Ear, Nose and Throat. The acquired general surgical skills during this year act as a foundation for their future development as surgeons in Otolaryngology—Head and Neck Surgery.

The residency program consists of four years with a gradual escalation in the clinical and surgical responsibilities of each resident. Residents are exposed to all subspecialties in Otolaryngology—Head and Neck Surgery, namely Otology, Rhinology, Laryngology, Head and Neck surgery, Pediatric Otolaryngology and Facial Plastic and Reconstructive Surgery. In each subspecialty, residents learn the clinical and surgical principles required for the diagnosis, medical and surgical management of various Otolaryngologic diseases. A series of courses covering the updates of each subspecialty are given by the corresponding faculty members. A temporal bone surgical dissection course is given yearly. For an interdisciplinary exposure, faculties from other departments and services are often invited as speakers. Residents also contribute and learn from the monthly activities of the department which include the Grand Rounds, Tumor Board, Mortality and Morbidity, Pathology conferences, Radiology conferences, and Journal Clubs. To ensure a busy clinical load, residents rotate in many affiliated hospitals with diverse exposure to different areas of the country. These include, among others, Clemenceau Medical Center, Bikzahi Medical Group, Beirut General University Hospital, Najjar Hospital and Keserwan Medical Center. In-service examination, both oral and written, are given on a yearly basis to assess the residents’ fund of knowledge and clinical competencies. The written in-service exam is acknowledged by the American Board of Otolaryngology and is the same test administered to all the US resident trainees.

The PGY4 training program includes at least two months of electives spent in an approved United States program. The rationale behind this elective is to broaden the medical perspective and provide a wider exposure for residents before graduating. Residents are also encouraged to present research projects at international meetings and are often sent for courses in Europe, the US and other countries.

Research is also an integral part of the resident training program. All residents contribute to multiple research projects either in terms of literature review, study design or data collection, analysis and manuscript writing. As a requirement for graduation, each resident is expected to design, execute and publish a full original research project.

Administrative responsibilities are also allocated to residents throughout their training as part of their development. The aim is to provide physicians who might assume future managerial tasks and positions, an added value to their clinical practice.

Following are the monthly activities of the department: First Monday: Mortality and Morbidity Conference, and Pathology Conference; Second Monday: Head and Neck Conference, and Radiology Conference; Third Monday: Journal Club and Otolaryngology Conference; Fourth Monday: Grand round given by chief resident.

The Division of Orthodontics and Dentofacial Orthopedics in the department offers post graduate residency training to dental graduates. The specialty program lasts 36 months, and is designed to carry clinical activities in a scholarly environment where basic science and clinical orthodontics are integrated. The major part of the postdoctoral program consists of clinical education and training with a spectrum of treatment ranging from childhood to adulthood, including patients who require orthognathic surgery. In addition, residents are required to enroll in one of the Master of Science Programs at the American University of Beirut. The completion and defense of a research project, clinical or basic, is a requirement toward certification. PGY II and PGY III residents are allowed to spend a period of one month per year in approved US Programs. A period of one month per year is for PGY2 and PGY3 to be spent in approved US programs.

Daily seminars and classes are scheduled in a planned sequence over the three years, and cover topics related to orthodontics and other specialties necessary for multidisciplinary treatment. The sessions include treatment planning, treatment progress, case reports, early treatment and many corrective treatments of malocclusion of children and adolescents, growth and development of the craniofacial complex and body, anatomy, anthropology, biostatistics, dental materials, biomechanics, periodontics, restorative dentistry, orthognathic surgery, temporomandibular joint dysfunction, and several other areas pertinent to orthodontic knowledge and treatment.

ORLG 267 Clinical Clerkship 11.120.
Mornings in the Outpatient Department (OPD); two to three mornings in the operating rooms, and the rest of the time in the hospital. Three weeks in the department.

ORLG 268 Elective in Otolaryngology 0.180.
Exposure to otolaryngology and its allied fields. One month.

ORLG 287 Internship 0.262.
Work divided between Outpatient Department (OPD), operating rooms, and hospital. Elective. One month.
Department of Pathology and Laboratory Medicine

Chairperson: Zaatari, Ghazi
Professors: Araj, George; Habbal, Zuhair; Rebeiz, Jean; Salem-Shabb, Nina; Tawil, Ayman; Zaatari, Ghazi
Associate Professors: Ahdab-Barmada, Mamdouha (Adjunct Clinical); Daher-Karam, Rose; Kfoury-Baz, Elizabeth; Mahfouz, Rami
Assistant Professors: Boulos, Fouad; Charafeddine, Khalil; Farra-Awwad, Chantal; Khalifeh, Ibrahim
Instructors: Chakhachiro, Zaher; Jurdí, Nawaf
Clinical Associates: Fakhreddine, Najla; Salti, Ibrahim

The Department of Pathology and Laboratory Medicine offers courses to medical students and undergraduate courses to students in the Medical Laboratory Sciences program (Faculty of Health Sciences). The department offers four-year residency training programs in pathology and laboratory medicine.

PATH 229  Pathology  108.72; 9 cr.
Undergraduate teaching of mechanisms of diseases (general pathology) and morphological and pathophysiological aspects of organ diseases (systemic pathology).

IDTH 221/222  Introduction to Medicine
See Department of Internal Medicine.

PATH 260  Elective in Pathology  0.180.
An elective open to Med IV students. The purpose of this clerkship is to expose the students to the general principles of surgical pathology and cytopathology. The student participates in the daily teaching activities of the department, learns general dissection skills, and attends the sign-out sessions. During the rotation, the student is required to make a presentation on a topic of interest, and encouraged to participate in an investigative research project. One to two months.

LABM 262  Elective in Laboratory Medicine  0.180-360.
A clerkship offered to Med IV students. This clerkship consists of daily practical training, supplemented by lectures and seminars to cover the disciplines of clinical chemistry, clinical microbiology and immunology, clinical hematology, blood banking and transfusion medicine and cytogenetics. This elective is available in these various disciplines of laboratory medicine and may be adjusted according to the interest of the candidate. During the rotation, the student is required to make a presentation on a topic of interest, and encouraged to participate in an investigative research project. One to two months.

LABM 287  Internship  0.180-360.
Same as LABM 262. Offered to rotating interns. One to two months.

Clinico-Pathology Conferences
Med III, IV, and staff in collaboration with the departments of Surgery, Internal Medicine, Pediatrics, Obstetrics and Gynecology, Diagnostic Radiology, Ophthalmology, and Otolaryngology—Head and Neck Surgery.

Courses Offered for Medical Laboratory Sciences Students

LABM 201/202  Clinical Chemistry I and II  2.0; 3 cr.
Clinical Chemistry courses I and II are designed to acquaint students with fundamentals of clinical chemistry, including basic physiological and biochemical processes, instrumentation, principles of analytical procedures, and methods used for reliable determination of clinical analytes. Correlation of laboratory results with clinical manifestation is also an integral part of these courses. These courses cover all aspects of routine clinical chemistry such as carbohydrates, electrolytes, acid-base balance, blood gases, nitrogen metabolites, proteins, enzymes, lipids and lipoproteins, calcium metabolism, and liver function. LABM 202 will also include some advanced topics like hormones, therapeutic drug monitoring, toxicology, and specialized techniques like chromatography (HPLC and GC/MS and so on).

LABM 210  Cytology and Histological Techniques  32.0; 2 cr.
A course that includes a series of lectures and demonstrations on cell biology, a review of normal histology of various human organs, a description of examples of pathological changes, lectures on techniques of tissue handling, and preparation and staining of sections and smears for cytological material. Members of the department and the Department of Human Morphology.

LABM 220  Clinical Chemistry and Endocrinology  0.128; 4 cr.
Practical experience in clinical chemistry. Eight weeks.

LABM 230  Clinical Hematology and Reception  0.128; 4 cr.
Practical experience in clinical hematology and reception. Eight weeks.

LABM 231  Clinical Laboratory Quality Systems  1 cr.
This course is intended to give Medical Laboratory Sciences students a thorough understanding of the quality systems used for implementation of total quality management in the clinical laboratories. The course covers all the basic elements and tools required to implement the quality system essentials across all phases of the laboratory workflow: preanalytical, analytical, postanalytical. In addition, it will include focused lectures related to quality and safety standards required in specialized areas such as blood bank, clinical microbiology, and molecular diagnostics. Practical examples from the laboratory setting will be part and parcel of the lectures to help students relate theory to practice.

LABM 233  Genetics and Molecular Biology  2.0; 2 cr.
A course that includes an introduction to human genetics, comprising the structure and function of DNA and the classification of genetic disorders, as well as the application of genetic testing in the laboratory and clinical differential diagnosis of variable disorders. Diagnostic techniques in human genetics (cytogenetics, biochemical, and molecular) will be covered, as well as state-of-the-art molecular techniques applied in pathology, oncology, immunology, and microbiology.

LABM 235  Medical Mycology  1.0; 1 cr.
A course that covers the different kinds and types of fungi (yeast and mold). This course discusses their disease spectrum mode of infection, growth requirements, and cultural and non-cultural methods of identifications as well as antifungal drugs and susceptibility testing of fungi.
LABM 240  Clinical Microbiology  0.128; 4 cr.
Practical experience in clinical microbiology (aerobic and anaerobic bacteriology, mycobacteriology, mycology, processing, identification, and susceptibility testing). *Eight weeks.*

LABM 250  Clinical Parasitology and Urinalysis  0.64; 2 cr.
Practical experience in clinical microscopy pertaining to parasitology, urinalysis, spermogram, and occult blood, as well as in the use of different types of microscopic methods for diagnosing particulate material in synovial fluid and others. *Prerequisite: MBIM 223. Four weeks.*

LABM 260  Serology  0.64; 2 cr.
Practical experience in clinical immunology and serodiagnostic techniques used for the diagnosis of infectious and non-infectious diseases. *Four weeks.*

LABM 270  Blood Banking  0.64; 2 cr.
Practical experience in blood banking, transfusion medicine and apheresis. *Four weeks.*

LABM 280  Cytogenetics, Molecular Diagnostics and Histotechniques  0.64; 2 cr.
Practical experience in cytogenetics, molecular diagnostics and histotechniques. *Prerequisite: LABM 210. Four weeks.*
Department of Pediatrics and Adolescent Medicine

Chairperson: Abboud, Miguel
Professors: Abboud, Miguel; Badr, Lina (Adjunct); Bitar, Fadi; Boustany, Rose-Mary; Dbaibo, Ghassan; El Solh, Hassan; El-Yusuf, Mounif (Adjunct); Mikati, Mohamad (Adjunct); Mroueh, Salman; Nabulsli-Khalil, Mona; Sanjad, Sami; Yunis, Khalid
Professor Emeritus Najjar, Samir
Associate Professors: Chelala, Claude (Adjunct); Dabbous, Ibrahim (Clinical); Musallam, Salim (Clinical); Muwakkit, Samar
Assistant Professors: Arabi, Mariam; Ariss-Timani, Majd; Charafeddine, Lama; Diab, Karim; Farra-Awwad, Chantal; Hanna-Wakim, Rima; Karam, Pascale; Majdalani, Marianne; Munla, Nabil (Clinical); Saab, Raya; Sharara-Chami, Rana; Sinno, Durriyah; Tfayli, Hala; Yazbeck, Nadine
Senior Lecturer: Ayyoub, Charles (Clinical)
Instructor: Hamade, Haya
Clinical Associates: Abdallah, Sawsan; Abou Jaoude, Ramzi; Abu Reslan, Walid; Akel, Samir; Al Araji, Alia; Aoun, Bilal; El-Bitar, Mohamad; Haddad-Abu Faysal, Nadra; Nasrallah, Mona; Shamseddine, Fadi; Soubra, Maher; Zaytoun, Fares

The Department of Pediatrics and Adolescent Medicine offers clerkships to medical students. The clerkships concentrate on those aspects of children’s and adolescents’ healthcare that are important to any physician, including the management of healthy and sick children; peculiarities of disease in infancy, childhood, and adolescence; nutrition growth and development. These clerkships also concentrate on the importance of combining preventive with curative medicine. Graduate training is offered to physicians leading to specialization (residency) in pediatrics over a three-year period.

PEDT 246 Clinical Clerkship 35.360.
Daily assignments in the Outpatient Department (OPD) (general Pediatrics and subspecialty clinic) for 6 weeks and 2 weeks inpatient rotation in the normal nursery and Neonatal Intensive Care Unit. Offered to third year students. Two months.

PEDT 267 Clinical Clerkship 0.360.
A clerkship consisting of daily assignments in the inpatient general Pediatric ward for 4 weeks, in the Children Cancer Center for 2 weeks, and in the OPD and Pediatric Emergency Unit for 2 weeks. Offered to fourth year students. Two months.
PEDT 268  Elective in Pediatrics  0.180-360.
Clinical electives are open to fourth year medical students. Laboratory research electives are open to students at all levels. Exposure of students to laboratory research in neurogenetics, molecular biology, infectious diseases, basic cardiology, or to a special area of clinical pediatrics of the student’s choice, including pediatric cardiology, neurology and hematology-oncology, and neonatal intensive care. *One(587,554),(787,569) to two months.*

PEDT 287  Internship  0.786.
A two- to three-month rotation each in the hospital wards, ambulatory services, or newborn nursery.

PEDT 288  Straight Internship  0.2882.
Interns spend 11 months in the Department of Pediatrics and Adolescent Medicine at the hospital (PL-1).

**Weekly Conferences**
Ward rounds (daily), radiology conferences, journal clubs, grand rounds, morbidity and mortality conferences, and specialty conferences (adolescent medicine, hematology/oncology, neonatology, and other house staff lectures).
Department of Pharmacology and Toxicology

Chairperson: Sabra, Ramzi
Professors: Sabra, Ramzi; Simaan, Joseph
Professor Emeritus: Cortas, Nadim
Associate Professor: Khoueiry-Zgheib, Nathalie

The field of pharmacology embraces the knowledge of the history, sources, physical and chemical properties, compounding, biochemical and physiological effects, mechanisms of action, absorption, distribution, biotransformation and excretion, and therapeutic and other uses of drugs. The Department of Pharmacology offers both undergraduate and graduate programs. The undergraduate program is designed to meet the needs of medical students and is offered during the second semester of the second year. The graduate program consists of a minimum of two years of didactic and practical training leading to the degree of Master of Science. The department also offers courses in the graduate program leading to the MS and PhD degrees.

PHRM 240  Pharmacology and Therapeutics  48.0; 3 cr.
A presentation of the chemistry, pharmacological effects, and therapeutic usefulness and toxicity of drugs. Designed to meet the requirements of the BS in nursing. Prerequisite: BIOC 246.

PHRM 228  Pharmacology and Toxicology  108.72; 9 cr.
A general course dealing with the chemistry, general properties, pharmacological effects on the various systems, therapeutic usefulness, and toxicity of drugs. A separate section deals with prescription writing and toxicology. Designed to meet the requirements of the second year medical program.

PHRM 300  Pharmacology and Toxicology
Similar to PHRM 228. Offered to graduate students.

PHRM 303/304  Pharmacological Methods  0.96; 3 cr. (each)
Methods of animal surgery, bioassay, and biochemistry. Prerequisite: PHRM 300.

PHRM 305/306  Enzymological Bioassays  0.96; 3 cr. (each)
Prerequisite: BIOC 211.

PHRM 307/308  Tutorial in Pharmacology  0.96; 3 cr. (each)
An introduction to research.

PHRM 309/310  Pharmacology Seminar  0.32; 1 cr. (each)

PHRM 314  Advanced Pharmacology and Therapeutics  48.0; 3 cr.
Designed to meet the requirements of the MS degree in nursing. Prerequisites: PHRM 240 and NURS 504.

PHRM 260  Elective in Pharmacology  0.180-360.
An introduction to biochemical and physiological methods in use in pharmacology. One to two months.
PHRM 315  Principles of Pharmacology 19.21; 2 cr
A course that covers the basic principles of drug action including pharmacokinetics, pharmacodynamics, pharmacogenetics, drug resistance, tolerance and toxicity, and pharmacovigilance.

IDTH 311  Foundations of Biomedical Science 90.40; 7 cr
An interdisciplinary course that presents the cellular and molecular concepts and principles that underlie the normal structure and function of the human body. It covers cellular structure and function, including mechanisms and regulation of gene expression, protein synthesis, structure and function, signaling mechanisms, membrane transport, energy metabolism, contractility, and excitability, and the basic principles of drug action.

IDTH 315/Principles of Pharmacology 21.23; 2 cr.
IDTH 316
The course presents the basic principles of drug action including pharmacokinetics, pharmacodynamics, drug dosing, drug-receptor interactions, variability in drug response, pharmacogenetics, drug resistance, tolerance and dependence, the principles of drug toxicity, and the process of drug development and post-marketing monitoring.

PHRM 395A/B  Comprehensive Exam 0 cr
Prerequisite: Consent of Adviser.

PHRM 399  MS Thesis 9 cr.
A/B/C/D/E
The Department of Psychiatry offers a course to Med II students and a clinical clerkship to Med III students, a post-graduate residency training program in psychiatry (starting July 2012) as well as clinical electives to interns and residents.

**PSYT 227  Psychopathology  32.36; 3 cr.**
The course consists of two parts: the first covers the psychological aspects of normal and abnormal behaviors: the second deals with the classification and pathophysiology of psychiatric disorders. *Annually.*

**PSYT 252  Clinical Clerkship in Psychiatry  0.180.**
A clinical clerkship in which third year medical students spend one month working up psychiatric patients and attending morning rounds on an inpatient psychiatric service where they are supervised by an attending psychiatrist. Students also attend psychiatry clinics in the outpatient department where they see new and old cases. The rotation also includes seminars dealing with psychopathology, case presentations and discussions, interview techniques and basic psychotherapy, as well as psychopharmacology. *One month.*
Department of Radiation Oncology

Chairperson: Geara, Fady
Professor Emeritus: Issa, Philippe
Professor: Geara, Fady
Assistant Professor: Taddei, Philip
Instructors: Eid, Toufic; Youssef, Bassem

RADO 260  Introduction to Radiation Oncology  0.180.
An elective clerkship that introduces the student to the basic principles, techniques, and application of radiation oncology. One month.

RADO 287  Internship  0.262-1.048.
An elective in radiotherapy. Open to interns. One to four months.

RADO 288  Residency Training in Radiation Oncology
Open to interns after completion of internship. The Program extends over four years with short elective rotations in pathology, medical oncology, radiology, pediatric oncology and research.

RADO 289  Fellowship-Advanced Training in Radiation and General Oncology
Open to residents in radiation oncology for advanced training in radiation and general oncology.

RADO 290  Clinical training in Medical Physics
Short intensive course open to Medical Physicists who need to acquire skills in modern radiotherapy physics and clinical training on modern equipment

RADO 291  Medical Physics to Medical Residents
Medical Physics courses open to Medical Radiation Oncology Residents to prepare them for their Radiation Oncology exam/certification.

Weekly Conferences
Tumor board conference, neurooncology, head and neck and thoracic oncology, and pediatric oncology conferences. The department participates in the teaching activities of the oncology section of the Department of Internal Medicine.

Monthly Conference
Head and neck, genitourinary, and breast cancer multidisciplinary conference.
Department of Surgery

Chairperson: Hoballah, Jamal
Professors Emeriti: Dagher, Ibrahim; Haddad, Fuad; Shehadi, Sameer
Professors: Al-Halees, Zohair (Adjunct); Abi Saad, Georges; Atiyeh, Beshara (Clinical); Bulbul, Mohamad (Clinical); Haidar, Rashid; Hoballah, Jamal; Khaili, Raja; Khoury, Ghattas (Clinical); Obeid, Mounir
Professors Emeriti: Dagher, Ibrahim; Haddad, Fuad; Shehadi, Sameer
Professors: Al-Halees, Zohair (Adjunct); Abi Saad, Georges; Atiyeh, Beshara (Clinical); Bulbul, Mohamad (Clinical); Haidar, Rashid; Hoballah, Jamal; Khaili, Raja; Khoury, Ghattas (Clinical); Obeid, Mounir
Associate Professors: Abbas, Jaber (Clinical); Akel, Samir (Clinical); Haddad, Fady; Haddad, Georges (Clinical); Haddad, Raja (Clinical); Jamali, Faek; Khalifeh, Mohamad; Safadi, Bassem; Saghieh, Said; Sfeir, Roger (Clinical); Skaf, Ghassan; Taha, Assad (Clinical)
Assistant Professors: Abbas, Jaber (Clinical); Akel, Samir (Clinical); Haddad, Fady; Haddad, Georges (Clinical); Haddad, Raja (Clinical); Jamali, Faek; Khalifeh, Mohamad; Safadi, Bassem; Saghieh, Said; Sfeir, Roger (Clinical); Skaf, Ghassan; Taha, Assad (Clinical)
Assistant Professors: Alami, Ramzi; Baddoura, Omar (Clinical); Bakhash, Joseph; Barmada, Bicher (Clinical); Deeba, Samer; El-Hout, Yaser; Faraj, Walid; Hallal, Ali; Hussein, Maher (Clinical); Kaddoura, Imad (Clinical); Kreidieh, Ibrahim (Clinical); Lakkis, Suheil (Clinical); Najjar, Marwan; Sfeir, Pierre; Sidani, Mustafa (Clinical); Souab, Maher; Tayim, Ahmad; Wassan, Wassim (Clinical)
Instructors: Abiad, Firass; Abu-Sitta, Ghassan; Al Taki, Muhyeddine; Nasr, Rami; Sagherian, Bernard; Salame, Joseph; Shehadi, Imad
Senior Lecturer: Afeiche, Nadim (Clinical)
Clinical Associates: Abdelnoor, John; Ajami, Habib; Bakhos, William; Bitar, Elias; El Hajj, Ziad; Harakeh, Ayman; Houcheime, Kassem; Hushaymi, Ibrahim; Jurdi, Hikmat; Kanaan, Salim; Louak, Elie; Makarem Rabih; Sakr, Ghazi; Sayyed, Khaled; Sinno, Khalil; Yehya, Raafat; Zubeir, Samir

Graduate Clerkship

The Department of Surgery offers graduate clerkships to medical students. It also offers a year of internship required for any further specialization.

A four-year residency program in general surgery is structured to conform to the requirements of the Arab Board of Surgery. It is also being restructured to conform with the Residency Review Committee (RRC) of the ACGME-I.

The General Surgery Residency program was recently accredited by the Royal College of Surgeons in Ireland (FRCSI), and general surgery residents will be eligible to sit for the FRCSI.

Starting February 2011, the General Surgical residents were allowed to sit for the annual International American Board of Surgery In-training Exam (I-ABSITE).

All the surgical residents will participate in the didactic curriculum established by the American College of Surgeons (ACS).

All junior surgical residents are enrolled in the Fundamentals of Surgery Curriculum.
Skills lab, including basic and advanced open and laparoscopic skills are included in the curriculum.

Starting this year, all senior residents will be required to take the Advanced Trauma Life Support (ATLS) course, which is currently offered by AUB and the ACS Lebanon Chapter.

The Department of Surgery offers a five-year training program in neurosurgery, a four-year training program in orthopedic surgery and urology, and a three-year training program in plastic surgery. One year of categorical internship is prerequisite to joining the Neurosurgery program. One year of categorical internship and one year of general surgery residency are prerequisites to joining the orthopedic surgery program, the urology program, and the plastic surgery program.

**SURG 246 Clinical Clerkship** 44.540.
The third year surgery clerkship at AUBMC is a 12-week rotation consisting of 6 weeks on a core general surgical service, 3 weeks in the surgical ER and 3 weeks on subspecialty surgical services (orthopedic surgery, neurosurgery, urologic surgery, cardiothoracic surgery, or plastic surgery). The goal of the surgery clerkship is to introduce the student to the principles of caring for the surgical patient. This goal is accomplished by allowing the student to participate in the care of patients at the various stages of evaluation and treatment by the surgical faculty and their teams. These stages include, but are not limited to, the preoperative office or clinic visit, inpatient admission, operative procedures, and inpatient and outpatient recovery.

The clerkship is structured on the principle that learning is an active process, which can be accomplished only by the student. The role of the faculty and housestaff is to provide guidance, motivation, and example. The third year clerkship educational experience is supplemented by a core curriculum set of lectures covering all the basic topics in general surgery and the surgical specialties, as well as multiple problem-based learning sessions designed by various faculty members. Students are required to attend all educational activities held in the department.

**SURG 268 Elective in Surgery** 0.180-360.
Knowledge of English is necessary. Fourth year students may elect to rotate through one or more of the following disciplines: general surgery and peripheral vascular surgery, cardiothoracic surgery, neurosurgery, orthopedic surgery, pediatric surgery, plastic surgery, and urology. Open to AUB and non-AUB fourth year medical students. Non-AUB students act as observers only, for a period of one to two months.

**SURG 288 Straight Internship** 0.2882.
Categorical interns are considered post-graduate first year trainees and are accepted by the Department of Surgery on a competitive basis. Workup and general care of patients are the major responsibilities of the intern, who functions as an integral part of the resident staff. The intern performs surgical procedures under supervision and actively participates in the various bedside rounds and teaching conferences of the department. The intern rotates through the Emergency Room and through other subspecialties. Categorical internship is considered the first year in the surgical training program. Eleven months.

**Conferences**
A grand round is held once a month. Each division has its own weekly conference and teaching activities. Bedside teaching rounds are held at least once or twice a week. The trend is more toward bedside teaching rather than didactic teaching. A quality improvement conference is held biweekly in most divisions. Didactic teaching conferences are held each Tuesday and Thursday at 7:00 am to cover the surgical curriculum.

**Pathology and Journal Club Reviews**
Special lectures are delivered as the occasions arise especially with visiting professorship lectures. Journal clubs are held monthly.

**Affiliations**
Currently there are several affiliations with the Department of Surgery based on agreements of cooperation:
- Makassed Hospital (since March 4, 1982)
- Rafic Hariri University Hospital (since June 9, 2005)
- Notre Dame Liban – Jounieh (since September 2008)
- Al Janoub Hospital – Saida (since May 2009)
- Clemenceau Medical Center (since July 2009)
- Notre Dame Liban – Zgharta
- Mount Lebanon Hospital (since August 2010)
- Najjar Hospital (since February 2010)
- Khoury Hospital (BMG) (2012)
- Wahib Nini Hospital (2012)

Additional affiliations are being explored.
Rafic Hariri School of Nursing (HSON)
Rafic Hariri School of Nursing (HSON)

Historical Background

The School of Nursing, founded in 1905, was the first nursing school in the Middle East. The five-year Bachelor of Science in nursing program established in 1936 was replaced by a four-year program in 1964, leading to the degree of Bachelor of Science in Nursing. Students entering the school as sophomores graduate in three calendar years. A two-year Associate Degree in Nursing program was established in 1980 and discontinued in 1984. The RN-BSN program was reactivated and launched in 2003. The Bachelor of Science in Nursing program (BSN) and the MSN program are registered by the Department of Education of New York State, HEGIS codes 1203.00 and 1203.10, respectively. The MSN program is accredited by CCNE, the Commission on Collegiate Nursing Education, in the USA. AUB School of Nursing is the first School of Nursing outside the US territories to be accredited by CCNE.

Mission

The mission of the School of Nursing is to promote and maintain the highest educational standards of excellence, integrity, and professionalism in nursing, following the American model of nursing education and practice. The school aims to provide learning opportunities that will enable students to develop into competent nurses who respect cultural diversity while coordinating and delivering high-quality, compassionate nursing care in Lebanon and the region, guided by ethical principles. The faculty believes education is an interactive process between faculty and students with both taking responsibility for active learning. The baccalaureate program, drawn primarily from the humanities, sciences, and caring disciplines, focuses on the use of nursing theory and research as a basis for practice. The master's program focuses on preparing nurses for advanced nursing practice roles. It is based on the use and generation of research-based knowledge to guide practice. Nursing students at AUB learn to think critically, develop professional attitudes and leadership skills, and appreciate the value of lifelong learning and freedom of speech.

Vision

The Rafic Hariri School of Nursing aspires to become the leading school of nursing in Lebanon and the region; nationally and internationally recognized for excellence in education, research, and service.
The school is committed to offering cutting-edge, culturally-relevant and internationally recognized graduate and undergraduate education. Such education would foster life-long learning and scholarship, develop leaders in nursing and health care, and attract a competent and culturally-diverse student body.

**Admission**

A student is eligible for consideration for admission to the Master of Science in Nursing (MSN) program if s/he fulfills the following AUB admission requirements for graduate studies:

- A bachelor’s degree in nursing from AUB or its equivalent degree from another recognized institution, with an undergraduate average of at least 80 in the major field of study (nursing) and a cumulative undergraduate average of at least 75.
- Please see the Admissions section of the Graduate Catalogue on pages 33–72 for further details regarding the English Language Proficiency Requirement (ELPR). The table on page 37 of the catalogue shows the English tests scores with corresponding English deficiency course requirements for applicants to the MSN program who do not meet the English Language Proficiency Requirement.
- A license to practice nursing from country of residence.
- Evidence of knowledge and competence in physical assessment skills.
- One year of work experience in nursing.

The program admits both full-time and part-time students, provided the student completes all program requirements within a maximum period of four years. Extension beyond the maximum allowed period of study requires approval by the Graduate Studies Committee of the school. Candidates who fail to meet any of the admission requirements but who, in the opinion of the faculty, demonstrate potential for graduate study are admitted on probation. Students admitted with curriculum deficiencies may need to register for prerequisite courses to make up those deficiencies. Students admitted with curriculum deficiencies may need to register for prerequisite courses that are undergraduate courses; such courses do not carry any graduate credit. The minimum grade required for a prerequisite course is 80.

**MSN Tracks**

The School of Nursing offers four tracks:

- MSN in adult care, with an optional minor in nursing education
- MSN in nursing administration
- MSN in psychiatric mental health, with an optional minor in nursing education
- MSN in community and public health, with an optional minor in nursing education

Both thesis and non-thesis options are available for all tracks.

**Graduation Requirements**

All recommendations for graduation are made by a vote of the faculty, upon the recommendation of the Graduate Studies Committee. To be eligible for graduation from the MSN program, the student must have:

- passed all required courses with a minimum grade of 70 per course
- achieved a cumulative average of at least 80 and
- completed a total of 36 credit hours
- passed the comprehensive examination
- completed the requirements for the thesis or project.

**Academic Rules and Regulations**

**Transfer of Credits**

As per AUB policy, no more than 9 credits may be transferred from graduate courses taken beyond the requirements for the bachelor's degree at AUB or at other recognized institutions (nine credits for non-thesis programs). Those courses in which the student scored 80 or above are the only ones that are transferable. Approval by the Graduate Studies Committee of the School of Nursing is required for all transfers.

**Supervision, Courses, and Grades**

Every graduate student is assigned an academic adviser to guide and help in planning the student's course of study, as stipulated by the graduate curriculum. Non-nursing courses relevant to the student's area of specialty can be taken as electives with the approval of the adviser. For students working toward a thesis, a thesis adviser who must be a full-time faculty member is assigned. S/he will also serve as chairperson of the thesis committee. The thesis adviser and committee members must be of professorial rank.

Graduate level courses in nursing are numbered 500 and above. The minimum passing grade for a graduate course is 70. However, students are required to maintain a cumulative average of at least 80 in all courses taken for graduate credit. Students who are absent without excuse for more than one third of the number of sessions in any course, or who fail to sit for scheduled examinations, or who fail to fulfill course requirements, will be given the minimum grade for graduate courses, which is 55. Results of tutorial courses, residencies, projects, or theses will be reported as pass (P) or fail (F).

Students admitted with curriculum deficiencies may need to register for prerequisite courses that are undergraduate courses; such courses do not carry any graduate credit. The minimum passing grade for a prerequisite course is 80.

**Probation and Dismissal**

A student working toward an MSN degree may be placed on probation by the School of Nursing Graduate Studies Committee if s/he:

- is admitted to graduate study on probation
- fails in any course taken for graduate credit
- does not maintain the cumulative average of 80

The probation may be removed upon the recommendation of the Graduate Studies Committee of the school if the student has completed a minimum of nine credits of graduate level courses within the two consecutive semesters after being placed on probation, has passed all courses,
and has obtained the cumulative average of 80. If the student fails to meet any of these conditions, s/he will be dropped from the program.

The Graduate Studies Committee may drop a student from graduate study if:

1. Probation status due to average is not removed in the semester following the first probation excluding students admitted on probation (see previous section on probation and removal of probation).
2. The student receives probation for a second time during the degree residency.
3. The student attains a cumulative average of less than 70 after completion of 9 credits or fails two courses in one term.
4. The student attains a cumulative average of 70 or above, but less than 80, in any term and fails one course in that term. (This rule does not apply to the first term of study.)
5. In the opinion of the department, and irrespective of the grades obtained, the work of the student is deemed unsatisfactory.
6. The student fails the comprehensive examination twice, or fails the thesis defense twice.

**Comprehensive Examination**

A student must pass a comprehensive examination after completion of most of the course requirements for the MSN degree. The Graduate Studies Committee of the School of Nursing sets the time of the examination. Students planning to take the comprehensive exam must register N526 (zero credit) in the semester they are planning to sit for the exam. The purpose of the examination is to ascertain the student’s knowledge of his/her field of specialization. A student who does not pass the comprehensive examination may take it a second time in the following semester. The comprehensive exam is offered twice per year, once in the fall and once in the spring semester. The grade for the exam is entered as P or PR (For the student who fails) online and reported to the Registrar.

**Thesis/Project**

For those students enrolled in the MSN with thesis option, s/he must submit a thesis based on original, independent research. The thesis must be in English. An abstract not exceeding 350 words must be submitted with the thesis. Once approval for writing the thesis/project is granted, the student must ensure that the thesis/project conforms to the guidelines outlined in the University Thesis Manual found in the library. It is mandatory to apply the Manual’s style to the thesis, and theses not conforming to the Manual requirements will not be accepted. The student must submit copies of the thesis to the members of the thesis committee at least two weeks before the thesis defense. These copies should be unbound but ready for binding.

Students may opt for a three credit project; if so, three credit elective course work in a related area should be taken. Students who choose to do a project are assigned an adviser who serves as the project adviser. The Master’s Project advisement team should be composed of at least two members recommended by the graduate program. The Master’s project topic proposal, and selection of the adviser and project committee members, should be approved by the Faculty Graduate Studies Committee. The Master’s project committee should be composed of at least two members recommended by the department/program. The project topic proposal and selection of the adviser, and selection of project committee members, should be approved by the Faculty/school Graduate Committee at least four months before the project defense. Pass (P) or Fail (F) is reported for project defense. If Fail (F) is reported, the student may resubmit the project and defend it after a period of at least three months. Failure on the second attempt results in discontinuation of the graduate work.

Refer to the Graduate Student Handbook of the School of Nursing regarding guidelines for projects and theses.

**Thesis Committee**

The master’s thesis committee should be composed of at least three members approved by the faculty Graduate Studies Committee. The thesis committee should be approved by the department chairperson/director. The student must submit the thesis proposal form signed by the thesis committee members to the department chair, who will forward it to the Graduate Studies Committee for its approval. It is advisable that the thesis committee includes one member from outside the School of Nursing (this member can be from an institution outside AUB). All committee members should hold professorial rank. The thesis committee approves the thesis topic and research program, and conducts the thesis defense.

**Thesis/Project Defense**

- A student is not allowed to defend his/her thesis unless he or she has passed the comprehensive exam.
- In order to present their defense students must be registered for the thesis in the session during which they expect to graduate.
- The thesis defense is open to the public. The table on page 60 of the catalogue shows the deadlines for approval of thesis/project topic, the deadline for defense and the deadline for thesis/project deposit at the library. Refer to the table on page 60 for deadlines of thesis defense.
- ‘Pass’ or ‘Fail’ is reported for the thesis. In case of failure, the student may resubmit the thesis and defend it after a period of at least three months. Failure the second time leads to dismissal from the graduate program.

**Deposit of Thesis/Project in the Library**

After passing the thesis defense examination the student is required to deposit two hard copies and a CD copy of the thesis at the Saab Medical Library. A library receipt of these copies must be delivered to the Office of the Registrar before the student is awarded the degree. The student should sign a release form indicating whether or not the library is authorized to supply copies of the thesis to other libraries or to individuals. The non-authorization option is valid for a period of two years only, after which copies of the thesis will be supplied on request.

**Specific Requirements for the Master’s Degree**

Refer to the Admissions section in this catalogue.
### Curriculum

#### Masters of Science in Nursing

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Lecture Hrs./Week</th>
<th>Clinical Hrs./Week</th>
<th>Credit Hrs.</th>
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<td>Foundations of Advanced Practice</td>
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**Role Development Courses**

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**Concentration Courses**

**Adult Care Track**

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<td>NURS 506</td>
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<td>PHRM 314</td>
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**Nursing Administration Track**

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<td>HMPD 342</td>
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<td>NURS 520</td>
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<td>MNGT 332</td>
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**Thesis/Project**

- NURS 599 or NURS 598

**Minor in Education**

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<td>EDU 326</td>
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**Community and Public Health Track**

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<th>Clinical Hrs./Week</th>
<th>Credit Hrs.</th>
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<tbody>
<tr>
<td>NURS 503</td>
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<td>NURS 504</td>
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<tr>
<td>PHRM 314</td>
<td>Advanced Pharmacology and Therapeutics</td>
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<tr>
<td>NURS 522</td>
<td>Principles and Practice of Community Health Nursing</td>
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<td>NURS 523</td>
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</table>

**Elective - - 3**

**NURS 526 Comprehensive Exam**

- - 0

Students may take a 3-credit course as an elective in any major that helps them with their studies. For students doing a minor in nursing education, the elective must be in education.

NURS 528 Certification Praticum is optional.

The School of Nursing also offers special topic courses ranging from 1 to 3 credits that cover nursing issues of interest to students in the various tracks. These courses can be counted toward the elective credits.
Course Descriptions

NURS 500 Nursing Theory 2.0; 2 cr.
This course provides analysis and evaluation of nursing theories and conceptual frameworks with implications for practice and research. Overview of theory development is presented with a focus on the students’ area of study.

NURS 501 Foundations of Advanced Practice 3.0; 3 cr.
The course provides students with knowledge about the advanced nursing practice (ANP) role, and focuses on the foundations and philosophy of care. Legal and ethical issues related to ANP, such as regulation, are explored. The role of nursing in affecting health care system change is emphasized.

NURS 502 Advanced Nursing Research 4.0; 4 cr.
This course focuses on complex research designs and analysis of multiple variables. The interrelationship of theoretical frameworks, quantitative/qualitative design, sample selection, data collection instruments, and data analysis are analyzed in terms of clinical nursing research problems.

NURS 503 Advanced Health Assessment 2.3; 3 cr.
This course focuses on the advanced comprehensive assessment of individuals using a case based approach. Students are provided with advanced knowledge and skills in clinical interview, focused history taking, psychosocial and physical assessment, and diagnostic reasoning.

NURS 503 A Advanced Health Assessment for Mental Health 1.0; 1 cr.
This theory course focuses on the comprehensive health assessment of clients using a biopsychosocial approach. Mental health students will build on their knowledge and skills in clinical interviewing, focused history taking, and critical analysis of client data to identify actual and potential health problems. The focus will be on the differential diagnosis of various case presentation with organic and psychological etiologies.

NURS 504 Advanced Pathophysiology 3.0; 3 cr.
This is a course in advanced pathophysiology related to acute and chronic illnesses experienced by adults. Emphasis is placed on pathophysiologic nursing phenomena experienced across diseases, their manifestations and assessment measures. Case studies are used to illustrate application to advanced nursing practice.

NURS 505 Advanced Practice in Adult Care I 2.6; 4 cr.
This course builds on NURS 504 and includes a theory and a clinical component. Emphasis is on the application of pathophysiologic, psychologic and pharmacologic principles and advanced practice skills in the management of adults with potential and actual health problems. The practicum provides opportunities for students to begin development of their advanced practice roles in specialty areas of their choice. Prerequisites: NURS 503, NURS 504.

NURS 506 Advanced Practice in Adult Care II 0.16; 4 cr.
This is a practicum in which students apply content learned in NURS 503, 504, 505 and 515, and use concepts learned in NURS 501 and NURS 509, in the advanced management of adult clients with various illnesses. Interdisciplinary collaboration, research utilization, educational activities and case management are emphasized in a specialty area of practice. Prerequisites: NURS 505 and PHRM 314.

NURS 507 Role Development in Nursing Administration 3.0; 3 cr.
This course focuses on administrative skill development, managerial roles and responsibilities, and organizational effectiveness in a changing health care environment. Emphasis is placed on strategic management, interdisciplinary collaboration, business ethics, and international health management.

NURS 508 Advanced Practice in Nursing Administration 0.16; 4 cr.
This practicum focuses on developing advanced management and administrative nursing skills in hospitals and primary health care settings. Prerequisite: NURS 507.

NURS 509 Role Development in Nursing Education 3.0; 3 cr.
This course addresses principles of teaching and learning, instructional methods, test construction and use, as well as curriculum and program development as applied to nursing. The course enables students to apply educational theory and research in various settings such as schools of nursing and staff development centers.

NURS 512 Advanced Psychiatric and Mental Health Assessment 1.3; 2 cr.
This course focuses on the advanced comprehensive mental health assessment of individuals using a case based approach. Students are provided with advanced knowledge and skills in clinical interview, focused history taking, mental status examination and diagnostic reasoning. The student performs comprehensive assessment and D.S.M. IV diagnosis on adult populations.

NURS 516 Psychopathology and Human Behavior 3.0; 3 cr.
This theory course examines the effects and/or sequels of alterations in selected bio-behavioral processes in the adult human suffering from illnesses with critical onsets and long-term unstable conditions. It focuses on the study of the brain and behavior and the neurological, physiological and biochemical foundations of cognition, mood and affect. Students will be exposed to advanced assessment skills, selected theories and research to identify complex psychiatric disorders and interventions utilizing case studies.

NURS 517 Models of Treatment-Psychotherapy (Bio-behavioral Nursing Interventions) 1.6; 3 cr.
In this course, students learn the models of treatment of psychiatric and mental health disorders, and become trained on psychotherapeutic interventions in acute settings. Theories on individual psychotherapy, crisis intervention, group and family therapy are covered. This course has a clinical component where students do practicum in a psychiatric care department. In this course students learn the application of the acquired knowledge in the field of practice and start to practice their role.

NURS 518 Group and Family Psychotherapy 1.6; 3 cr.
This course is complementary to the "Models of Treatment" course, and it focuses on group and family psychotherapeutic interventions. Students synthesize knowledge of theories in the provision of care to groups and families with complex psychiatric problems. Family and group intervention strategies are discussed in a variety of settings. Students explore the practice of these interventions in psychiatric care departments.

NURS 519 Clinical Residency in Acute Psychiatric Care 0.16; 4 cr.
The purpose of this clinical practicum course is to provide opportunities for students to apply the content learned from courses. Students will use assessment skills, selected theories, and research to identify complex health problems and interventions for diverse populations. The focus is on advanced case management and practice of the role, which is further developed as the student integrates theory and practice skills in acute and chronic or community settings. Students will spend 224 hours of clinical hours under the supervision of a preceptor.
NURS 520 Managing Quality With Teams 3.0; 3 cr.
This course addresses theory and application of quality teams, their composition, purposes, function, and decision making tools. Process improvement team and the use of mapping processes for process improvement are a main focus.

NURS 522 Principles and Practice of Community Health Nursing 2.3; 3 cr.
This course introduces concepts and issues relevant to the advanced practice of public and community health nursing. Areas of focus include health promotion, management of chronic disease and health education. The course will use case studies in class and field work in the community.

NURS 523 Advanced Community Assessment and Interventions 2.3; 3 cr.
This course focuses on the nursing assessment of the health of communities using a case based approach. Students are provided with advanced knowledge and skills in population and individual needs assessment and community based interventions. Clinical experience will be provided.

NURS 524 Clinical Residency in Public and Community Health Care 0.16; 4 cr.
The purpose of this clinical course is to provide students with opportunities to apply content learned in community courses, with a focus on advanced case management and health promotion. Assessment skills, theories and research will be utilized in identifying health problems and planning community interventions. Prerequisites: NURS 522 and NURS 523.

NURS 525 Leadership for Nursing Practice 3.0; 3 cr.
The purpose of this course is to promote critical thinking about, and application of evidence-based learning theories. The course encourages a reflective approach to cultivating an effective personal leadership style, with a particular emphasis on transformational leadership; servant leadership; principal agent theory; emotional intelligence theory and applications; authentic leadership, and thought leadership. Students will assess leadership and follower behaviors with reference to current and future organizational roles, develop strategies to improve personal leadership effectiveness, and practice targeted leadership behaviors.

NURS 527 Developing Health Service Programs 3.0; 3 cr.
The purpose of this course is to introduce students to the development and implementation of programs/projects intended to improve practice and health system outcomes. The course will focus on the theory and practice of organizational communication in its various forms - internal, external, informal and formal - and introduce conceptual approaches and techniques of program evaluation. Opportunities for gaining access to health service organizations for project work will be provided. Students will prepare a project plan as part of the course.

NURS 528 Practicum 0.8; 2 cr.
This is a practicum in which students apply the various roles of the advanced practice nurse in their area of specialty. The aim is to extend the clinical experiences obtained during the residency and enhance advanced practice competencies, in preparation for specialty certification.

NURS 526 Comprehensive Exam 0 cr.

NURS 598 Project 3 cr.
Special projects directed toward acquiring skills needed in the development of programs relevant to nursing care within the student’s area of interest. Projects vary depending on the track of study.

NURS 599 Thesis 6 cr.
Division of University Interdisciplinary Programs (DUIP)
Division of University Interdisciplinary Programs (DUIP)

Officers of the Faculty

Peter F. Dorman  President of the University
Ahmad Ballal  Provost, ex-officio
Nesreen Ghaddar  Director
Moueen Salameh  Registrar, ex-officio
Salim Kanaan  Director of Admissions, ex-officio
Rabih Talhouk  Chair of the Graduate Council, ex-officio
Lokman Meho  University Librarian, ex-officio

Background

The Division of University Interdisciplinary Programs, established in 2012, is a degree-granting unit at the American University of Beirut. It supports University interdisciplinary programs involving multiple departments or disciplines in two or more faculties.

Mission

The Division of University Interdisciplinary Programs promotes interdisciplinary engagement in teaching and research as a shared enterprise involving AUB faculties and research units. These collaborative engagements permit faculty members and graduate students to cross traditional disciplinary boundaries in order to advance research and scholarship, acquire knowledge, and generate new insights.

The DUIP provides a responsive environment for graduate education and research by focusing on scholarship in areas not addressed through existing departmental structures, and by connecting graduate students from a variety of backgrounds with the resources which they need to achieve diverse career goals.

Objectives

- To create an environment that fosters interdisciplinary approaches to graduate education and research.
- To improve administrative and financial support for interdisciplinary programs.
- To strengthen existing interdisciplinary programs and to support the creation of new interdisciplinary curricular offerings.

Master Degree Programs in Environmental Sciences

Chairperson: Zurayk, Rami
Professors: El-Fadel, Mutasem (CEE); Farajalla, Nadim (LDEM); Saliba, Najat (CHEM); Shehadeh, Alan (MECH); Zaataari, Ghazi (Pathology and Laboratory Medicine); Zurayk, Rami (LDEM)
Associate Professors: Makdisi, Karim (PSPA); Massoud; May (ENHL)

General Information

The degree of Master of Science (MS) in Environmental Sciences is offered with four possible specializations
- Ecosystem Management in the Faculty of Agricultural and Food Sciences (FAFS)
- Environmental Health in the Faculty of Health Sciences (FHS)
- Environmental Technology in the Faculty of Engineering and Architecture (FEA)
- Environmental Policy Planning in the Faculty of Arts and Sciences (FAS)

The program draws on the resources of various departments of the faculties of Agricultural and Food Sciences (FAFS), Arts and Sciences (FAS), Engineering and Architecture (FEA), Health Sciences (FHS), and Medicine (FM), and provides opportunities for study and research in the general field of the environment.

The program provides graduates with the necessary tools for professional practice and/or the pursuit of higher education. It is administered by an interfaculty committee that coordinates with the graduate committees of the faculties concerned.

Criteria for Admission

To be accepted into the program, an applicant must
- meet general university requirements for admission to graduate study
- be recommended by the appropriate faculty graduate committee and accepted by the Interfaculty Coordinating Committee of the program.

Applicants to the program may be admitted under the following categories:
- graduate - if the average in the last 60 credits or the last two years is greater than 80
- graduate on probation - if the average in the last 60 credits or the last two years is less than 80 and greater than 75.

Adequate preparation to take any graduate course is decided by the academic adviser and the Interfaculty Graduate Environmental Sciences Program Committee (IGESPC).
Comprehensive Examination

The student must register and pass a zero-credit comprehensive examination course in accordance with University general requirements. Timing of the examination is set by the department/program. The Pass (P) or Fail (F) is entered online or reported to the Registrar immediately on the date the comprehensive examination is passed any time during the semester.

In general, a comprehensive examination is a test that covers a broad base of material. The purpose of the examination is to assess the student’s knowledge and capacities to earn a given graduate degree in the field of specialization. Depending on the degree program, it may test course knowledge, knowledge of the student’s proposed research area, and/or the general knowledge in the field. The student’s thesis committee or the department administers the comprehensive exam.

Degree Requirements

Requirements for the degree of Master of Science in Environmental Sciences (any specialization), both thesis and non-thesis options, are tabulated below. The Master’s degree with thesis option will normally require between 20 and 24 months to complete. In both options, the student is required to complete 30 credits of which 9 credits are core courses. All students are required to register in zero credit seminar ENSC 690 whenever it is offered.

### Course Group

<table>
<thead>
<tr>
<th>Course</th>
<th>Group</th>
<th>Thesis Option Credits</th>
<th>Non-Thesis Option Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core A</td>
<td>A</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Electives B</td>
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<td>Seminar</td>
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</tr>
<tr>
<td>Thesis</td>
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<td>6</td>
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</tr>
<tr>
<td>Project</td>
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<td>3</td>
</tr>
<tr>
<td>Total number of credits required for graduation</td>
<td></td>
<td>30</td>
<td></td>
</tr>
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</table>

Core courses, as well as basic and broad electives, are listed below. These courses are structured to provide students with a diversified and multi-disciplinary background in environmental sciences. Students have to register the core course offered by their faculty of concentration. Students are also required to select two other supplementary courses from the list of core courses approved by the program. Specific Faculty/Department requirements are defined under each respective Faculty/Department.

### Core Courses in Environmental Sciences

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENSC 630/LDEM 630</td>
<td>Natural Resources Management</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 640/ENHL 310</td>
<td>Toxicology and Environmental Health Hazards</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 650/PSPA 316</td>
<td>International Environmental Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 660 Environmental Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>ENSC 600/CIVE 656</td>
<td>Air Pollution and Control I</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 610/CIVE 654</td>
<td>Solid Waste Management I</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 620</td>
<td>Water and Wastewater Treatment Technology</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 690</td>
<td>Seminar in Environmental Sciences</td>
<td>0</td>
</tr>
</tbody>
</table>

### Examples of Concentration Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENSC 600/CIVE 656</td>
<td>Air Pollution and Control I</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 601/CIVE 657</td>
<td>Air Pollution and Control II</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 602/CIVE 751</td>
<td>Air Pollution Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 610/CIVE 654</td>
<td>Solid Waste Management I</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 611/CIVE 655</td>
<td>Solid Waste Management II</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 612/CIVE 658</td>
<td>Industrial/Hazardous Waste Management</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 620</td>
<td>Water and Wastewater Treatment Technology</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 621/CIVE 653</td>
<td>Water and Sewage Design</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 622/CIVE 651</td>
<td>Environmental Chemistry and Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 631/LDEM 631</td>
<td>Agricultural Pollution and Control</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 633/LDEM 633</td>
<td>Ecological Landscape Design and Planning</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 641/ENHL 312</td>
<td>Occupational Health</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 642/ENHL 314</td>
<td>Environmental Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 651/CIVE 650</td>
<td>Methods of Environmental Sampling and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 652/CIVE 659</td>
<td>Environmental Impact Assessment</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 653/PSPA 306</td>
<td>Research Methods and Techniques</td>
<td>3</td>
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<tr>
<td>ENSC 654</td>
<td>Physical and Biological Resources in Terrestrial Ecosystems</td>
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</tr>
<tr>
<td>ENSC 655/AGSC 301</td>
<td>Statistical Methods in Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 656/PSPA 362</td>
<td>Public Policy and Administration</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 657/PSPA 341</td>
<td>Environmental Regulation and Legislation</td>
<td>3</td>
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<td>ENSC 658/PSPA 343</td>
<td>Environmental Conflict Resolution</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 659/PSPA 362</td>
<td>Policy Analysis and Program Evaluation for Policy Analysts</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 661/BIOL 363</td>
<td>Population and Community Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 662/ECON 338</td>
<td>Economics of Natural Resources and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>AGSC 376</td>
<td>Resource and Environmental Economics</td>
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</tr>
<tr>
<td>AGSC 384</td>
<td>Rural Social Changes Development and Environment</td>
<td>3</td>
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<tr>
<td>PSPA 300</td>
<td>Methodology and Research Design</td>
<td>3</td>
</tr>
<tr>
<td>PSPA 301</td>
<td>Political Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

1. ENSC 690 course should be registered twice by the program’s students during their residency at AUB. Otherwise, they are equally encouraged to attend the seminar when offered.
Graduation Requirements

To be eligible for graduation with the Master's degree in environmental science, a graduate student

- must have attained a cumulative course average of 80 or above
- is not placed on probation by the time the course work is completed
- must have completed the minimum credit hours of course work designated by the program
- must have passed comprehensive exam
- must have completed thesis requirements for thesis option degree
- must have completed project requirements for the non-thesis option degree
- must have met the residence requirements specified for the Master's degree.

Master of Science in Environmental Sciences—Suggested Curriculum

Thesis Option

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENSC 640</td>
<td>Toxicology and Environmental Health Hazards</td>
<td>3</td>
</tr>
<tr>
<td>Any one of the following offered courses</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ENSC 600</td>
<td>Air Pollution and Control I</td>
<td></td>
</tr>
<tr>
<td>ENSC 610</td>
<td>Solid Waste Management I</td>
<td></td>
</tr>
<tr>
<td>ENSC 620</td>
<td>Water and Wastewater Treatment Technology</td>
<td></td>
</tr>
<tr>
<td>ENSC 690</td>
<td>Seminar in Environmental Sciences</td>
<td>0</td>
</tr>
<tr>
<td>ENSC 69</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENSC 630</td>
<td>Natural Resources Management</td>
<td>3</td>
</tr>
<tr>
<td>ENSC 650</td>
<td>International Environmental Policy</td>
<td>3</td>
</tr>
<tr>
<td>Any one of the following offered courses</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ENSC 600</td>
<td>Air Pollution and Control I</td>
<td></td>
</tr>
<tr>
<td>ENSC 610</td>
<td>Solid Waste Management I</td>
<td></td>
</tr>
<tr>
<td>ENSC 620</td>
<td>Water and Wastewater Treatment Technology</td>
<td></td>
</tr>
<tr>
<td>ENSC 69</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

Non-Thesis Option

<table>
<thead>
<tr>
<th>Term</th>
<th>Fall</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENSC 640</td>
<td>Toxicology and Environmental Health Hazards</td>
<td>3</td>
</tr>
<tr>
<td>Any one of the following offered courses</td>
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<td>3</td>
</tr>
<tr>
<td>ENSC 600</td>
<td>Air Pollution and Control I</td>
<td></td>
</tr>
<tr>
<td>ENSC 610</td>
<td>Solid Waste Management I</td>
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<tr>
<td>ENSC 620</td>
<td>Water and Wastewater Treatment Technology</td>
<td></td>
</tr>
<tr>
<td>ENSC 690</td>
<td>Seminar in Environmental Sciences</td>
<td>0</td>
</tr>
<tr>
<td>ENSC 69</td>
<td>Elective</td>
<td>3</td>
</tr>
</tbody>
</table>
Term II  Spring  Credits
ENSC 630  Natural Resources Management  3
ENSC 650  International Environmental Policy  3
Any one of the following offered courses  3
ENSC 600  Air Pollution and Control I  3
ENSC 610  Solid Waste Management I  3
ENSC 620  Water and Wastewater Treatment Technology  3
ENSC 69_  Elective  3

Term III  Summer  Credits
ENSC 697  Project  3
ENSC 69_  Elective  3

Term IV  Fall  Credits
ENSC 690  Seminar in Environmental Sciences  0

Term V  Spring  Credits
ENSC 697  Project  3

Total 30

Course Descriptions
ENSC 600/ CIVE 656  Air Pollution and Control I  3 cr.

ENSC 601/ CIVE 657  Air Pollution and Control II  3 cr.
Process analysis, operational limitations, cost and performance, and evaluation of control process and equipment. Case studies, field visits, and inspection of industrial installations. Prerequisite: ENSC 600 or consent of instructor. Alternate years.

ENSC 602/ CIVE 751  Air Pollution Modeling  3 cr.
Air pollution meteorology. Plume rise. Dispersion and atmospheric chemistry. Meteorological models. Gaussian, statistical, and other special application models. Prerequisite: ENSC 600 or consent of instructor. Alternate years.

ENSC 610/ CIVE 654  Solid Waste Management I  3 cr.

ENSC 611/ CIVE 655  Solid Waste Management II  3 cr.
Design of solid waste disposal schemes, including design reports and literature search on the development of conventional treatment and disposal processes. Prerequisite: ENSC 610 or consent of instructor. Alternate years.

ENSC 612/ CIVE 658  Industrial/Hazardous Waste Management  3 cr.

ENSC 620  Water and Wastewater Treatment Technology  3 cr.
Quality and methods of treatment of water and wastewater. Literature search on the development of conventional treatment processes. Students who have taken CIVE 086 cannot register for this course. Annually.

ENSC 621/ CIVE 653  Water and Sewage Works Design  3 cr.
Design of wastewater schemes, including design reports and literature search on the development of conventional treatment processes. Prerequisites: CIVE 076, CIVE 586, and ENSC 620, or consent of instructor. Alternate years.

ENSC 622/ CIVE 651  Environmental Chemistry and Microbiology  3 cr.

ENSC 630/ LDEM 630  Natural Resource Management  3 cr.
Ecosystem approach to NRM. Data sources and interpretation for NRM. Physical, socioeconomic, cultural, political, and geographic specificity of NRM. Principles and processes of NRM. Case studies and practical examples in contrasting situations.

ENSC 631/ LDEM 631  Agricultural Pollution and Control  3 cr.
Fate of agrochemicals in the environment. Effect on terrestrial and aquatic systems. Contamination, monitoring residues, methodologies, and risk assessment models and research. Annually.

ENSC 633/ LDEM 633  Ecological Landscape Design and Planning  3 cr.
Introduction to the theory and methodology of ecological landscape design and planning, aims to introduce the holistic approach of landscape ecology and its application in sustainable management of natural and cultural landscape stero-systems. Alternate years.
ENSC 640/ ENHL 310
Toxicology and Environmental Health Hazards 3 cr.
Reviews of the essentials of toxicology: dose response, toxicokinetics (absorption, distribution, metabolic conversion, elimination), and the molecular basis for toxic action, target organ toxicity, mutagenesis, teratogenesis, and carcinogenesis. Selected chemical agents that adversely affect human health are introduced as case studies. Concepts of risk assessment. Annually.

ENSC 641/ ENHL 312
Occupational Health 3 cr.
Conditions and hazards in occupational environments, and control and effect on workers and the neighborhood. Administrative aspects of occupational health programs in industries and monitoring of occupational environments. Annually.

ENSC 642/ ENHL 314
Environmental Management Systems 3 cr.
This course provides an overview of the most common international standards for environmental management systems, primarily the International Standards Organization (ISO) harmonized management systems, and its implications for different firms. It provides students with the skills to design, implement and assess such management systems. Though the first part of the course is mainly lecture based, student participation in the form of questions and discussion is always welcomed and encouraged. Critical thinking will be promoted throughout the course. Students will be expected to prepare a technical report on a firm or industry of their choice and to communicate project findings to their colleagues through verbal presentation. Emphasis is placed on solving environmental problems using an integrated approach in order to achieve an optimized management performance. Alternate years.

ENSC 650/ PSPA 316
International Environmental Policy 3 cr.
This course seeks to provide a broad overview of the key concepts, actors, and issues related to global environmental policy. It outlines the evolution of environmental policy in facing global environmental challenges, and how such policies have become inherently intertwined with government policy, business practice, and international trade. Ethical considerations in relation to the environment are also addressed. Annually.

ENSC 651/ CIVE 651
Methods of Environmental Sampling and Analysis 3 cr.
Theory and practice of sampling techniques and instrumental methods used in environmental sciences and technology, with emphasis on the determination of pollutants in water, air, and soil by modern analytical techniques. Adaptation of procedures to specific environmental matrices through case studies and practical application. Alternate years.

ENSC 652/ CIVE 659
Environmental Impact Assessment 3 cr.
Theories and procedures of assessing environmental impact. Analysis of the impact of development on various measures of environmental quality. Benefit-cost considerations in environmental impact assessment. Cost of environmental degradation: methodologies and case studies. Prerequisites: ENSC 600, ENSC 610, and ENSC 620, or consent of instructor. Alternate years.

ENSC 653/ PSPA 306
Research Methods and Techniques 3 cr.
A course that deals with various methods of data collection and analysis. Specific research methods include both quantitative and qualitative techniques such as experimental, survey, field observation, content analysis, historical/comparative, and evaluation. Offered occasionally.

ENSC 654
Physical and Biological Resources in Terrestrial Ecosystems 3 cr.

ENSC 655/ AGSC 301
Statistical Methods in Agriculture 3 cr.
Non-experimental observational studies. Survey research instrumentation and analysis. Factorial design and analysis. Model testing and validation. Basic statistical concepts. Regression and correlation analysis. Analysis of variance and co-variance. Chi square and other non-parametric tests. Prerequisite: MATH 208 or equivalent. Alternate years.

ENSC 656/ PSPA 352
Foundations of Public Policy 3 cr.
This seminar covers topics related to the substance, methods and frameworks of public policy in a variety of disciplines including: welfare economics, political science, political economy, and organization theory. Emphasizing the role of theory in empirical policy research, the course illuminates the various policies and policy challenges in the following substantive areas: economics; education; the environment; national security; and immigration. Core course. Annually.

ENSC 657/ PSPA 341
Environmental Regulation and Legislation 3 cr.
An introduction to contemporary legislative approaches to environmental protection, the rationales for their embodiment in policies, and their effectiveness in achieving prescribed goals and alleviating environmental degradation. This course also examines the emergence of environmental initiatives in developing countries with a focus on the latest developments in Lebanon. Alternate years.

ENSC 658/ PSPA 343
Environmental Conflict Resolution 3 cr.
An introduction to contemporary approaches to global environmental negotiation and conflict resolution, including the efforts of international organizations at risk, communication, mediation, and facilitation. This course focuses on procedures to manage negotiations of environmental conflicts and disputes between governments, corporations, ecologists, the media, and the general population. Information is also provided on environmental dispute cases successfully resolved. Alternate years.

ENSC 659/ PSPA 362
Public Policy and Administration 3 cr.
This seminar covers topics and frameworks related to the substance and approaches of public policy as they relate to public administration. Students will engage in a serious analysis of the economic, social, and cultural assumptions that underpin government and its relationship to the polity. The course is also designed to give students an organized opportunity to investigate their own interests within a specific key policy area. Annually.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSPA 317</td>
<td>International Political Economy</td>
<td>3 cr.</td>
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<tr>
<td>PSPA 360</td>
<td>Public Policy Research and Analysis</td>
<td>3 cr.</td>
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<tr>
<td>AGSC 376</td>
<td>Resource and Environmental Economics</td>
<td>3 cr.</td>
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<tr>
<td>AGSC 384</td>
<td>Rural Social Change, Development and the Environment</td>
<td>3 cr.</td>
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<tr>
<td>ENSC 661/ ECON 338</td>
<td>Population and Community Ecology / Economics of Natural Resources and the Environment</td>
<td>3 cr.</td>
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<tr>
<td>ENSC 690</td>
<td>Seminar in Environmental Sciences</td>
<td>0 cr.</td>
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<tr>
<td>AGSC 300</td>
<td>Methodology and Research Design</td>
<td>3 cr.</td>
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<tr>
<td>AGSC 376</td>
<td>Resource and Environmental Economics</td>
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<tr>
<td>ENSC 661</td>
<td>Special Topics in Environmental Policy and Politics</td>
<td>3 cr.</td>
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<td>ECON 338</td>
<td>Public International Law</td>
<td>3 cr.</td>
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<td>ENSC 301</td>
<td>The UN and International Politics</td>
<td>3 cr.</td>
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<td>AGSC 304</td>
<td>Rural Social Change, Development and the Environment</td>
<td>3 cr.</td>
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This course provides a critical examination of the politics of international economic relations, global economic development, and transnational economic activity with a special emphasis on the position and experiences of the Middle East states in the global political economy. The course offers a survey of theoretical approaches to international political economy and addresses themes critical to the experience of the Middle East such as state-led industrialization, trade and regionalism, finance, oil, labor migration, MNCs, transnational movements, globalization, neo liberalism, and the politics of development and global governance. Occasionally.

This course provides an introduction to the philosophy of science and how it influences the choice of research design. The emphasis is on developing skills that are useful for any method (survey, research, comparative historical analysis, game theory). The objective is to provide students with the practical tools they need to successfully complete original research. Core course. Annually.

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PSPA 317 International Political Economy 3 cr.
This course provides a critical examination of the politics of international economic relations, global economic development, and transnational economic activity with a special emphasis on the position and experiences of the Middle East states in the global political economy. The course offers a survey of theoretical approaches to international political economy and addresses themes critical to the experience of the Middle East such as state-led industrialization, trade and regionalism, finance, oil, labor migration, MNCs, transnational movements, globalization, neo-liberalism, and the politics of development and global governance. Occasionally.

PSPA 318 Theories of International Relations 3 cr.
The seminar offers a critical study of readings drawn from the major theoretical traditions (realism, liberalism, constructivism) in international relations theory as well as critical approaches and trends. Occasionally.

PSPA 320 Theories of Comparative Politics 3 cr.
A survey of various paradigms in comparative politics, focusing on behavioralist, institutional, development, and radical approaches. Themes such as structure of power, state-society relations, political development, political culture, and political economy are emphasized. Core course. Annually.

PSPA 345 Special Topics in Environmental Policy and Politics 3 cr.
May be repeated for credit. Occasionally.

PSPA 351 Foundations of Public Administration 3 cr.
This seminar is an advanced study and analysis of the field of public administration, from its foundations and origins up to the present. It covers topics such as: historical public administration, the traditional model of public administration, new public management, and collaborative public administration. The course will also review contemporary research activities and findings related to public administration. Core course. Annually.

PSPA 352 Foundations of Public Policy 3 cr.
This course covers topics related to the substance, methods and frameworks of public policy in a variety of disciplines including: welfare economics, political science, political economy, and organization theory. Emphasizing the role of theory in empirical policy research, the course illuminates the various policies and policy challenges in the following substantive areas: economics; education; the environment; national security; and immigration. Core course. Annually.

PSPA 360 Public Policy Research and Analysis 3 cr.
This seminar provides an introduction to policy analysis typologies, policy tools, and the factors that shape the utilization of policy analysis. It is designed to give students the theoretical and practical exposure to the process of the analysis of public policy as well as to its relevant qualitative, survey, and mixed method approaches and techniques. Annually.

This seminar investigates the conceptual and practical boundaries of public management reform initiatives with a comparative perspective. Moving beyond the foundations of traditional public administration, topics covered include performance and personnel management, privatization, e-government, and accountability. The limits of public management will also be considered. Annually.

PSPA 371 Public Management 3 cr.
This seminar investigates the conceptual and practical boundaries of public management reform initiatives with a comparative perspective. Moving beyond the foundations of traditional public administration, topics covered include performance and personnel management, privatization, e-government, and accountability. The limits of public management will also be considered. Annually.

PSPA 372 Leadership and Management of Public 3 cr.
This seminar examines the distinction between leadership and management, from theoretical and applied perspectives. It also analyzes the major theories of leadership and assesses their impact on group and individual behavior in light of personality differences and cross-cultural management. Alternate years.

PSPA 381 Special Topics in Public Policy 3 cr.
May be repeated for credit. Occasionally.

CIVE 647 GIS for Water Resources and Environmental Engineering 3 cr.
A course that introduces the concepts and principles of Geographic Information Systems (GIS) from the perspective of water resources and environmental engineering. It provides coverage of state-of-the-art GIS methods and tools specifically targeting water resources and environmental applications including: spatial and terrain analysis, geostatistical analysis, watershed delineation and identification of river networks, representation of groundwater and aquifer systems, time series analysis and development of GIS integrated water and environmental models. The course will be based on the recently released ESRI ArcGIS 9.3 and the Arc Hydro data model developed by the Consortium for GIS in Water Resources (CGWR).

CIVE 652 Environmental Biotechnology and Bioremediation Applications 3 cr.
This course examines current and emergent environmental biotechnologies used for environmental quality evaluation, monitoring, and remediation of contaminated environments, and provides the student with a working knowledge of the science that underpins them. The fundamentals of environmental microbiology are presented; these provide a foundation for subsequent discussions of bio-treatment of problem environmental pollutants, and engineering strategies for bioremediation.

CIVE 655 Solid Waste Management II 3 cr.
A course on the design of solid waste disposal schemes, including design reports and a literature search on the development of conventional treatment and disposal processes. Prerequisite: CIVE 654 or consent of instructor.

CIVE 752 Environmental Case Studies and Conflict Resolution 3 cr.
A course on case studies in environmental management: pesticide application, air pollution, solid waste land filling, wastewater treatment facilities, oil exploration, ocean dumping, deep well injection, reservoirs, and water resources. Prerequisites: CIVE 450, CIVE 654, and CIVE 656; or consent of instructor.

ENHL 300 Introduction to Environmental Health 2 cr.
A course that introduces students to the physical life support system and interactions with the socio-economic context. Emphasis is placed on assessing, preventing, and controlling environmental hazards affecting human health and ecological wellbeing. The role of local and global regulatory systems in impacting change and sustaining a healthy environment is highlighted. Enabling communities through this process of sustainable development is critically assessed.
ENHL 307  Food Safety and Health  3 cr.
The course will focus on the safety and management of processed food products. It will address the advantages and limitations of food processing techniques and in specific the application of food additives. Areas covered will relate mainly to food safety and quality control, health impacts, types and limitations of food processing methods, use of food additives, exposure estimation, toxicological implications, risks and benefits governing use and quality control measures and applications both at the national and international levels.

ENSC 695  Comprehensive Exam  0 cr.

ENSC 697  Project  3 cr.
The project must be undertaken, in partial fulfillment of the requirements for the degree, upon the completion of at least 27 credits of core and elective courses. A student who is unable to finish the project in one semester can register for one additional time.

ENSC 699  Thesis  6 cr.
Interdisciplinary Research Centers and Programs
Interdisciplinary Research Centers and Programs

Interfaculty programs are under the direction of the provost. Each interfaculty program is administered by a coordinating committee consisting of one representative member from each participating faculty.

Members of the committee are appointed by the provost, upon recommendation of the dean concerned. The provost appoints the chair from within the committee membership. The chair and members serve for a term of three years which is subject to renewal.

The committee coordinates interdisciplinary course offerings, content, and standards among the various faculties, and through the appropriate departments concerned. It is responsible for the continuous evaluation of the program, including the approval of new, required, or elective courses, and the discontinuation or modification of existing courses. The committee recommends any changes in requirements for student admission, evaluation, or graduation that are specific to the program to the Board of Graduate Studies.

The committee acts on applications for admission to the program based on recommendations from the graduate committees of the faculties offering the specific majors.
AUB Nature Conservation Center (NCC)

Director: Saliba Aoun, Najat, Professor, Chemistry Department

AUB Faculty with Membership in IBSAR

Abiad, Mohammad, PhD  Assistant Professor; Agribusiness, (FAFS)
Al Sayed, Amani  Instructor, English (FAS)
Al Zein, Mohammad  Instructor, Biology (FAS)
Alameddine, Mohammad  Assistant Professor, (FHS)
Arakji, Reina  Assistant Professor, (OSB)
Barbour, Elie, PhD  Chairperson and Professor; Animal and Veterinary Sciences (FAFS)
Bibi, Karma,  Instructor, Sociology and Anthropology, (FAS)
Bouhadir, Kamal, PhD  Associate Professor; Chemistry (FAS)
Chaaban, Jad, PhD  Assistant Professor; Economics (FAS)
Chalak, Ali, PhD  Assistant Professor; Agribusiness, (FAFS)
Choueiri, Lina, PhD  Associate Professor, English (FAS)
Dajani, Nabil, PhD  Professor, Sociology and Anthropology, (FAS)
Darwiche, Nadine, PhD  Professor; Biochemistry and Molecular Genetics (FM)
Dib, Nelly  Instructor; Philosophy (FAS)
Dimechkie, Riad  Director of EMBA(OSB)
El-Sabban, Marwan, PhD  Professor; Human Morphology (FM)
Feghali, Antoine, PhD  Assistant Professor and Co-Director, Business Information and Decision Systems Track (OSB)
Ghaddar, Tarek, PhD  Associate Professor, Chemistry Department
Ghaibeh, Lina,  Assistant Professor; Architecture and Design (FEA)
Ghattas, Hala, PhD  Assistant Professor; Nutrition (FAFS)
Habib, Rima, PhD  Associate Professor, Environmental Health (FHS)
Harb, Charles, PhD  Chairperson and Associate Professor, Psychology, (FAS)
Homaidan, Fadia, PhD  Director of Grants and Contracts, Associate Professor; Physiology (FM)
Hwalla, Nahla, PhD  Dean and Professor; Nutrition and Food Sciences (FAFS)
Jaalouk, Diana, PhD  Assistant Professor, Biology, (FAS)
Kaisi, Samira, PhD  Managing Director, Molecular and Cellular Medicine, (FM)
Kassaify, Zeina, PhD  Assistant Professor; Nutrition and Food Sciences (FAFS)
Khayat, Munira, PhD  Visiting Assistant Professor; Social and Behavioral Sciences (FAS)
Mabsout, Mounir, PhD  Professor, Civil Engineering (FEA)
Makdisi, Karim, PhD  Associate Professor; Political Studies and Public Administration (FAS)
Established in 2002, The Nature Conservation Center is an interfaculty center with a mission to promote the conservation and sustainable utilization of biodiversity in arid and Mediterranean regions by providing an open academic platform for innovative research and development.

The Center’s objectives are to link biological, ecological, social, economic, and cultural disciplines to generate new knowledge and publish information that is useful to society and that provides it with direction and tools for effective nature conservation and use. It achieves these objectives by:

- Conducting basic and applied research.
- Fostering collaboration among different sectors.
- Guiding policy and legislation.
- Exploring and developing economic opportunities for the sustainable use of biodiversity.

Membership and Governance

The AUB Nature Conservation Center consists of volunteers committed to collaborative learning and discovery. Membership includes AUB faculty and staff members and other scholars whose interests focus on Biodiversity and Nature related issues. The Center is a platform for scholars at all stages in their careers and from all parts of the world to exchange ideas and information. The Center’s members take part in seminars and activities as well as provide assistance to researchers and students. These individuals are categorized as Members, Associates, Assistants, Affiliates, Volunteers, Interns or Friends of the Center.

The Center is managed by a director and three committees whose members are appointed by election. The mission and objectives of these committees have been designed to ensure diversity and synergism within the center:

- The Advisory Board is responsible for giving advice on the Center’s vision, projects, programs, and future directions. It is also responsible for promoting the Nature Conservation Center to the general community, and to public and private Institutions, as well as helping and facilitating fundraising.
- The executive committee is responsible for coordinating the work of the center and providing guidance to its committees. It is also in charge of fundraising.
- The research committee is responsible for the cultivation of research activities, and encourages those leading to patentable innovations.

The Advisory Board is responsible for giving advice on the Center’s vision, projects, programs, and future directions. It is also responsible for promoting the Nature Conservation Center to the general community, and to public and private Institutions, as well as helping and facilitating fundraising.

In addition to coordinating with the appropriate University administrators and an International Advisory Board, AUB Nature Conservation Center works with the business community, with governments and NGOs at the national, regional, and international levels.
Center for Advanced Mathematical Sciences (CAMS)

The American University of Beirut has established the Center for Advanced Mathematical Sciences (CAMS), the first such center among the institutions of higher learning in the Arab world. Given the seminal historical role of the Arab Middle East in the development of mathematics and astronomy, it is only natural for the region to have such a center dedicated to advanced teaching and research. The establishment of the Center is also especially timely, in view of the significant scientific talent both within the region and among its Diaspora, as well as the central importance of mathematical inquiry to the region’s scientific, technological, and economic development.

Director
Wafic Sabra

International Advisory Committee
Sir Michael Atiyah (Chairman), University of Edinburgh, UK
R. Dijkgraaf, University of Amsterdam, Netherlands
I. Ekeland, UCB, Canada; PIMS, Canada
P. Griffiths, IAS, Princeton, USA
N. Khuri, Rockefeller University, New York, USA
D. Zagier, MPI Bonn, Germany; College de France, France

In addition to their scientific distinction, members of the International Advisory Committee are highly experienced scientific leaders and have been involved in the administration of some of the world’s top academic institutions in Europe and the USA. The International Advisory Committee’s main task is to advise the president of AUB and the director of CAMS on policies, fundraising, appointments of fellows, and scientific programs.

CAMS Objectives

CAMS provides a vehicle for promoting research and graduate studies in the mathematical sciences, and a focal point for collaborative research among scientists and mathematicians in Lebanon and the region at large. Its aims are to:

- conduct research in the sciences and engineering, with special emphasis on their mathematical aspects. In this regard CAMS acts as a regional research facility in various mathematical sciences such as theoretical physics, pure and applied mathematics, computer science, engineering, and a variety of fields in computational science
- promote and contribute to the graduate programs in the mathematical sciences and engineering at AUB
- promote postdoctoral research and education at AUB and at other local universities, and foster a multi-disciplinary environment encompassing various areas of mathematical science
- assist the university community at large in integrating the use of high performance computing into the various academic and administrative programs by capitalizing on the expertise developed by the scientific and professional staff of CAMS
- identify and pursue promising new fields of science and engineering that might be integrated within CAMS and the University
- act as a focal point for promoting collaborative research among scientists in the region, partly by accommodating visitors for various intervals of time, and partly by organizing topical meetings, workshops, and conferences in different fields
- encourage and help promising young students to start on academic careers in mathematical sciences including applied areas crucial to economic growth.
Center for Civic Engagement and Community Service (CCECS)

Director: Mabsout, Mounir, Professor of Civil Engineering
Associate Directors: Safa Majzoub, Olga (Activities and Planning); Shibli, Rabih (Development and Projects)
Center Coordinator: Abou Farraj, Lina
Center Assistant: Makarem, Yasmeen
Project Consultant: Kanafani, Samar
Project Coordinators/Research Assistants: Basma, Ali; Hokayem, Anastasia; Masalkhi, Fatme; Zein, Dahlia

Introduction

Established in 2008, the Center for Civic Engagement and Community Service (CCECS) aims to develop a culture of service and civic leadership within the AUB community and provide opportunities for AUB students, faculty, and staff from all backgrounds to study and respond to social and civic needs. The Center identifies, integrates, and supports university-wide community initiatives, thus upholding AUB’s mission of service towards its community.

The main objective of the Center is to seek connections between civic engagement and liberal learning and encourage leadership, scholarship, volunteerism, and community partnerships by: promoting the integration of service to society with academic study and research in a variety of disciplines; encouraging responsibility and leadership through outreach volunteering programs; building sustainable collaborations and creating close links with the community.

Approach

To fulfill its mission, CCECS has adopted Community Service Outreach Activities, Community-Based Projects and Research, and Community-Based Learning (or Service Learning) which is an academic type of experiential learning combining service with explicit academic learning objectives, preparation for community work, and deliberate reflection. This is achieved by structuring the CCECS into three main service units:

Community Outreach Projects unit (COPu) that aims to organize a strong outreach volunteering program, link with students’ organizations, and reach out to administrative units and academic departments to expand community engagement across campus.

Community Development Projects unit (CDPu) that aims to initiate and/or support inter/multi-disciplinary community-based research and community development projects.

Community-Based Learning unit (CBLu) that aims to integrate the service activities of the Center into academic programs and develop service or community-based learning across the university.

A research, documentation, and media hub supports the Center and its various units and provides resources on civic engagement to the public.

The Center’s main focus is on education, public health, the environment, urban and rural sustainable development, philanthropy, and social justice.

Partners

The Center works with AUB departments, faculty, centers, and student organizations, and with a growing list of community partners including governmental and non-governmental organizations, and various municipalities throughout Lebanon. It supports the Tomorrow’s Leaders program under the Middle East Partnership Initiative (MEPI) and the University Scholarship Program (USP) by providing community service opportunities to students in the programs and developing service learning at AUB. CCECS also collaborates with centers and institutes within the region and around the world which share a mutual commitment to community service and its implementation through Community-Based Learning. Through the Center, AUB is a founding member of the Ma’an Arab University Alliance, and a member of the Talloires Global Network of Universities and Campus Compact. It is also a partner with nine other universities from Europe, Jordan, and Lebanon on a TEMPUS EU-supported project to develop service-learning and civic engagement partnerships across the curriculum. CCECS also receives donations and funds from various collaborators who support and partner on its various community activities and projects.

Volunteering

CCECS seeks to establish and maintain an active volunteering program at AUB, whereby students mainly, but also faculty and staff, can identify opportunities and options to be involved in projects that best satisfy their aspirations, match their expertise, and respond to critical societal needs. These events and activities involve volunteers with the community at large, and inspire them to develop a relationship with those in need. For more information on volunteering opportunities, contact the Center at ccecs@aub.edu.lb.
The Issam Fares Institute for Public Policy and International Affairs (IFI)

Director: Khouri, Rami G.
Associate Director: Makdisi, Karim
Staff: Abbas, Dania; Bekdash, Hania; Bittar, Sara; Ghali Addam, Hana; El-Amine, Rayan; El Hajj, Rana; Karajerjian, Sarine; Sleiman, Hana

About IFI

The Issam Fares Institute for Public Policy and International Affairs (IFI) at the American University of Beirut (AUB) is an independent research-based, policy-oriented institute that aims to harness, develop, and initiate policy-relevant research. It is committed to increasing and deepening knowledge production in, and about, the Arab region; and to creating a space for the interdisciplinary exchange of ideas among researchers, civil society actors and policy makers.

IFI considers that in a globalized world, it is crucial to understand and connect policy issues, problems and subjects on the local, national, international, transnational and global levels with the various players, interests and power structures that shape, interact and respond to them. In this sense, IFI understands policy as embedded in larger historical, social, economic and political contexts, rather than just a technical process to be implemented.

IFI’s main goals include:
• enhancing and broadening public policy-related debate and knowledge production in the Arab world and beyond;
• better understanding the Arab world within shifting international and global contexts;
• providing a space to enrich the quality of interaction among scholars, officials and civil society actors in and about the Arab world; and
• disseminating knowledge that is accessible to policy-makers, media, research communities and the general public.

Research, Advocacy and Public Policy-making in the Arab World (RAPP)

Research, Advocacy and Public Policy-making (RAPP) Program works to forge an Arab contribution to global knowledge about the practice of policy-making. It aims at bridging an existing knowledge gap in policy-making by documenting experiences, replicating successful ones, and assessing and improving weak ones. Its uniqueness lies in being an indigenous effort by a policy research institute in the Arab world, collectively with other institutes in the region, to assess and improve how research is influencing policy-making.

United Nations in the Arab World Program

The United Nations in the Arab World Program was created with the objective of exploring and analyzing the role of the United Nations (UN) in the Arab region and the impact it has had on regional politics and societies. The aim of the program is to collect, support and generate research relevant to the UN’s multiple roles in the Arab region. In addition, the program aims to bring together scholars and decision-makers to discuss salient issues, to be able to develop a rich academic environment in the Arab World, and to inform public policy decisions.

Climate Change and Environment in the Arab World Program

The Climate Change and Environment in the Arab World Program aims to understand the climate change and environment policy process in the region and to define the most appropriate policy recommendations, by linking development in applied sciences on issues related to climate change and environment to social sciences. In addition, the program aims to develop an information bridge between research and policy-making, and to influence national and regional debates in international negotiations on climate change and sustainable development.

Youth in the Arab World Program

The Youth in the Arab World Program acts as a meeting point, catalyst, and central repository for Arab-international research and policy on youth, by working regularly with researchers, public policy officials, and relevant institutions in the private sector and civil society. As part of its effort to nurture multidisciplinary research, the program is jointly facilitating the AUB Youth Research Working Group with the Faculty of Health Sciences (FHS). The working group is advised by a steering committee composed of a multidisciplinary group of AUB faculty, with the aim of researching, synthesizing, and disseminating quality research on youth well-being, while bringing practical, relevant, and situated recommendations to the policy-making process.

Policy and Governance in Palestinian Refugee Camps Program

The Policy and Governance in Palestinian Refugee Camps Program is a multi-year research, analysis, and policy-recommendations program to explore the public policy and governance challenges of Palestinian refugee camps in Lebanon, Jordan, Syria, the West Bank and Gaza. This program is the first integrated and coordinated mechanism to share the vast amount of individual and collective research that exists on Palestinian refugees in the region, while driving cross-sectoral analyses and using their conclusions to enrich policy-making by the various authorities and parties concerned.
Arab Uprisings Research Initiative

The Arab Uprisings Research Initiative, instigated by the office of the AUB Provost and managed by IFI is a long-term, multi-sectorial research initiative on the Arab uprising aiming to harness the university’s many resources and assets to engage constructively to better understand the nature and consequences of the changes underway in the region.

Nadim Makdisi Memorial Fund

AUB-IFI received a generous endowment from the Makdisi family to honor the memory of Nadim A. Makdisi, one of Lebanon’s accomplished journalists and publishers. IFI invites annually a prominent or recognized promising journalist or expert in current affairs with particular emphasis on the Middle East to AUB to give a public lecture to the AUB community. The fund also annually awards a grant to a graduate student whose thesis covers relevant issues in journalism and current affairs.

Bill and Sally Hambrecht Distinguished Peacemakers Lecture Series

IFI inaugurated the Bill and Sally Hambrecht Distinguished Peacemakers Lecture Series in October 2007 and in the course of three years, over a dozen speakers who have mediated national and international conflicts have been invited to deliver a public lecture at AUB and meet with conflict-resolution practitioners. Lakhdar Brahimi, Jimmy Carter, Alvaro de Soto and Amre Moussa are a few of the previous speakers in the series.

Writer in Residence

IFI offers a resident fellowship at AUB for distinguished Arab and international journalists and other writers to complete texts they are working on while also contributing to the academic and intellectual life of the university. Our first writer in residence was the late Anthony Shadid who was followed by Nora Boustany of The Washington Post.
Interfaculty Graduate Neuroscience Program (IGNP)

The Interfaculty Graduate Program leading to the MS degree in neuroscience draws on the resources of the Faculty of Medicine, the Faculty of Engineering and Architecture, and the Faculty of Arts and Sciences, and is administered by graduate committees of the faculties concerned.

Neuroscience is the study of the nervous system. It includes an interrelated set of scientific disciplines including basic (neuroanatomy, neurophysiology, neurochemistry, neuropharmacology, neurobehavior) and clinical (neurology, neurosurgery, anesthesiology, neuropathology, ophthalmology, psychiatry) subjects. Although the participating faculty comes primarily from the Department of Anatomy, Cell Biology and Physiology (former Physiology and Human Morphology Departments) contributions are made from faculty in the Neurology and Neurosurgery Divisions and the Psychiatry Department in the Faculty of Medicine, the Biology Department in the Faculty of Arts and Sciences, and the Electrical Engineering Department in the Faculty of Engineering and Architecture.

The Interfaculty Graduate Neuroscience Program (IGNP) is a member of the Association of Neuroscience Departments and Programs (ANDP) in Bethesda, Maryland (USA), whose aim is to advance education and research in neuroscience.

Admission Requirements

Student applicants must be recommended for admission by both the department concerned and the appropriate graduate committee. The program is flexible in accepting students from a variety of backgrounds, including MD graduates and holders of the BS degree from various university programs.

Graduation Requirements for the MS in Neuroscience

• Students holding a BS or BA degree are required to take a minimum of 21 graduate credit hours and present a thesis based on independent research in one of the basic neuroscience subjects.

• Holders of the MD degree, or medical students who have completed the first two years towards the MD, are required to take a minimum of 10 non-medical graduate credit hours in addition to a thesis.

• Only one course (IDTH 308 - Basic Neuroscience (6 credits)) is required, in addition to a wide choice of electives from various departments and faculties.
Average Length of Time

- Four semesters for holders of BS or BA degrees.
- Two semesters for MD graduates or medical students who have completed the first two years of the medical program.

Course Descriptions

Required Courses

**IDTH 308 Basic Neuroscience**

`62.54; 6 cr.`

A course that covers the structure and function of the human nervous system. This course can also be taken in two parts: *IDTH 308A* and *IDTH 308B*. *Six weeks. Annually.*

**IDTH 308A Neuroanatomy**

`31.27; 3 cr.`

Offered to graduate students the course covers normal structure of the human nervous system. *See Department of Human Morphology. Three weeks.*

**IDTH 308B Neurophysiology**

`31.27; 3 cr.`

Offered to graduate students the course covers function of the human nervous system. *See Department of Physiology. Three weeks.*

**IDTH 301 Introduction to Medical Science Literature**

`16.32; 2 cr.`

A multi-disciplinary approach to the use of medical science publications (open to beginning graduate students in the Faculty of Medicine). *This course is a requirement for all graduate students in the Faculty of Medicine.*

**IDTH 397–398 MS Thesis**

`9 cr.`

Recommended Courses

**IDTH 309 Biology of Nerve and Muscle**

`48.0; 3 cr.`

A multi-disciplinary study of anatomy, physiology, biochemistry, pharmacology, and pathology of nerve and muscle. *Alternate years.*

**PHYL 310 General Physiology: Cellular Mechanisms**

`48.16; 3 cr.`

A study of aspects of membrane transport processes across symmetrical and asymmetrical cell membranes, electrophysiology, membrane potentials, action potentials in excitable cells, synaptic transmissions, receptors and excitation-contraction coupling in muscles. *Annually.*

**PHYL 324 Electrophysiology of Excitable Cells**

`12.9; 1 cr.`

A study of the basic mechanisms of membrane cable property and resting potentials in all cells, action potential initiation and propagation in excitable cells, receptor physiology, central synaptic transmission, neuromuscular transmission, and muscular contraction. *Annually.*

In addition, any elective graduate course from other graduate programs.
The Interfaculty Graduate Nutrition Program (GNP), leading to the MS degree in Nutrition (thesis or non-thesis), draws on the resources of various departments of the faculties of Agricultural and Food Sciences, Medicine, and Health Sciences, and provides opportunities for study and research in the general field of nutrition. The involvement of several faculties in this program provides students with a wide range of choices and enables students to specialize in areas of nutrition such as basic nutrition, community nutrition, clinical nutrition, or nutritional biochemistry. Students can register in this program through any of the participating faculties.

The program is administered by an interfaculty coordinating committee and the graduate committees of the participating faculties.

To be accepted into the program, the student must:
• meet general university requirements for admission to graduate study,
• be recommended by the department concerned.

Degree Requirements

MS Nutrition (Thesis)

Requirements for the MS degree in Nutrition (thesis) are coursework, research, and a thesis. (Total number of credits required is 30: 21 course credits and 9 thesis credits).

<table>
<thead>
<tr>
<th>Required Core Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NFSC 311 Advanced Nutrition: Macro Nutrients</td>
<td>3</td>
</tr>
<tr>
<td>NFSC 314 Advanced Nutrition: Minerals</td>
<td>3</td>
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<tr>
<td>NFSC 315 Advanced Nutrition: Vitamins</td>
<td>3</td>
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<tr>
<td>NFSC 395 Graduate Seminar in Nutrition and Food Science</td>
<td>1</td>
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<tr>
<td>NFSC 301 Statistical Methods for Nutrition and Food Science</td>
<td>3</td>
</tr>
<tr>
<td>NFSC 399 Thesis</td>
<td>9</td>
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<table>
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<tr>
<th>Suggested Electives</th>
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</thead>
<tbody>
<tr>
<td>NFSC 300 A Graduate Tutorial</td>
<td>1</td>
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<tr>
<td>NFSC 300 B Graduate Tutorial</td>
<td>2</td>
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<tr>
<td>NFSC 300 C Graduate Tutorial</td>
<td>3</td>
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<tr>
<td>NFSC 305 Sensory Evaluation of Food</td>
<td>3</td>
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<tr>
<td>NFSC 306 Community Nutrition: Research and Intervention</td>
<td>3</td>
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<tr>
<td>NFSC 308 Advanced Therapeutic Nutrition</td>
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<tr>
<td>NFSC 312 Sports Nutrition</td>
<td>3</td>
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<tr>
<td>NFSC 351 Food Safety: Contaminants and Toxins</td>
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</tbody>
</table>

Other elective courses must be approved by the Thesis Committee and the Faculty/School Graduate Studies Committee.
The course program followed by the student as well as the thesis to be undertaken will be selected in consultation with the Thesis Committee and the Faculty/School Graduate Studies Committee and the department concerned depending on the student’s background and interests.

Graduate students in the Nutrition (thesis) program may take a maximum of 3 credits in graduate tutorial courses.

**MS Nutrition (Non-Thesis)**

Requirements for the MS degree in Nutrition (non-thesis) consist of course work and research. (Total number of credits required is 33).

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Other elective courses need to be approved by the Thesis Committee and the Faculty/ School Graduate Studies Committee.

Graduate students in Nutrition (non-thesis) can take a maximum of 6 credits in graduate tutorial courses.
Continuing Education Center (CEC)
Continuing Education Center (CEC)

Officers of the Center
Andre Nahas  Acting Vice President, Regional External Programs
Ziad Shaaban  Director, Continuing Education Center

Center Administrative Support
Hala Barakat Nahas  Program Officer
Wafa Abou Daher  Assistant to the Director
May Abu Haidar  Administrative Assistant

Instructors
Abdallah Dahdouh, Tania; Abdallah, Khaled; Abou Chacra, Nader; Ali, Maysoon; Atiyah, Rima; Attalah, Tania; Azzam, Nadia; Chidiac Siblini, Hoda; Daccache, Jenny; Deeb, Rima; Diab, Dazy; Dibo, Amal; El-Assaad, Karma; El Hage, Johnny; Faroukh-Abiad, May; Geha, Monah; Ghalayini, Salim; Hammoud, Mina; Helou, Joseph; Hodelb, Heba; Jabre, Silvana; Maalouf, Jacki; Nadra, Mira; Najjar, Farida; Nassif, Mona; Obeid, Laure; Papazian, Pateel; Rawas, Mahmoud; Rouhana, Amal; Rubeiz, Samir; Salem, Jehad; Shab, Rima; Shibaklo, Mona; Shbeir, Elie; Shebaya, Sara; Shibl, Bassel; Shibl, Shibi; Sobaik, Joe; Tayara, Khaleed; Tukan, Mounir

Background
In line with its mission to serve the region and its commitment to lifelong learning, AUB offers a variety of certificate and diploma non-credit programs, non-credit courses, intensive professional courses, as well as special programs for older people and children of AUB alumni. The Continuing Education Center (CEC) at the American University of Beirut is a division of the Office of the President for Regional External Programs (REP). CEC promotes AUB’s motto “so that they may have life and have it more abundantly” and stands at the heart of AUB’s strategic goals.

Mission
The mission of CEC is to meet the lifelong educational and training needs of all learners in the local community and the region. Harnessing AUB’s resources in various fields of knowledge, CEC offers a variety of standard and customized certificate programs, non-credit courses, and workshops in Lebanon and the region. CEC aims to enhance professional and technical skills while addressing the needs for personal development and cultural enrichment.

Vision
CEC aspires to become a center of excellence in providing quality education and training in a variety of fields to a diverse population of learners in Lebanon and the Middle East and North Africa (MENA).

Programs of Study

CEC students may also consider enrolling in individual courses to continue their professional development without earning a certificate. These students will be provided with attestations of courses completed.

In addition to the certificate courses, CEC offers non-certificate courses in various areas including: languages, information technology, SAT, MCAT, GMAT, radiography, photography, interior design, leadership skills, project management, and green building; develops intensive professional courses tailored to corporate clients in Lebanon and the region; and organizes public workshops that aim at helping participants maintain a competitive edge throughout their career path. CEC also oversees a special program designed for older people (University for Seniors), and, in collaboration with the Office of Alumni Relations and the Worldwide Alumni Association of the American University of Beirut (WAAAUB), offers a special summer program to children of AUB alumni throughout the world to strengthen the ties between AUB and all of its alumni.

General Criteria for Admission

- Students applying to one of the certificate or diploma programs should submit a secondary school or university certificate. Also, a minimum score of 400 in EEE (TOEFL: CBT 163 or IBT 57) is required for admission. Applicants who are graduates of an English speaking university are exempted from the English language test. An applicant might also be required to report for an interview with the program coordinator.

- A student with an EEE score of 350-399 (TOEFL: CBT 155 or IBT 50) will be allowed to take a maximum of two courses in one of the certificate programs provided that he/she sits for the EEE/TOEFL at the end of the first and/or second course and meets the minimum requirements. If the student does not meet the minimum required English score for entry into that program by the end of the second course, he/she will be disqualified for the certificate and will not be allowed to register for another course in that certificate. The student will have to take more English courses before being allowed to re-register to complete the courses in that certificate program and become eligible for a certificate upon completion of course requirements.

- Students applying for enrollment in English language courses are required to sit for a placement test given at CEC to all new applicants before the semester begins.

- Enrollment in special courses is generally open to all learners from diverse educational backgrounds.
Graduation Requirements for Certificate and Diploma Programs

A certificate or a diploma is offered upon the successful completion of all the required courses and attaining a minimum grade of 60/100 in each course, with a minimum cumulative average of 70/100. If the academic requirements change before the student finishes a specified program of study, the student may follow the new requirements upon the approval of the program coordinator.

Certificate Programs

Accounting Studies Certificate

Objective

The objective of this program is to provide learning opportunities in selected aspects of accounting with emphasis on modern developments.

Certificate Requirements

This program consists of four courses to be completed in two years:

- CACT 101 Principles of Accounting I
- CACT 201 Principles of Accounting II
- CACT 301 Cost Accounting and Control
- CACT 302 Auditing

Community Health Nursing Certificate

The post basic Community Health Nursing Certificate program consists of four courses:

- CNRS 310 Introduction to Theories and Concepts in Community Health Nursing
- CNRS 311 Practicum I: Application of Theories and Concepts
- CNRS 312 Advance Concepts and Issues Relevant to Community/Public Health Nursing
- CNRS 313 Practicum II: Planning and Evaluation of Community Based Interventions

Critical Care Nursing Certificate

The program is designed to build on the knowledge and clinical experience of nurses. It consists of 90 contact hours theory and 180 contact hours clinical. The theory part tackles concepts and issues related to assessment, care, and evaluation of critically ill adults. The practicum part includes application of critical care concepts in assessing and managing evidence-based care to critically ill clients. Areas of emphasis include nursing assessment, interventions, and evaluation in critical illness, ventilatory assistance, hemodynamic monitoring, dysrhythmias and EKG interpretation.

The program is based on the nursing process as a framework for building theoretical knowledge and applying nursing care. Concepts such as critical care environment, relationship with patient and family, end-of-life care, infection control and safety, communication, documentation and critical thinking will be integrated in this course. Reading and understanding nursing research, doing library research and using information technology to enhance learning will be incorporated.

The post basic Critical Care Nursing Certificate program consists of five courses:

- CNRS 314 Fundamental Concepts in Critical Care Nursing: Assessment and Evaluation
- CNRS 315 Nursing Management During Critical Care Illness
- CNRS 316 Practicum I: Critical Care Nursing: Assessment and Evaluation
- CNRS 317 Practicum II: Critical Care Nursing: Management
- CNRS 313 Practicum II: Planning and Evaluation of Community Based Interventions

Essentials of Business Certificate

Objective

The objective of this program is to provide learning opportunities in selected aspects of business with emphasis on modern developments. Some may consider enrolling in individual courses to continue their professional development and will be given attestations of courses completed.

Certificate Requirements

The program consists of the following six courses to be completed in three years:

- CACT 101 Principles of Accounting I
- CMKT 101 Principles of Marketing
- CECN 101 Introduction to Economics
- CMGT 101 Principles of Management
- CECN 301 Money and Banking
- CFIN 101 Principles of Finance

Financial Management Certificate

Objective

The objective of this program is to introduce participants to the process of financial decision making to serve various business objectives in different settings. The program enables participants to deal with financial decisions facing businesses, household savers and institutional and individual investors. Participants cover the areas of financial management, financial reports, security analysis, and banking activities.
Certificate Requirements
The program consists of the following four courses to be completed in two years:

- CFIN 201  Business Finance
- CFIN 301  Financial Statements Analysis
- CFIN 302  Investment Analysis
- CFIN 303  Commercial Banking

Human Resource Management Certificate
Objective
The objective of this certificate is to offer instruction on practical, current issues in the human resource field for professional development. Increasingly, companies in Lebanon realize that a motivated, appropriately selected, trained, appraised and compensated workforce is critical to improving company financial performance and success. Human resource professionals facilitate this process through effective management of human resource issues.

Certificate Requirements
The Human Resource Certificate requires successful completion of four core courses to be completed in two years:

- CHRM 101  Overview of Human Resource Management
- CHRM 201  Workforce Planning and Staffing
- CHRM 202  Total Compensation and Benefits
- CHRM 203  Employee Training and Development

Interior Design Certificate
Objective
The Interior Design Certificate Program equips students with the methods and skills needed to temper the urgent problems generated by a rapidly growing demography and to create a friendly urban environment. The courses will address the different types of living spaces, the different concepts of interior design, and the different methods for combining aesthetic factors with cost and functional concerns. Graphic illustrations, sketches, case studies, AutoCAD, and real models will be used.

Target Participants
- All individuals with a Baccalaureate level of education may be able to join the certificate program.
- Professionals from other areas (engineers, architects, scientists, physicians) are encouraged to take courses from the program.
- Amateurs may also be admitted to the program on the basis of an interview with the program coordinator.

Certificate Requirements
The program consists of four courses:

- CINR 101  Introduction to Interior Design
- CINR 102  Colors, Materials, and Lighting

Leadership and Management in Nursing Certificate
Objective
The post basic program in Leadership and Management in Nursing helps build the managerial capacity of nurse managers or nurses in charge in leading and managing skills to ensure success in today's dynamic healthcare environment. It emphasizes the use of creativity in problem solving and decision-making thus promoting critical thinking which is essential to the nursing process. It introduces nurses to the change process and control measures which contribute to the improvement of nursing practice. This program allows the nurses to examine their role as leaders in today's rapidly changing healthcare environment.

Certificate Requirements
The program consists of four courses:

- CNRS 301  Nursing Leadership Roles and Management Functions
- CNRS 302  Managing Quality Improvement
- CNRS 303  Advanced Management Practice
- CNRS 304  Practicum

Marketing Management Certificate
Objective
The objective of this program is to provide participants with an understanding of the marketing-management process. The basic components of marketing, such as consumer behavior, marketing research, product distribution, promotion, and price planning will be emphasized.

Certificate Requirements
The program consists of the following four courses to be completed in two years:

- CMKT 101  Principles of Marketing
- CMKT 202  Marketing Research
- CMKT 301  Marketing Communications and Advertising
- CMKT 302  Sales Management

Nursing Informatics Certificate
Objective
The post basic certificate in Nursing Informatics is designed to provide students with the knowledge and skills necessary to take a leadership role in the selection and implementation of health care information management systems, and in applying the knowledge gained from the information generated from these systems. This program entails five courses which focus on concepts and issues surrounding technology and information management in today's rapidly changing health care environment.
Certificate Requirements:
The post basic NI program consists of five courses:
- CNRS 305 Data, Information and Knowledge
- CNRS 306 Informatics and the Health Care Delivery System
- CNRS 307 System Lifecycle
- CNRS 308 Issues in Health Care Informatics
- CNRS 309 Data Standards, Terminologies & Implications for Practice

Office Management Certificate
Objective
The objective of this program is to develop efficient executive secretaries to facilitate the complex and demanding jobs of today’s executives.

Certificate Requirements
The program consists of the following four courses to be completed in two years:
- CBUS 101 Introduction to Business
- CBUS 102 Business English
- CBUS 202 Office Procedures and Routines
- CBUS 203 Office Automation

Project Management Certificate
Objective
This certificate program provides participants with the knowledge and skills needed to deliver even the most complex project. The courses reflect a mix of “hard” and “soft” skills that the managers need to deliver. The material used in all classes is drawn from existing, real-life, and current project management tools.

The certificate will also allow organizations to make the best use of resources and provide a career path for project managers to grow.

Certificate Requirements
This program consists of the following five courses:
- CPRM 201 Best Practices in Managing Small to Medium Projects
- CPRM 202 Project Leadership/Communication Skills
- CPRM 203 Project Management Scheduling Tools & Techniques
- CPRM 204 Project Stakeholder Management
- CPRM 205 Advanced Project Management Practical Workshop

Diploma Programs

Human Resources Management (HRM) Diploma
Objective
This diploma program provides a comprehensive overview of HRM roles and responsibilities in the workplace from a strategic perspective. It fosters and develops the participants’ professional expertise and competencies. This diploma program involves an intensive education program using traditional classroom instruction, hands-on case studies, and executive presentations.

Diploma Requirements
This program consists of the following eight courses to be completed in four years:
- CHRM 101 Overview of Human Resource Management
- CHRM 201 Workforce Planning and Staffing
- CHRM 202 Total Compensation and Benefits
- CHRM 203 Employee Training and Development
- CHRM 301 Managing Human Behavior in Organizations
- CHRM 302 Managing the Employment Relationship: HRM, Society and the Law
- CHRM 401 Strategic Human Resource Management
- CHRM 402 Advanced Topics in Human Capital Management

Marketing Management Diploma
Objective
The objective of this diploma is to provide an advanced and comprehensive overview of marketing from basic to strategic. The components of marketing, such as consumer behavior, sales management, marketing communication, marketing research, market segmentation, and strategic marketing planning will be emphasized.

Diploma Requirements
The program consists of the following eight courses to be completed in four years:
- CMKT 101 Principles of Marketing
- CMKT 202 Marketing Research
- CMKT 301 Marketing Communications and Advertising
- CMKT 302 Sales Management
- CMKT 401 Services Marketing
- CMKT 402 Public Relations
- CMKT 403 Consumer Behavior
- CMKT 404 International Marketing

Project Management Diploma
Objective
The Project Management (PM) Diploma is a practical, hands-on program with a clear focus placed on advanced project management knowledge and skills enabling the participant to deliver complex projects based on best practices. The curriculum draws heavily on a long,
acknowledged experience of practitioners and trainers in project, program, portfolio, and risk management.

Diploma Requirements
The PM diploma is composed of 11 components, divided over two parts: PM Certification (5 courses) and a Diploma Focus (4 courses + an elective course + a final graduation project) from among 4 possible tracks:

- Engineering Project Controls
- Business Development, NGOs and Entrepreneurship
- Project Management Office and Program Management
- Enterprise and Project Risk Management

Track I: Engineering Project Controls
The objective of the program is to provide students with the perspectives of major stakeholders of real estate, design, and construction management: owners/developers, consultants/designers/supervision consultants, and contractors. It will provide them with a deeper understanding of how to manage all parties and design projects by taking into consideration the deep impact of quality design on successful implementations. Estimation, planning, contract management, extension of time analysis, and construction management topics will be covered in a practical manner.

Track I consists of the following courses:
- CPRM 301 Cost Estimating, Budgeting, and Controlling
- CPRM 302 Managing Engineering Design Projects
- CPRM 303 Construction Project Management
- CPRM 304 FIDIC Conditions of Contract & Claims and Dispute Resolution
- CPRM 305 Project in Controls
- Elective Course

Track II: Business Development, NGOs, and Entrepreneurship
This program covers a wide spectrum of project management initiatives including business expansion into new geographical areas, marketing management, promotional projects, or internal development planning. The course is ideal for those wishing to establish a business or manage NGO projects. The program will cover all the competencies required for sponsoring projects, and identifying and managing requirements to equip participants to develop projects/business plans.

Track II consists of the following courses:
- CPRM 306 Project Sponsorship
- CPRM 307 Project Management for Entrepreneurs
- CPRM 308 Certified Business Analysis Professional
- CPRM 309 Project Management for NGOs
- CPRM 310 Project in Business Development, Organization development or Entrepreneurship
- Elective Course

Track III: Project Management Office and Program Management
The program features some of the most advanced topics in organizational project management, including Organizational Project Management Maturity Model (OPM3), Portfolio Management, Program Management, and Governance, in addition to PMO setup and enhancement. The program provides sophisticated competencies that will leverage the development of strategic, tactical, or unique program management offices, as required by semi-government, public-private-partnership (PPP), infrastructure, and organizational development initiatives.

Track III consists of the following courses:
- CPRM 311 Project Management Office Setup and Implementation
- CPRM 312 Program Management Professional
- CPRM 313 Project Feasibility and Portfolio Prioritization Techniques
- CPRM 314 Organizational Governance for Enabling Portfolio/Program/Project Management
- CPRM 315 Project in Program Management/PMO Governance
- Elective Course

Track IV: Enterprise and Project Risk Management
The track will focus on performing risk management at portfolio, program, and project levels, as well as on enterprise risk management when adopting it as a strategic decision-making tool to optimize performance across all business functions. The risk management track provides a logical and systematic method of establishing risk methodology: identifying, analyzing, integrating, evaluating, treating, monitoring, and communicating risks in a way that allows organizations to make sound decisions and timely responses to risks and opportunities as they arise.

Track IV consists of the following courses:
- CPRM 316 Achieving Risk Management Professional Certification
- CPRM 317 Quantitative Risk Analysis
- CPRM 318 Enterprise Risk Management using ISO-31000
- CPRM 319 Practical Risk Workshop
- CPRM 320 Project in Risk Management
- Elective Course

Elective Courses
Elective can be any of the focus courses listed above, in addition to the following courses:
- CPRM 321 Strategic Project Management for Executives
- CPRM 322 Extension of Time Analysis & Time Request
- CPRM 323 Contracting and Procurement
- CPRM 324 Earned Value Management
- CPRM 325 Contract Administration and Claim Management
- CPRM 326 Effective Submittal Management in Construction Projects
- CPRM 327 Cost Engineering Certification
- CPRM 328 Project Planning and Scheduling
- CPRM 329 Green Project Management
- CPRM 330 Project Lessons Learned
- CPRM 331 Effective Project Controls for Engineering and Construction Projects
- CPRM 332 Workshop on the Preparation for the PMP Certification Exam
Certificate and Diploma Programs Course Descriptions

**CACT 101  Principles of Accounting I**  42 hrs
This course introduces students to principles of recording transactions, the preparation of financial statements, and completion of the accounting cycle.

**CACT 201  Principles of Accounting II**  42 hrs
This course is a continuation of Accounting I. It covers depreciation policies and procedures, depletion and amortization, income determination, partnership accounts, corporate capital accounts, dividends and retained earnings.

**CACT 301  Cost Accounting and Control**  42 hrs
This course focuses on the nature and purpose of cost accounting; basic techniques of process and job costing; accounting of materials, labor and overhead; development and use of cost budgets and standards for planning and evaluation of performance; cost classification in relation to behavior; and cost condition statements as tools for evaluating alternative courses of action.

**CCECN 101  Introduction to Economics**  42 hrs
This course is intended to introduce students to principles of recording transactions, the preparation of financial statements, and completion of the accounting cycle. It covers depreciation policies and procedures, depletion and amortization, income determination, partnership accounts, corporate capital accounts, dividends and retained earnings. This course focuses on the nature and purpose of cost accounting; basic techniques of process and job costing; accounting of materials, labor and overhead; development and use of cost budgets and standards for planning and evaluation of performance; cost classification in relation to behavior; and cost condition statements as tools for evaluating alternative courses of action.

**CCECN 301  Money and Banking**  42 hrs
This course focuses on management of commercial banks, the structure of commercial banking, management of bank funds and the role of money in the economy.

**CFIN 101  Principles of Finance**  42 hrs
This course offers students with the opportunity to study many dimensions of the business system. Subjects covered include management and organization, human resource management, information for business decision-making, financial information, and business and its environment.

**CFIN 201  Business Finance**  42 hrs
This course offers students with the opportunity to study many dimensions of the business system. Subjects covered include management and organization, human resource management, information for business decision-making, financial information, and business and its environment.

**CFIN 301  Financial Statements Analysis**  42 hrs
This course focuses on the description and interpretation of reported and audited financial statements, limitations of company reports, analysis of financial ratios, examinations of professional practices regarding measurement and disclosure of financial information, and development of skills needed to read, analyze and evaluate financial statements. **Prerequisite:** Business Finance.

**CFIN 302  Investment Analysis**  42 hrs
This course focuses on the description and analysis of the sources of investment information, various investment vehicles, operations of security markets, trading environment, security valuation models, investment objectives, and modern techniques of investing in securities. **Prerequisite:** Business Finance.

**CHRM 101  Overview of Human Resource Management**  42 hrs
This course introduces the main concepts of managing human resources in organizations, discusses the various roles that HRM departments play and demonstrates how HR policies and practices help support the business strategy. Topics include the strategic role of HRM, job analysis and personnel planning, recruitment and selection, training and development, performance management, compensation and retention as well as the ethical aspect of HRM.

**CHRM 202  Total Compensation and Benefits**  42 hrs
This course conveys applied knowledge about compensation systems for aspiring HR professionals. The course objective is to provide a solid understanding of the art of compensation practice and its role in promoting companies’ competitive advantages. It is assumed that students will be best prepared to assume the role of competent compensation strategist if they possess a solid understanding of compensation practices. Thus, we will examine the context of compensation practice, the criteria used to compensate employees, compensation system design issues, employee benefits, and contemporary challenges that compensation professionals will face well into the 21st Century.
CINR 101 Introduction to Interior Design 42 hrs
This course will introduce students to the creation of living spaces, types of interior spaces, space organization, techniques of harmony and esthetics. It will focus on clarifying interior design concepts through graphics, sketches, colors and geometric instruments.

CINR 102 Colors, Materials, and Lighting 42 hrs
This course introduces the elements that affect the interior spaces. It focuses on color and its implications; ideas of space and the use of color to solve spatial problems; color harmony and the way colors interact; color qualities and combinations; and the major finish materials used in today's interiors from fabrics to wall coverings and hard surface materials. Students will also learn the fundamentals of lighting design in relation to interior spaces. Visits will be planned to art galleries and factories.

CINR 201 Presentation Techniques for Interior Designers 42 hrs
This course focuses on how to present a technical drawing and a basic floor plan. The student will learn to develop interior elevations, and then transform the ideas and drawings into a polished presentation. The course will also introduce the basic tools necessary to translate drafting skills into a digital format using AutoCAD. Prerequisite: CINR 101.

CINR 202 Interior Architecture Project 42 hrs
The emphasis of this course is on spatial problem-solving, influence of human factors on design, and the application of design principles to projects of varying scale, materials, and structure. This course will develop and expand students' ability to solve complex design issues, and hence their drafting, rendering; presentation skills will also be enhanced. Prerequisite: CINR 101.

CMKT 201 Marketing Research 42 hrs
This course covers the entire research process: problem definition, data collection methods, sample design, collection of data, tabulation and analysis, and presentation of results.

CMKT 301 Marketing Communications and Advertising 42 hrs
This course is an overview of promotion management and integrated marketing communications. Topics covered include behavioral foundations of marketing communications, environmental influences on marketing communications, and the promotion management process and its execution.

CMKT 302 Sales Management 42 hrs
This course focuses on the activities of first-line field sales managers. It covers sales management functions and strategies, developing the selling function, sales goals and structure, building a sales program, and leading and motivating the sales force.

CMKT 401 Services Marketing 42 hrs
This course is an overview of the process of marketing services. It includes a study of the characteristics of services and their marketing implications, developing marketing strategies, creating value, pricing and promoting the service performance, and ensuring a positive customer experience.
This course is designed to introduce students to the field of health care informatics. It focuses on the history of health care informatics, basic informatics concepts and health information management applications. During the course, students will discuss and compare information management applications related to administration, education, practice and research.

This course is an overview of the scope and challenge of international marketing. Topics covered include the cultural environment of global markets; assessing global market opportunities; and developing and implementing global marketing strategies.

This course focuses on the requisites and foundations of successful and effective leadership and management. The topics that will be discussed include: organizational structure, strategic and operational planning, time management, staffing, communication, managing conflict, delegation, and performance appraisal.

This course focuses on the communication between an individual or organization and the public to promote stakeholder acceptance and approval. Students explore traditional and emerging components of the public relations process through mass media, as well as the needs of different types of businesses, such as corporations, non-profit organizations, and governmental offices.

This course is designed to encourage students to engage in a dialogue among themselves and with experts in the field of health care and health care informatics in order to come to some understanding of current issues. Using a single broad case study, students view the issues engendered by the case through the many-colored lenses of ethics, politics, society and law.

This course focuses on Knowledge Representation: data standards, terminologies, and their implications for practice. The terminologies component provides an overview for nursing, and other health care terminologies in use. The data component describes the functions of data standards and implications for informatics as well as professional practices.

This course is designed to introduce students to theories of nursing and principles underlying current community health nursing practice, public health and primary health care. The focus of care is on clients who may be represented as individuals, families, and small groups or larger aggregates and community.

This course addresses advanced concepts and issues relevant to community/public health nursing. Students are provided with advanced knowledge and skills in population, family and individual needs assessment. Areas of focus include health promotion, health education, and management of chronic diseases.

This course provides field experiences designed to enhance collaborating with interdisciplinary team members in planning, organizing, delivering and evaluating population-focused programs to achieve health goals, including health promotion and disease prevention activities.

This course gives an overview of critical care nursing: critical care environment, relationship with patient and family, end-of-life care, infection control and safety, communication and documentation. It also focuses on dysrhythmia interpretation, EKG interpretation, hemodynamic monitoring, and ventilatory assistance

This course aims at enhancing the participants' know how in cases of shock, cardiac alterations, nervous system alterations, acute respiratory failure, acute renal failure, hematological and immune disorders, gastrointestinal alterations, endocrine alterations, trauma, and burns.
CPRM 201  Best Practices in Managing Small to Medium Projects  21 hrs  
The course is focused on practicing how to successfully manage small to medium projects. Participants will practice applying best practices and will receive immediate feedback from the expert.

CPRM 202  Project Leadership/Communication Skills  21 hrs  
This course is designed to help project managers become better team leaders by honing their skills and improving their knowledge in key areas of communication, motivation, expectation setting and problem solving. Participants will be equipped with practical knowledge, skills, and tools that empower them to lead teams towards successful projects.

CPRM 203  Project Management Scheduling Tools and Techniques  21 hrs  
This course provides hands-on project management training using a project scheduling application, and leads participants through the entire project life cycle. The instructor will walk the participants through the various project management processes with a special focus placed on the planning process group as per PMI's standards. Participants will gain in-depth practical knowledge about creating work breakdown structures, activity lists, scheduling activities, resource leveling, and base-lining.

CPRM 204  Project Stakeholder Management  21 hrs  
This course is designed to enable the participant to effectively gain an essential understanding of stakeholder communications and management. Project managers will learn how to identify, assess, and manage stakeholders expectations. Various elements of the course are built from a Practitioner's perspective.

CPRM 205  Advanced Project Management Practical Workshop  21 hrs  
The workshop will teach practical skills to plan and manage projects throughout the project lifecycle. Participants will gain the confidence needed to tackle issues with competence and increase the probability of completing their projects on time and within budget.

CPRM 301  Cost Estimating, Budgeting, and Controlling  21 hrs  
This course provides extensive knowledge about cost planning and scheduling. It covers the classification of cost elements (labor, equipment and material), estimation of the required project resources, allocation on time schedule, and generation of cash flow.

CPRM 302  Managing Engineering Design Projects  21 hrs  
In this course, the enrolled candidate will be introduced to processes and procedures governing the project management aspects of the design phase according to current industry standards, principles and international best-practices. Moreover, the concepts are examined at multiple levels ranging from early phase conceptual design to the final and detailed stage of the design process. This gives the participant a more global approach to the management of any project or design task, and it leads to a better integration of efforts towards the project objectives.

CPRM 303  Construction Project Management  21 hrs  
This course will provide participants with the required skills needed to be a successful and effective construction or site manager. It provides a general overview of construction management with emphasis on inspection, contract writing, and material testing. It also provides an in-depth discussion of construction management with emphasis on cost estimation, safety/risk management and claim handling.

CPRM 304  FIDIC Conditions of Contract and Claims and Dispute Resolution  21 hrs  
This course is designed for the participant to effectively gain an essential understanding of FIDIC contracts, and it outlines the various elements of the FIDIC suite of contracts with emphasis placed on the Conditions of Contract for Construction (The “Red Book”). Besides, in the second part of the course, topics covered will include the basic concepts of delays, tracking delays, mitigating delays, base-lining schedule, as well as analyzing the effect of delay(s) on the baseline schedule. In addition, it includes a detailed guide on the preparation of a comprehensive Extension of Time Request including the prolongation and disruption cost, claims avoidance, parties good and bad practices, and other focal issues in claims and disputes.

CPRM 305  Project in Controls  52 hrs  

CPRM 306  Project Sponsorship  21 hrs  
This course is an eye-opener on the to-dos and expectations of project and PMO sponsorship. As good sponsorship is critical to the success of projects, the professional filling the position should remove the guess work and be ready to take on this leading position. The participant will learn and practice sponsorship best practices at a project, program, and portfolio level.

CPRM 307  Project Management for Entrepreneurs  21 hrs  
This course will allow participants to effectively gain an essential understanding of what value integration between business development and project management can add. It will also guide participants through a solid business development roadmap empowered by project management best practices.

CPRM 308  Certified Business Analysis Professional  21 hrs  
This course provides a detailed review of all knowledge areas of IIBA®'s Business Analysis Body of Knowledge (BABOK®) key concepts, terms, and principles of business analysis. The BABOK is a globally recognized standard for the practice of business analysis and acts as a baseline for practitioners so that it defines the profession of business analysis with its best practices.

CPRM 309  Project Management for NGOs  21 hrs  
This course is designed to provide participants with key tools and techniques for people involved in project management in NGOs. It covers the basics of project management in alignment with PMI's standards as well as topics like the Logical Framework Approach. The instructor will also map PMI’s terminology to the PM terminology used by NGOs.

CPRM 310  Project in Business Development, Organization Development or Entrepreneurship  52 hrs  

CPRM 311  Project Management Office Setup and Implementation  21 hrs  
The objective of this course is to help participants understand Project Management Office setup and implementation phases, requirements, and steps. It covers topics related to the role of a PMO in an organization and the development of processes, guidelines, and related templates. The course will also focus on how to transfer the developed processes and material to operations with the proper training, mentorship, evaluation, and control.
CPRM 312  Program Management Professional  21 hrs
This course is designed for the participants to effectively gain an essential understanding of, and/or formalize, program management skills and concepts. The course addresses a layer above project management where benefit management is central. It was developed according to the new PMI delineation of a Program Management Professional.

CPRM 313  Project Feasibility and Portfolio Prioritization Techniques  21 hrs
This course focuses on analyzing the expected status of every initiative by conducting a feasibility study, and optimizing the selection in order to maximize the return on organizational capacity. The course capitalizes on the Portfolio PMI standard and highlights some portfolio selection and balancing tools and techniques.

CPRM 314  Organizational Governance for Enabling Portfolio/Program/Project Management (OPM3) 21 hrs
This course provides participants with an understanding of enablers to project/program/portfolio maturity in an organization. An objective assessment of the level of maturity of project, program, or portfolio management matched with a sound improvement plan is central to carrying out those projects or programs, or even portfolio. Presentations and case studies will be used to illustrate such scenarios.

CPRM 315  Project in Program Management/PMO Governance  52 hrs
CPRM 316  Achieving Risk Management Professional Certification  21 hrs
This course will cover risk management from basic to advanced processes. The course is an excellent preparation for those interested in applying for the challenging PMI-RMP Risk Management Professional Certification.

CPRM 317  Quantitative Risk Analysis Concept  21 hrs
The course explores the Perform Quantitative Risk Analysis process by performing a numerical analysis on the effects of identified risks on overall project objectives and prioritizing those risks in order to better plan the responses.

CPRM 318  Enterprise Risk Management Using ISO 31000  21 hrs
This course offers a sound understanding of the International Organization for Standardization (ISO) risk standard released in 2009. It helps to address the needs for understanding the enterprise risk management ins and outs, and for selecting the appropriate risk response plan while adhering to an international standard.

CPRM 319  Practical Risk Workshop  21 hrs
This is a workshop meant to give participants who have completed the “Achieving Risk Management Professional Certification” course extensive hands-on through activities carefully planned to contribute intensively to reinforcing risk management knowledge.

CPRM 320  Project in Risk Management  52 hrs
The objective of this course is to help students understand project management science and how it is used to successfully deliver strategically aligned projects to achieve the company’s ultimate vision. Participants will learn how to incorporate the art and science of project management into new and exciting ways to do business. The course focuses on consolidating project principles across the organization.

CPRM 321  Strategic Project Management for Executives  21 hrs
This course is designed to provide in-depth understanding of the concepts and art of preparing and defending Time Extension Requests. Topics will cover the basic concepts of delays, tracking delays, mitigating delays, and analyzing the effect of delay(s) on the baseline schedule. In addition, it is extended to give a detailed guide about preparing a comprehensive Extension of Time Request including the prolongation and disruption costs.

CPRM 322  Contracting and Procurement  21 hrs
This course is meant to give professionals a comprehensive set of tools and techniques to handle contracting procedures as well as procurement cycle for an optimization of the organization benefits.

CPRM 323  Earned Value Management  21 hrs
This course is designed to provide the essential understanding of Earned Value Management to facilitate improvement in project performance outcomes by encouraging the use of EVM on projects. It will focus on EVM’s contribution to provide early warning, achieve cost goals, improve communication, achieve schedule goals, and improve scope management.

CPRM 324  Effective Submittal Management in Construction Projects  21 hrs
This course will familiarize participants with the standards and procedures for managing different types of project submittals (i.e. RFIs, drawings, material submittals, action items, punch lists, …) whether from a contractor, a consultant or an owner perspective. The content of the course is tailored to cater to the needs of the construction and engineering industries; in addition, participants will be introduced to several project management software applications used to automate the submittals in construction projects.

CPRM 325  Contract Administration and Claim Management  21 hrs
This course reflects the sophistication of individuals in today’s cost control industry and it improves one’s knowledge and adherence to best cost management practices. Participants can then apply to CCC/CCE certification with the Association for Advancement of Cost Engineering International (AACEI).

CPRM 326  Cost Engineering Certification  21 hrs
This course addresses how to identify, monitor, and balance crucial information for the successful management of projects, and covers the development of a baseline performance management plan (PMP) for the project that will allow the efficient compilation and the timely generation of quantitative performance comparisons. The comparisons highlight significant performance departures (“actual vs. baseline”) and allow for preventive and early corrective actions. The course will also enable participants to apply for the Scheduling Professional (PSP) certification from AACE-International as well as PMI-SP certification of the Project Management Institute (PMI).

CPRM 327  Project Planning and Scheduling  21 hrs
This course will provide participants with a thorough background in Planning and Scheduling projects. It addresses how to identify, monitor, and balance crucial information for the successful management of projects, and covers the development of a baseline performance management plan (PMP) for the project that will allow the efficient compilation and the timely generation of quantitative performance comparisons. The comparisons highlight significant performance departures (“actual vs. baseline”) and allow for preventive and early corrective actions. The course will also enable participants to apply for the Scheduling Professional (PSP) certification from AACE-International as well as PMI-SP certification of the Project Management Institute (PMI).
CPRM 329  Green Project Management  21 hrs
The Green Project Manager (GPM®) certification embodies the commitment of a project management professional to act as an agent of change by managing and directing efforts to maximize sustainability within the project life cycle, improving the construct and delivery of goods and services produced as a project deliverable, and thoroughly considering and accounting for environmental impacts in the project management roles assigned using measurable standards. Green Project Manager (GPM®) certification is the first project management credential for individuals demonstrating competency in delivering projects using sustainable methods.

CPRM 330  Project Lessons Learned  21 hrs
This course focuses on the importance of having lessons learned in project context. Moreover, it assists participants in understanding when lessons learned should occur and the framework to document project lessons learned. In addition, it provides practical steps to improve project processes through lessons learned.

CPRM 331  Effective Project Controls for Engineering and Construction Projects  21 hrs
The course is aligned with the best practices and standards of the Project Management Institute (PMI) Project Management Body of Knowledge (PMBOK), AACE International and Construction Specification Institute (CSI). It provides extensive knowledge of the core elements for controlling projects and covers Project Management Control System overview, project planning and scheduling, cost management, risk management, document management, and performance reporting.

CPRM 332  Workshop for the preparation of the PMP certification Exam  21 hrs
This course will provide participants with the knowledge needed for the PMP examination; how to apply for it; how to prepare for it, and how to pass the exam. The seminar will provide the basic knowledge required, and it will cover all the steps needed to pass the exam and attain the PMP certification. The course is designed for professionals seeking to refresh their knowledge on the PMBOK before taking the PMP exam, as well as for those who are interested in understanding the science of project management.

Non-Certificate Courses
CEC offers non-certificate courses in languages, arts, and information technology; it also offers exam preparatory courses and a variety of special courses.

Languages
English language courses are offered at all levels of proficiency, as well as specialized courses for members of various professions and students preparing for the TOEFL and SAT. CEC also serves non-native speakers of Arabic by providing classes in Modern Standard Arabic, and colloquial Arabic. Students may also take classes in a variety of other languages.

English Language
Courses are offered at all levels from beginners to advanced with emphasis on communication competence. Students who complete Level 6 are often able to pass the AUB English Entrance Exam (EEE) or the Test of English as a Foreign Language (TOEFL). Each student’s level is determined by a placement test given to all new applicants before the session begins.

CENG 100  English Language for Beginners  96 hrs
CENG 101  English Language Level 1  96 hrs
CENG 102  English Language Level 2  96 hrs
CENG 103  English Language Level 3  96 hrs
CENG 104  English Language Level 4  96 hrs
CENG 105  English Language Level 5  96 hrs
CENG 106  English Language Level 6  96 hrs

CEG 201  Conversational English  24 hrs
This course offers students the opportunity to speak in formal and informal situations. Throughout the course, students will participate in discussions, group activities, and simulated role-playing. They will also give and evaluate presentations.

Applicants eligible for this course must have a score of 450 on the EEE; otherwise, candidates will sit for a placement test at the CEC.

CEG 202  Creative Writing  30 hrs
This course provides participants with the opportunity to apply and extend their creative writing skills in a workshop setting through a series of directed writing activities and in-class discussions. Genre-specific writing will be addressed allowing participants to pursue specific interests in writing fiction, creative non-fiction, memoir and/or poetry. Developing voice and revision will be important components of this course. Participants will also learn how to prepare a piece of writing for publication and will examine the publishing opportunities available to writers.

Arabic Language
Standard Arabic Language
CARB 101  Standard Arabic Beginner  48 hrs
This course introduces students to the language through a proper acquisition of the alphabet, pronunciation of the sounds, connection of letters, and formation of words and simple sentences.

CARB 102  Standard Arabic Intermediate  48 hrs
This course focuses on basic grammar structures and vocabulary; and on comprehension and articulation of simple statements, questions, and paragraphs.

CARB 103  Standard Arabic Advanced  48 hrs
This course stresses complex grammar structures and vocabulary needed to comprehend and compose written and oral material.
Colloquial Arabic Language

CARB 201 Colloquial Arabic Beginner 48 hrs
This course focuses on pronunciation and vocabulary needed to engage in simple dialogues such as, greetings, directions, traveling, and shopping.

CARB 202 Colloquial Arabic Intermediate 48 hrs
This course focuses on the basic principles of expression and builds the students’ vocabulary to enable them to comprehend and compose simple sentences needed in day-to-day conversations.

CARB 203 Colloquial Arabic Advanced 48 hrs
This course offers students the opportunity to practice their communication skills in different settings to achieve a comfortable level of verbal interaction in business, social, and formal environments.

Other Languages

CFRN 101 French I 36 hrs
This course provides students with the chance to use the language in familiar contexts both orally and in writing. In Level One, the emphasis is on conversations using basic structures.

CFRN 102 French II 36 hrs
This course provides students with the chance to use the language in familiar contexts both orally and in writing. In Level Two, the student will be able to read and write simple texts.

CGER 101 German I 36 hrs
In this course, students will learn basic vocabulary and sentence formation that would enable them to participate in simple conversations.

CGER 102 German II 36 hrs
In this course, students will learn the basics for writing and conversing in a more professional way. Prerequisite: German I.

CHNS 101 Chinese I 36 hrs
This course provides students with basic working knowledge of Chinese (Mandarin). The course exposes beginners to Chinese Pinyin (spelling with one tone), Chinese characters, Chinese grammar, commonly-used sentence structures, and simple situational dialogues.

CHNS 102 Chinese II 36 hrs
This course is a continuation of Chinese I. Students will learn more characters, grammar, sentence structures, and dialogues; and they will practice simple applied writing. Prerequisite: Chinese I

CITL 101 Italian 36 hrs
This course provides the student with a basic knowledge of Italian and foundation for speaking, reading, and writing the language.

CSPN 101 Spanish I 36 hrs
This course is designed to provide the student with a basic knowledge of Spanish, both of its conversational form and of the elementary grammatical structure. By the end of the course, the student will be able to engage in simple conversation, read short articles and write letters and simple compositions.

CSPN 102 Spanish II 36 hrs
This course aims to enhance the students’ skills of speaking, listening, reading, and writing. Students who complete this course should be able to communicate in a more professional way. Prerequisite: Spanish I

SAT, GMAT, and MCAT Preparatory Courses

CGMT 201 English for GMAT 30 hrs
This course aims to prepare students for the English (Verbal) component of the Graduate Management Admission Test (GMAT). It helps students improve their essay writing skills, their grammar skills, their ability to read and understand short complex passages, and be able to develop their critical reasoning skills.

CGMT 202 Math for GMAT 30 hrs
This course aims to prepare students for the Mathematical (Quantitative) component of the Graduate Management Admission Test (GMAT). It helps them understand how Computer Adaptive Testing (CAT) works, tackle effectively both types of multiple choice questions that are usually given on the Mathematical sections of the GMAT (i.e., standard multiple choice questions and data sufficiency questions), review in detail the fundamental Mathematical concepts to be tested on the GMAT, and finally help them develop their problem solving skills through extensive practice.

CMCT 201 MCAT Preparatory Course 36 hrs
This course aims at improving the critical thinking and core knowledge of participants in the content of the Medical College Admission Test (MCAT) as determined by the latest editions of Kaplan and Princeton Review, and at enhancing their writing skills and test-taking skills in order to attain a competitive score in the MCAT. Participants will do practice tests in each segment of the MCAT biology, physics, chemistry, writing and verbal reasoning.

CSAT 201 English for SAT 60 hrs
This course aims to familiarize students with the English component of the Scholastic Aptitude Test (SAT). It helps them practice their English language skills and vocabulary.

CSAT 202 Math for SAT 60 hrs
This course aims to familiarize students with the mathematical and reasoning components of the SAT test. It reviews mathematical concepts and helps students practice their basic math and reasoning skills.

Technology in Practice

CAPP 200 Apple iOS Development 24 hrs
In this course, students will learn how to develop fully operational iOS applications. It will provide an overview about mobile application rules and iOS, Objective-C language, Xcode tool, Story Board, View Controllers, Graphics, Animation, Data Management, Motion, Location, and Client-Server Applications; and real life examples on how to develop iOS applications.

CAPP 300 MAC OS X Support Essentials (With Certification) 42 hrs
This course provides an in-depth exploration of troubleshooting on MAC OS X. It is designed to give a tour of the breadth of functionality of MAC OS X and the best methods for effectively supporting uses of MAC OS X systems. The course is a combination of lectures and hands-on case study exercises that provide practical real-world experience. Basic Knowledge of MAC OS X and troubleshooting experience are required.
CAPP 302  Overview of Final Cut Pro 7  36 hrs
This course introduces students to the primary feature set and basic interface of Final Cut Pro. Students will learn how to perform basic editing functions while familiarizing themselves with the user interface. Topics include basic setup, adjusting and customizing preferences and settings, capturing video and audio, various editing and trimming techniques, Ripple, Roll, Slip and Slide tools, finishing and final output. Knowledge of Mac OS X, computer navigation, and editing terminology is required.

CAPP 303  Introduction to Final Cut Pro 7 (With Certification)  42 hrs
This course focuses on the basic editing functions and aims at familiarizing students with the Final Cut Pro user interface. In this course, student will cut a scene from the TNT television series Leverage, create a promo for SeaWorld’s Believe documentary, as well as master filters and effects as they edit a segment of Playing for Change, the international music-creation event. Students will start with basic video editing techniques and work all the way through Final Cut Pro's powerful advanced features. They will also learn to mark and edit clips, mix sound and titles, create transitions, apply filters, and more. Topics include basic setup, customizing preferences and settings, capturing video and audio, various editing and trimming techniques, Ripple, Roll, Slip, and Slide tools, audio editing and audio creation, finishing and final output. Knowledge of Mac OS X, computer navigation, and editing terminology is required.

CAPP 304  Introduction to DVD Studio Pro 4 (With Certification)  42 hrs
This course focuses on DVD authoring with DVD Studio Pro 4. It guides students through every aspect of DVD authoring, from initial storyboarding to burning and replication. Using compelling media and real-world production workflow, students will learn how to create amazing MPEG 2 video with Compressor as well as create eye-popping motion menus directly in DVD Studio Pro 4. They will also “author” a DVD by creating buttons, interactive links, slideshows, playlists and even adding alternate audio steam and camera angles. Basic knowledge of the Macintosh OS and Final Pro is required.

CTIP 101  Digital Radiography  42 hrs
Digital radiography will acquaint the radiographers with the various digital image acquisition and display systems currently being introduced into the radiology departments. Radiographers will gain technical skills to help them in the transition from an analogue to a digital imaging environment. This course will also focus on radiation protection techniques employed with digital systems. This course is approved for credit (38 credits) by the American Society of Radiologic Technologists.

CTIP 102  Online Community Management  25 hrs
This course provides students with the knowledge and skills needed to effectively manage their online community in order to increase visibility and market share. It focuses on online visual identity, etiquettes, content research and creation, and best online practices of customer relations and public relations. Students will be trained to develop online marketing strategies, campaigns, and advertisements; derive analytics and metrics and build on them for best online results and client-facing reports; and advance digital engagement strategies across stakeholders.

CTIP 103  Medical Information Literacy Skills  32 hrs
This course is designed to expose attendees to a wide variety of medical information resources/tools available on the Internet, which are useful for locating specific medical/health information. The course relies heavily on hands-on training and focuses on how to use free and reliable Internet resources to do an efficient and productive search.

Special Courses
CBSC 201  Balanced Scorecard Management System  45 hrs
This course focuses on developing the understanding of participants about the BSC system. Students will learn how to use the BSC system to keep track of an organization’s performance in order to monitor how well it is achieving its goals. The course includes practical training on developing strategy maps and measuring initiatives.

CEVP 101  Event Planning  36 hrs
This course is designed to provide the necessary knowledge and skills an event planner should acquire. It focuses on the fundamentals of event planning, the communication process, and event branding and marketing. The course includes organizing and planning actual events taking place on AUB campus.

CHST 101  History of Lebanon  36 hrs
This course covers the history of Mount Lebanon from the period of Fakhreddine and until the Independence in 1943. It focuses on the historical facts & dates; the political, economic, social and demographic changes; and the effects of European powers in shaping Lebanon's history. The course also discusses the Mount Lebanon emirates with particular stress on politics & economy, and the events and policies during World War I and the effects of the war on Lebanon passing by Sykes-Picot and eventually leading to the establishment of present-day Lebanon in its present borders.

CIPE 201  Business Protocol and Etiquette  36 hrs
This course teaches students how to greet people, converse with them, understand their business and management styles while respecting their cultural attitudes. Topics include: first impressions and networking skills, dressing for success, communication at its best, business lunching and dining etiquette, hosting business potentials, and mastering business meetings.

CLAB 101  Legal Aspects of Business  36 hrs
The objective of this course is to introduce participants to commercial law and to the legal elements that are required for starting and managing a small business or for the constitution of different kinds of companies. It includes information on various contracts and day-by-day operations from a legal point of view.

CLDS 101  Leadership Skills  36 hrs
The objective of this course is to introduce the participants to the essential skills needed for a successful leader. Participants will be able to determine their leadership qualities and personal leadership style. They will also understand their responsibility in developing further as leaders. Participants will learn how to set, evaluate, and follow up on short and long-term objectives. This course will use a practical approach emphasizing exercises, discussion, group work, and practical experience. A pre-test will be given at the beginning of the course and a post-test at the end so that participants will be able to evaluate their leadership skills and plan for improvement.

CLDS 102  Extracurricular Activities Program  36 hrs
The purpose of this course is to introduce participants to the objectives, programs, organization and benefits of the Extra-Curricular Activities Program at various school levels (Elementary through Secondary level). It will emphasize practical activities that contribute to the development of the student’s personality and encourage creativity, voluntary work and good citizenship. It will also focus on the essential skills needed for the leaders and providers of these activities who can be teachers, counselors, NGO leaders and parents.
CLDS 201 Emotional Intelligence 36 hrs
This course is designed to help participants understand the relationship between emotions and decision making, and their role in developing their own emotional intelligence. The course focuses on the importance of emotional intelligence to our health and leadership qualities. Participants will learn to identify their emotions, express themselves clearly, and understand others. They will also learn how to motivate themselves and others, and how to plan for self-management in order to achieve a higher emotional intelligence.

CPGB 102 Green Buildings and LEED Certification Concepts 8 hrs
This course helps participants acquire familiarity with USGBC, GBCI, and LEED. It focuses on the LEED rating systems and applications, and the key components of the LEED certification process, recommended timeline and certification levels, as well as LEED Credentialing levels and exam requirements. Participants will also be introduced to the LEED NC 2009 categories, credits, and green strategies to achieve LEED credits. This course is recommended for LEED Green Associate candidates.

CPRM 200 The Certified Associate in Project Management - PMP 916 25 hrs
This course provides an advanced level of LEED technical training. It fosters understanding of all the LEED NC 2009 prerequisites and credits through going over their individual intents and technical requirements, touching on their required technical standards and calculation procedures, and discussing various compliant sample project applications. The course also discusses the integrated design approach from various perspectives, exhibits the importance of such management strategies for achieving successful green projects, and includes essential preparation materials for “LEED Accredited Professional for Building Design and Construction” (LEED AP BD+C) exam. Prerequisite: CPGB 102.

CPBM 205 Implementing LEED NC 2009 8 hrs
This course provides an advanced level of LEED technical training. It fosters understanding of all the LEED NC 2009 prerequisites and credits through going over their individual intents and technical requirements, touching on their required technical standards and calculation procedures, and discussing various compliant sample project applications. The course also discusses the integrated design approach from various perspectives, exhibits the importance of such management strategies for achieving successful green projects, and includes essential preparation materials for “LEED Accredited Professional for Building Design and Construction” (LEED AP BD+C) exam. Prerequisite: CPGB 102.

CPBM 300 PMP Exam Preparation - PMP 905 35 hrs
This course introduces senior project managers to the science of Project Management and how it applies to their business; and refreshes the knowledge of those who want to sit for the PMP exam. The basic elements of project management will be discussed: PMP logistics, integration management, project scope management, project time management, cost management, quality management, human resource management, communication, risk, procurement, and professional responsibility. Each topic is introduced and discussed with emphasis on the Inputs-Processes-Tools and Techniques-Outputs structure outlined in the PMBOK. This course is approved for credit (25 PDUs) by the Project Management Institute.

CSTM 201 Stress and Time Management 25 hrs
This course is designed to improve the students’ productivity and job satisfaction by developing their understanding of the causes and consequences of stress in their work environment. Students will also learn time management strategies such as workload planning and task prioritization. The course includes case studies, real-life examples, and practical sessions.

CART 101 Introduction to Arts Policy and Management 36 hrs
This course introduces the main concepts related to arts policy and management, giving an overview of the fundamentals of arts policy as well as essential concepts related to third sector arts and cultural organizations management.

CART 201 History of Arts 36 hrs
This course is an introduction to the art of the twentieth century. It focuses on the approaches and methodology used in the Dadaist and the Surrealist movements in visual art and literature. The course covers the sources and influences of the major artists. Styles and movements of this period are closely examined. Emphasis is on discussion of pioneering attitudes, theories, and concepts of the art world with topics ranging from a focus on artists and media, art politics, and various thematic concerns. Seminars, workshops and lectures diversify the course.

CDRW 101 Life Drawing I 36 hrs
This course concentrates on "seeing" and rendering with pencil and charcoal. Special emphasis is placed on still life, taken from nature and landscapes.

CGRD 101 Introduction to Graphic Design 36 hrs
This course concentrates on "seeing" and rendering with pencil and charcoal. Special emphasis is placed on still life, taken from nature and landscapes.

CLGH 101 Landscape Gardening for the Home 30 hrs
This 10-week course includes: horticulture skills (potting, propagation and transplanting of annuals and perennials) and landscape principles (plant selection and layout in small gardens, balconies and indoors) introduced through lectures, live demonstrations and hands-on application.

CPHT 101 Basic Photography 36 hrs
This course is designed to familiarize the students with the photography equipment and build their basic skills in photography. It will focus on photographic methods and techniques, composition elements and theories, and the interdependence of medium and image. The course includes practical photography exercises.

CPHT 102 Advanced Photography 36 hrs
This course is designed for students who want to develop their skills in the technical and artistic production of photography. It builds on previously acquired skills and guide students in developing personal outlooks towards specific applications of the photographic process. Students will be challenged to explore the concept of developing a series of images that cultivate a personal vision while building a portfolio which illustrates an understanding of various processes and professional presentation. Prerequisite: CPHT 101

CSKT 101 Sketching 36 hrs
In this course, students will learn how to execute a free hand drawing that is not intended as a finished work. They will be introduced to perspective, proportions, scales and composition.
Public Workshops

CEC draws on the expertise of AUB faculty to respond to the professional training needs in many areas including engineering, medicine, business, English, information technology, education, and agriculture. Public workshops offer participants unique engaging opportunities to acquire the knowledge, skills and strategies that are needed to move forward along the career path. The following are examples of the public workshop topics:

Applying Quantitative Discipline to Asset Allocation
In this workshop, participants will learn how to use quantitative tools effectively to make asset allocation decision in a global investment marketplace. They will be provided with a practical guide on using some powerful quantities tools, from mean variance optimization to dynamic Bayesian statistical modeling, with a few comments on the new direction implied by nonlinear modeling techniques.

Business English
This workshop aims to improve the English language communicative competence of the participants in business and social settings. It focuses on developing participants' productive skills of speaking and writing as well as the receptive skills of reading and listening. It also focuses on the acquisition of a wide range of business expressions, idioms, and grammatical knowledge.

Advanced Negotiation and Conflict Resolution Skills
This workshop gives participants a better understanding of conflicts from an objective point of view. It introduces them to the dynamics of conflicts and offers methods, such as negotiation, through which conflicts can be resolved. Topics include: the explicit and implicit issues inherent in a conflict situation, conflict resolution frameworks and techniques within the context of current organizational decision making models, practical negotiating and conflict resolution skills and experiences that can be applied immediately.

Developing Young Professionals
This workshop is designed to prepare young employees or prospective employees for the work environment. It teaches them business communication, time management, discipline, presentation techniques, and other practical and mental tools that will facilitate their way to success.

Databases Fundamentals
This workshop trains participants to use a scientific method to design a database from business requirements. It focuses on the process of normalization, and gives the participants an overview of the main components of a database engine and techniques for improving query performance and protecting data through views, authorization control, and semantic integrity control.

Scholarships and Awards

Kamil Sadeddin Continuing Education Scholarship
The Kamil Sadeddin Continuing Education Scholarship fund aims to encourage AUB’s community members to enhance their education and become more effective employees by pursuing individual courses and professional certificates at CEC.

Arab Student Aid International (ASAI) Scholarship
The Arab Student Aid International Scholarship fund aims at providing support to improve the managerial performance of the non-governmental organizations in the private and public sectors. The fund is used to organize customized training courses for NGO leaders that include project-based work aiming at improving their managerial skills. All NGO leaders are eligible to apply.

Arab Student Aid International (ASAI) Scholarship was founded in 1976 by a group of Arab and American academics and business people who believe in the mission, vision and objectives of the development of human resources in the Arab countries and the Palestinian territories in particular.

Abdul-Hamid Hallab REP Service Excellence Award

Purpose
The purpose of Abdul-Hamid Hallab REP Service Excellence Award is to recognize the accomplishments of outstanding REP consultants from the AUB community who have made major contributions to the AUB mission of serving “the peoples of the Middle East and beyond” and the REP mission of providing “the Middle East and North Africa with world class professional services...while reflecting AUB core values and its commitment to service excellence.” By recognizing these individuals, REP demonstrates its commitment to service excellence and provides incentives for AUB faculty and staff to serve as REP consultants. The award is based on qualitative and quantitative evidence for excellence in consulting work.

Eligibility
Full-time AUB faculty and staff who have served on at least one REP project during the entire fiscal year are eligible to be nominated. Consultants who were nominated in previous years may be nominated again on condition that they haven't received the award during the previous year.

Criteria for Excellence in Consulting
The Abdul-Hamid Hallab REP Service Excellence Award acknowledges the efforts of faculty and staff members and their contributions to the mission of the University and the mission of REP. The number of projects the faculty or staff member has worked on would not, in itself, be considered sufficient evidence for recognition. The selection committee will rely on qualitative and quantitative measures and on any and all supporting material provided by the nominator and nominee including evaluations by the clients, letters of support received from referees, and other relevant materials. Nominees will be evaluated against these criteria:

- Client focus
- Commitment to service excellence
- Exceptional commitment to the project
- Teamwork

Nomination Procedures
A nomination can be initiated by REP clients, Deans, VPs, project coordinators, and colleagues.

All AUB staff members at grade 12 or below are eligible to apply for the Kamil Sadeddin Continuing Education scholarship.
Continuing Education Center (CEC) Continuing Education Center (CEC)

Graduate Catalogue 2013–14 Graduate Catalogue 2013–14

Program Structure

Academic Courses
Participants will learn classical and colloquial Arabic using a curriculum rich in social and cultural activities. Participants will also cover pre-history, contemporary history, and the archaeology of Lebanon through field trips and course work. The language of instruction is English, though Arabic will be used where it is found suitable.

The following academic courses will be offered to each participant:

• **Colloquial Arabic:** Arabic for communicating in common day-to-day situations
• **Literary Arabic:** An elementary knowledge of classical Arabic grammar, expanded vocabulary and basic reading skills
• **Contemporary Lebanese Studies:** This course aims at giving participants a better understanding of Lebanon from the pre-historic period till today. The archaeology program starts with a general introduction to the archaeological sites in Lebanon and surveys prehistoric Lebanon
• **Art Elective:** Students may choose to participate in one of three afternoon courses (photography, drama, or life drawing).

Social Activities
Afternoons on the scenic campus of AUB will be a time for a variety of extracurricular activities. Participants are at liberty to choose from the following social activities:

• Visits to museums, souks, and AUB libraries
• Extensive use of the Charles Hostler Student Center facilities including swimming, gym, basketball courts, and the soccer field
• Volunteer services at AUB Medical Center
• Dinner outings to various destinations in the country.

Country Excursions
One-day and overnight trips to significant historical and cultural destinations throughout Lebanon will ensure participants’ exposure to the diversity Lebanon has to offer. Field trips may include (among others):

• Visits to the archaeological and historical sites in Jbeil, Batroun, Beiteddine, Mousa Castle, Baalback, Jelta
• Hiking in the Cedars and Qadisha Valley
• Rafting on the Orontes River (Nahr-El-Assi) in Hermel
• Weekly visits to various Lebanese beaches.
Meals and transportation on our planned excursions are included in the program costs.
University for Seniors

The University for Seniors is an independent program for older adults in AUB’s Continuing Education Center. It aims to create a new and positive face of aging in Beirut, Lebanon and the Middle East Region: one where older adults remain intellectually and socially engaged, energized to learn new things, and active contributors to their communities.

The University for Seniors is different from standard adult education classes, or from many of the offerings of AUB’s Continuing Education Center. Three core principals underline the program: peer-learning, community-building, and intergenerational connections. Peer-learning means that seniors learn from one another rather than from a paid professional instructor. Study group leaders and lecturers are all volunteers. Community-building: the University for Seniors is a membership organization to reinforce the idea that one is joining a community rather than paying for one-off activities. Intergenerational connections: Seniors wish specifically to be connected to the regular AUB student body. These intergenerational connections will be created through multiple academic and extra-curricular activities.

Anyone over 50 may become a member of the University for Seniors. The typical academic year is comprised of two eight week terms, one in the Fall and one in the Spring.

Activities include study groups, lectures, educational trips, and projects with AUB students and more.

For more information about the University for Seniors you can visit our website: www.aub.edu.lb/seniors

You can also reach us by email ufs@aub.edu.lb or by phone 01/350000 extension 1-2563 or 1-3236.

CEC Rules and Regulations

AUB EEE

Applicants who need to sit for the AUB EEE should register for the test two days prior to the examination day, pay an exam fee of L.L. 50,000, and submit two passport photos and an identity card. Registration and test administration are done in Nicely Hall, Room 500.

Student IDs

CEC students are provided with AUB identification cards which they should carry while on AUB campus. In case the student loses his/her ID card that s/he gets upon registration, s/he can get a new one by paying a replacement fee.

Course Offerings

The updated course listing is posted each semester on the CEC website. CEC is under no obligation to offer any of the certificate or diploma courses at all times.

Course Cancellations

CEC reserves the right to cancel any course due to insufficient enrolment or other unavoidable circumstances. All registrants will be notified and a complete refund is made automatically.

Student Withdrawal

Should a student need to withdraw from a course anytime before or after classes officially begin, s/he must inform CEC in writing and return his/her AUB ID (if issued). Non-attendance does not constitute official withdrawal.

Attendance

Attendance to all classes is required. A student who is absent one fourth the number of sessions of a course without a valid excuse will not be entitled to a final grade for that course.

Access to University Facilities

- Students enrolled in CEC courses are entitled to use the reading facilities at Jafet Library but not to check out books.
- CEC students are not entitled to free access to Charles Hostler Student Center. Those who wish to join may apply for a paid monthly membership.

Examinations

Final Examinations are held within one week of the last class session, unless the course instructor specifies otherwise.

Grading System

CEC uses the AUB grading system which is as follows:

<table>
<thead>
<tr>
<th>Cumulative GPA</th>
<th>GPA</th>
<th>Cumulative Average GPA</th>
<th>GPA</th>
<th>Cumulative Average GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>0</td>
<td>67</td>
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<td>1.74</td>
<td>74</td>
<td>2.62</td>
<td>82</td>
</tr>
</tbody>
</table>

I: Incomplete
P: Pass
All final grades are expressed in multiples of one.

Repeating a Course
A student is not allowed to register for the same course more than twice.

Attestations
Attestations are offered to students who enroll in individual courses to continue their professional development. Request for attestations can be made in person at the Office of the Registrar.

During registration and examination periods, attestations are not issued.

Holidays
The CEC follows the AUB calendar with respect to holidays.

AUB Rules and Regulations
All students are expected to abide by the rules and regulations of the University.

Change of Personal Information
Students are encouraged to inform CEC about any changes in their contact information.

Contact CEC
Continuing Education Center
PO Box 11-0236
Riad El Solh 1107 2020
Beirut, Lebanon

Phone: +961-1-350000 or 374374, ext.3140/1
Fax: +961-1-349404
Email: cec@aub.edu.lb
Website: www.aub.edu.lb/rep/cec
Endowed Faculty Chairs, Academic Centers, Programs, Institutes; Student Scholarships, Hardships; Fellowships; Awards; and Research Funds
Endowed Faculty Chairs, Academic Centers, Programs, Institutes; Student Scholarships, Hardships; Fellowships; Awards; and Research Funds

Endowed Faculty Chairs

Faculty of Medicine
Raja N. Khuri Deanship for the Faculty of Medicine: Sayegh, Mohamed

Faculty of Engineering and Architecture
Mohammed Abdulmohsin Al-Kharafi Chair in Engineering
Al Mu'allim Mohamed Awad Binladin Chair in Architecture in the Islamic World
Dar Al-Handasah (Chair & Partners) Endowed Professorship in FEA: El-Fadel, Mutasem
The Qatar Chair for Energy Studies: Ghaddar, Neseen

Suliman S. Olayan School of Business
Coca-Cola Chair in Marketing: Vanhonacker, Wilfried
The Abdul Aziz Al-Sagar Chair in Finance
Kamal Chair Chair in Leadership at OSB
The Husni A. Sawwaf Chair in Business Management
Rami Fouad Makhzoumi Endowed Chair in Corporate Governance

Faculty of Arts and Sciences
Michael Atiyah Chair in Mathematics: Ghoussoub, Nassif
Alfred H. Howell Chair: Dringil, Selim
Margaret Weyerhaeuser Jewett Chair of Arabic: Baalbaki, Ramzi
The Sheikh Zayid bin Sultan Al-Nahyan Chair of Islamic and Arab Studies: Khalidy, Tarif
Edward W. Said Endowed Chair in American Studies: Puar, Jasbir
Mary Fox Whittlesey Visiting Professorship: O'Dell, Emily

Academic Centers, Programs and Institutes
Abu-Haidar Neurology and Behavioral Science Center
The Prince Alwaleed Bin Talal Bin Abdulaziz Alsaud Center for American Studies and Research (CASAR)

Scholarships and Hardship Grants

The scholarships listed below have been made available to needy and deserving students through the generosity of alumni and friends of the University. Many of them represent the income from endowed funds which in some cases are supplemented by an additional grant. A student requesting aid does not apply to a particular fund but is considered for all awards administered by the University for which the student is qualified.

A. Sayour-Greek Orthodox Scholarship
A.M. Rabbat Endowed Scholarship
AANA Washington DC Chapter Scholarship
Abdallah Yousef Lahoud Endowed Scholarship
Abdel Rahman Tabbara Scholarship
Abdul Aziz Al-Bahar Scholarship
Abdul Fattah and Mona Ghali Scholarship
Abdul Ghanim Hammour Endowed Scholarship
Abdul Ghanim Hammour Scholarship
Abdul Halim Jabre Memorial Scholarship
Abdul Mohsen Al-Qattan Endowed Scholarship
Abdullah Osseiran Memorial endowed Scholarship
Abdul Malik Al-Hamar Scholarship
Abdul Malik Yousuf Al-Hamar Memorial Scholarship
Abu Dhabi Alumni Chapter Endowed Scholarship for FAFS
Abu Dhabi Alumni Chapter Endowed Scholarship for FHS
Abu Dhabi Alumni Chapter Endowed Scholarship for undergraduate-FHS
Abu Dhabi Alumni Endowment Scholarship
Abu Dhabi Alumni Medical Sciences Endowment Scholarship
Adnan Dandan Scholarship
ADS Scholarship
Ahmad Abdul Jabbar Endowed Scholarship Fund
Ahmad Abu Ghazaleh Scholarship
Ahmad S. El-Khalidy Endowed Scholarship
Ahmad Shamsuddin Memorial Endowed Scholarship
Ahmad S. Zaabri Endowed Scholarship
Al-Aoud Afif Al-Mahmassani Scholarship
Alarab Education Foundation Scholarship
Alfardan Excellence Sponsorship Scholarship
Ali Abdallah Jammal Memorial Scholarship
Ali Ghandour Endowed Scholarship
Alsaad General Contracting Endowed Scholarship
Alya A. Al-Katami Scholarship
Amal and Fawouk K. Jabre Endowed Scholarship Fund
Amal Barraj Kamaalreddeen Scholarship
Amin and Penny Hajj Memorial Scholarship
Anis A. Bibi Memorial Scholarship Fund
Anis B. and Mima Malouf Endowed Scholarship
Anis Mouasher Memorial Scholarship
Anonymous Scholarship c/o Joe Manok
Anonymous Scholarship c/o Salma Oueida
Anonymous Scholarship c/o Soha Hmaidan
Anthony Bing Scholarship
Anthony E. Mansour Endowed Scholarship
Antoine Saad Hamra Memorial Endowed Scholarship Fund
APEAL Scholarship for Fine Arts
Applied Medical Scholarship
Applied Medical Scholarship for Needy Students
Arabia Insurance Nabih Faris Memorial Endowed Scholarship
Archak and Maroun Senekjian Scholarship Fund
AREC ‘78 and Friends Endowed Scholarship Fund
AREC ‘80 Endowed Scholarship
Areen Projects Scholarship Fund
ASAI Scholarship
Asfari-LIFE Scholarship
Asfari-Welfare-Unite Lebanon Scholarship
ATFL Scholarship in the name of Joseph Jacobs
AUB Alumni Association - Mount Lebanon Branch Scholarship
AUB Alumni Association - Oman Branch Endowed Scholarship
AUB Alumni Association - Qatar Endowed Scholarship
AUB Alumni Association - Swiss Endowed Scholarship
AUB Alumni Association-Greece Branch Scholarship
AUB Alumni Association in Syria Endowed Scholarship
AUB Alumni Association in Syria Scholarship
AUB Alumni Association of North America
AUB Alumni Association-UK Branch Endowment Scholarship
AUB Alumni At NPCC Abu Dhabi Scholarship
AUB Alumni Club of Jordan Scholarship Fund
AUB Alumni Development Scholarship
AUB Alumni Metropolitan NY Chapter Endowed Scholarship Fund
AUB Alumni of Kuwait Society Endowed Scholarship
AUB Alumni of Staff of BankMed Scholarship
AUB Alumni Student Scholarship
AUB Alumni-Riyadh Branch Endowed Scholarship Fund
AUB Faculty and Staff Scholarship Fund
AUB Fine and Performing Arts Endowed Scholarship
AUB Scholarship Fundraising Committee Endowed Scholarship Fund
AUB UNRWA-EU Scholarship
Ayman Taji Farouki Scholarship Fund
Azeez and Saleemeh Shaheen Scholarship Fund
Aziz Stephan Scholarship
Aznive Etinoff Memorial Scholarship
Bank of Beirut Scholarship Fund
Banque Audi Scholarship
Barakat-Sawabini Endowed Scholarship Fund
Bashar Hassan Khayat Memorial Endowed Scholarship
Beidas Aboughazale Scholarship
Bliss Memorial Scholarship
BLOM Bank Scholarship for Business Students
Boodai Endowed Scholarship Fund
Boosting You Scholarship
C.R. Whittlesey Memorial Scholarship
C.V. Starr Endowed Scholarship Fund
Camille Sarieddine Scholarships
Charles Hagopian Endowed Scholarship
Clapp-Constance Endowed Scholarship
Clefs Union Endowed Scholarship
Constantine Zurayk Endowed Scholarship
Dani Amal Azzi Scholarship
Daniel and Emily Oliver Endowed Scholarship
Daniel Bliss Scholarship
David A. Fuleihan Endowed Scholarship
David S. Dodge Arabic Fund
David S. Dodge Endowed Scholarship
Dean Robert Najemy Endowed Scholarship
Deloitte & Touche (M.E.) Scholarship
Deutsche Bank MBA Scholarship
Dinar Y. Afghani Scholarship Fund
Doris Dodge Endowed Scholarship
Dorothy H. Rogers Memorial Endowed Scholarship
Douma Ladies Charitable Society Endowed Scholarship
Dr. Abdul Afoz Kronfol Scholarship
Dr. Aeff and Mrs. Zamam Abdulwahab Scholarship
Dr. Fadlo Raji Abu-Haydar Endowed Scholarship
Dr. Fady and Mrs. Roula Dalloul Sharara Endowed Scholarship
Dr. Farahe Maloof Medical Endowed Scholarship
Dr. Farouk S. Idriss Endowed Medical Scholarship
Dr. Fuad and Alice Trabulsi Endowed Scholarship
Dr. Gebran and Mrs. Salma Farah Endowed Scholarship Fund
Dr. Georges Fakhoury Endowed Scholarship
Dr. Harry G. Dorman Scholarship
Dr. Henri Habib Scholarship
Dr. Jean Moadie Memorial Endowed Scholarship
Dr. Joseph Yammine Endowed Scholarship
Dr. Kassem Faress Foundation Endowed Scholarship
Dr. Marwan Mneimenh Scholarship
Dr. Marwan S. Aboujoud Scholarship
Dr. Maurice H. Bisharat Endowed Scholarship
Dr. Michael A. Shadid Endowed Scholarship
Dr. Muhammad Hijazi and Mrs. Nuha Mikdashi Endowed Scholarship
Dr. Naji Sahyoum Memorial Endowed Scholarship
Dr. Salim Musalli Pasha Scholarship
Dr. Samuel White Endowed Scholarship
Dr. Shahrokh Mokhtari Memorial Endowed Scholarship
Dr. William Carslaw Memorial Scholarship
Scholarships and Hardship Grants

Dr. Yakub Inati Scholarship
Dr. Yusuf K. Hitti Endowed Scholarship
Druze Foundation For Social Welfare Scholarship Fund
E. Maxine Bruhns Endowed Scholarship
Eastern Province Saudi Arabia Endowed Scholarship Fund
Eileen Page Medical Endowed Scholarship
Elissa A. Bateh & Brothers Foundation Scholarship
Elias and Shirine Matta Endowed Scholarship
Elias A. Husni Endowed Scholarship
Elias M. Doumet Scholarship
Elie Kii Scholarship Fund
Elsa and Stanley Kerr Scholarship
Emile and Helen Chartouni Endowed Scholarship
Engineering and Architecture Alumni Chapter Endowed Scholarship Fund
Enno and Hildegarz Ercklentz Endowed Scholarship
Fadil and Nijmeh Khalil Matta Endowed Scholarship
Fadwa Nassif Taleb Endowed Scholarship
FAFS 50Th Anniversary Graduate Student Endowment Fund
FAFS Dean's Hardship Fund
Fahad M. Al-Rajaan Scholarship
Faisal AlMutawa Endowed Scholarship
Farid and Wafa Saab Scholarship
Farid Sa’id Graduate Endowed Scholarship in Science-Tech.
Fauq W. Agha Scholarship
Farris S. Malouf Memorial Endowed Scholarship
Fatimah Abu-Ghazaleh Scholarship
Fawzi M. Najm Scholarship
FEA Class of 1964 Endowed Scholarship
Fingerprint Endowed Scholarship Fund
Fouda G. Khouri Scholarship
Fouda M. Saleh Scholarship
Francis Asbury Palmer Scholarship Fund
Frank H. Teagle Memorial Endowed Scholarship
Fuat Es-Said Scholarship
Fuat Muhsin Afnan Memorial Fund
Fuat Nakhle Endowment Scholarship
Gabriel and Kimberly Rebeiz Scholarship
Gaza Endowed Scholarship
General Scholarship Fund
George F. Faris Memorial Scholarship
George Issa Hazbun Memorial Scholarship
George K. Farah Endowed Scholarship
George Salibi Scholarship
Ghassan Al-Mahasini Scholarship
Ghassan and Manal Saab Endowed Scholarship
Ghassan Jdeed Scholarship Fund
Gladys Brooks Scholarship Endowment
Goguikian Foundation Scholarship
Gordon H. Ward Scholarship
Graduate Regional Scholarships-Ford Foundation Match
H. Morton Endowed Scholarship
H.H. Mar Ignatius Zakka Iwas Endowed Scholarship
Habib B. Yared Memorial Endowed Scholarship
Habib Kairouz Scholarship Award
Hamoud and Jamal Makarem Scholarship Fund
Hani Qaddumi Foundation Scholarship
Hanna Bisharah Endowed Scholarship
Hanna Said Chouliji Endowed Scholarship
Harold B. Hoskins Endowed Scholarship
Harry G. Dorman, Jr. and Virginia Whitney Dorman Memorial Scholarship
Hassan Al Shawwaf Scholarship Fund
Hazar - AUB Development Scholarship
Hosein S. Rasi Scholarship Fund
HH Shaikh Khaled Bin Hamad Al-Thani Endowed Scholarship
HH Sheikh Dr. Sultan Bin Mohamed Al Qasimi Endowed Scholarship
HH Sheikh Dr. Sultan Bin Mohamed Al Qasimi Endowed Scholarship for FAFS
HH Sheikh Dr. Sultan Bin Mohamed Al Qasimi Endowed Scholarship for FHS
Hileni Nichola Ayoub Endowed Scholarship
Hisham H. Tabbbara and Marie E. Zouein Scholarship
Howard W. Page Endowed Scholarship
HRH Prince Talal Ben Abdel Aziz Endowed Scholarship
Humam Jabban Scholarship
Husni Ahmad Sawaf Endowed Scholarship
Hussein and Leila Ammar Scholarship
Hussein Oueini Graduate Memorial Endowment Fund
Hussein Oueini Memorial Scholarship
Iliya Harik Memorial Scholarship
Ingeborg Sai Scholarship
Innas Wafa Soufan Scholarship
Intermedic (Jean Farah & Co.) Sal Scholarship
IPI Group Holding Group Scholarship
Isam and Awatef Soufan Scholarship Fund
Issa I. Farah Scholarship
Issam and Nouroud Helou Scholarship
Issam Kronolp Scholarship
J.J. Arakelyan Endowed Scholarship
Jabir Shibli Endowed Scholarship
Jacob Thaddeus Scholarship
Jacques A. Nasser Endowed Scholarship
Jad Cancer Foundation Scholarship
Jamal and Murad Barooody Endowed Scholarship
Jamal and Murad Barooody Scholarship-Current
Jamile Dagher Jureidini Endowed Scholarship
Job Fair Committee Endowed Scholarship
Job Fair Committee Scholarship
John Michael Fawaz Scholarship
John Miskoff Endowed Scholarship
John Naim Hanna Dagher Scholarship
Joseph Asmar Endowed Scholarship
Julia Dodge Rea Scholarship
Julia Ziadeh Endowed Scholarship
Kamal and Nuha Hemady Endowed Scholarship
Scholarships and Hardship Grants

Scholarships

Scholarships and Hardship Grants

Graduate Catalogue 2013–14

Morris Janowitz Endowed Scholarship
Mounir and Jamileh El-Khatib Scholarship for FEA
Mr. and Mrs. Mustafa Jundi Scholarship Fund
Mr. and Mrs. Nafez Jundi Endowed Scholarship
Mr. Nicholas Abumrad Scholarship Fund
Mrs. Annie and Dr. Munir Nasr Endowed Scholarship
Mrs. Daniel Bliss Endowed Scholarship
Muneef Assaf Farah Endowed Scholarship
Munir Baalbaki Memorial Scholarship
Murex Endowed Scholarship Fund
Murex Scholarship Fund
Murray Endowed Scholarship Fund
Nadim Kassar Scholarship
Najeeb N. Meshaka Memorial Endowed Scholarship
Najib Ibrahim Salha Scholarship
Nancy Maysara Sukkar Scholarship
Nasser Saidi Scholarship
Near East Scholarship Fund
Nicola Ziadeh Endowed Scholarship Fund
Nicolas H. and Hannah F. Dagher Endowed Scholarship
Noura Hatem Juffali Endowed Scholarship
Odette Atalla Scholarship
Osama Al-Aziz Endowed Scholarship Fund
Oussama Aboughazale Scholarship
Palestinian Cultural Club Scholarship Fund
Palestinian Students’ Fund - Scholarship
Pauline Nadim Makdisi Memorial Scholarship
Petrofac Endowed Scholarship
Philip and Mary G. Hitti Endowed Scholarship
Philippe Jabre Scholarship
Pilgrim Endowed Scholarship
President Mahmoud Abbas Scholarship for Palestinian Students in Lebanon
Procter & Gamble Levant Scholarship
Professor Khalil Malouf Memorial Scholarship Fund
R. Bayly Winder Scholarship
Rajfur Manoukian Scholarships
Rafic Hariri Endowed Scholarship for Nursing Students
Raja Trad–Dubai Alumni Endowed Scholarship
Ramzi Ackawi Scholarship
Ramzi F. Daouk Memorial Endowed Scholarship
Ramzi Mohamad Safadi Memorial Scholarship Fund
Ramzi Kteily Scholarship
Ramzi Mohammad Safadi Endowed Scholarship in FAS
Ramzi Mohammad Safadi Scholarship in FHS
Ray R. irani Endowed Scholarship
Reverend Mounir R. Sa‘adah Endowed Scholarship
Riad and Hassana Sadik Endowed Scholarship
Riad T. Sadik Scholarship
Rida Iranian Memorial Endowed Scholarship
Rifat S. El Nimer Scholarship
Rima Aiko and Maya Farah Makhoul Financial Aid Fund
Riyadh Alumni Chapter Endowed Scholarship for FHS

Kamal El Tayara Scholarship
Kamel Dajani Memorial Scholarship
Karakulla Endowed Scholarship
Karim Habre Endowed Scholarship
Karim W. Nasser Endowed Scholarship
KFI Scholarship
Khadijah Sabahat Kahhalet Takieddine Endowed Scholarship
Khaled and Mona Miqdadi Scholarship Fund
Khaled El-Yashruti Memorial Endowed Scholarship
Khalil and Taghrid Khoury Scholarship Fund
Khalil Arab Scholarship Fund
Khalil Bsheer Memorial Scholarship Fund - Endowment
Khalil Tabet Memorial Endowed Scholarship
Khushroo N. J. Patel Memorial Endowed Scholarship
Lama Hatoum Scholarship Fund
L’Emir Faysal Majid Arslan Scholarship
Lina Naaman Azhari Endowed Scholarship
Magida El-Roumi Endowed Scholarship
Maher Abu Ghazaleh Scholarship
Mahmoud Dalal Endowed Scholarship
Makram Ghassan Iweini Endowed Scholarship
Malak Tamim Sahli Scholarship
Malcolm H. Kerr Memorial Scholarship Fund
Maloof Family Endowed Scholarship Fund
Mamdouha El-Sayed Bobst Scholarship Fund
Mamdouha El-Sayed Bobst Scholarship Fund - Current
Maria Aziz Scholarship
Maria Shaar Sukkar Scholarship
Marie El-Khoury Scholarship in Fine Arts
Marwan and Lynne Muasher Endowed Scholarship Fund
Marwan Hayek Scholarship
Mary and Archie S. Crawford Scholarship
Mary Bajada Memorial Scholarship for Women
Marzouk Jassim Al Marzouk Scholarship
Matiel Mogannam Endowed Scholarship
Maximilian E. and Marion O. Hoffman Foundation, Inc. Endowed Scholarship for Medical Students
May Halabi Taleb Scholarship
Maysoon Akrawi Bowling Scholarship
Mazen Dajani Scholarship
Medical Alumni Endowed Scholarship
Michael N. Malouf Endowed Scholarship
Michel Alexandre Namour Memorial Endowed Scholarship
Michel Salim Nasser Scholarship
Midis Group Scholarship Fund
Mohamad Ali Zameli and Dina Tabbara Endowed Scholarship
Mohamad S. Dimashkieh Endowed Scholarship
Mohamad Salim Oueida Family Scholarship
Mohiedine Jishi Memorial Scholarship
Monzer Hourani Scholarship
Monzer Wehbe Scholarship Fund

Graduate Catalogue 2013–14
Robert and Myrle Linnell Endowed Scholarship
Roosevelt and Georgette Fattouh Endowed Scholarship Fund
Roots Group Scholarship
Ruh I. Hindawi Endowed Scholarship for Medical Students
RYMCO Scholarship Fund
S. M. Minassian Endowed Scholarship Fund
Saad Na’man Azhari Scholarship Fund
Saadat Hasan Endowed Scholarship
Sabra Purtili Endowed Scholarship
Sadie B. Latouf Endowed Scholarship
Said Khalaf Scholarship
Sakina Jarudi Scholarship
Salem Suleiman Al-Othman Memorial Endowed Scholarship Fund
Salman Al-Jishi Scholarship Fund
Saloua Raouda Choucair Foundation
Salwa El-Said Endowed Scholarship
Samer and Hiba Al-Rayyes Scholarship
Samer Younis Scholarship
Sami Maurice Atallah Scholarship
Sami V. Abdoo Scholarship
Samia Ghobril Endowed Scholarship
Samia Taji Farouki Arts and Sciences Merit Scholarship
Samim Alami Memorial Endowed Scholarship
Samir Ahmad Zaabri Scholarship
Samir and Malak Abdulhadi Scholarship
Samira Fadil Scholarship Fund
Samuel B. and Grace H. Kirkwood Scholarship
Sarah Al-Turki Endowed Scholarship
Saoud Binladin Group Scholarship
Sebouh Mekhejian Scholarship Fund
Selma Shaheen Nursing Scholarship
Serene Dajani Memorial Scholarship Fund
Shadi Refai Scholarship
Shafic Melhem Shabshab Endowed Scholarship
Shafik and Mary Tumeh Endowed Scholarship
Shaheen Brothers Endowed Scholarship
Shake Ketefian Scholarship in Nursing
Shawki Ghomieh Endowed Scholarship Fund
Sheikh Aref Yehia Scholarship
Shweir Scholarship Fund
Sidani Scholarship Fund
Sleiman and Sofia Trabulsi Endowed Scholarship
Southern California Chapter Endowed Scholarship Fund
Stella B. Kerr Endowed Scholarship
Stephen A. Miller Endowed Scholarship
Suhayl Assaf Farah Endowed Scholarship
Sulayman Salim Almuddin Baakline-Lebanon Memorial Endowed Scholarship
Suliman S. Olayan Endowed Scholarship
Sumaya Aboughazale Scholarship
Tala Mikdashi Scholarship
Teddy D. Abdoo Scholarship

Terry and Pierre Aboukhattar Endowed Scholarship
Teta Endowed Scholarship
The Alexis and Anne-Marie Habib Foundation Scholarship
The Ameen and Sophia Taft, and Nelly Antoun Endowed Scholarship
The Armenian Catholocosate of Cilicia Scholarship Fund
The Armenian Students Endowed Scholarship Fund
The Asfari Endowed Scholarship
The Cleveland H. Dodge Foundation Endowed Scholarship
The Cleveland H. Dodge Foundation Scholarship
The Dorothy Faheem-Beck Endowed Scholarship Fund
The Fuleihan Family Endowed Financial Aid Fund
The Herter Endowed Scholarship
The Houa Idriess Memorial Endowed Scholarship Fund
The Khayreddine and Adel Abdul-Wahab Endowed Scholarship
The Makassed - AUB Scholarships
The MasterCard Foundation Scholarship
The Maximilian E. and Marion O. Hoffman Endowed Scholarships
The Medicine Class of 1982 Endowed Scholarship Fund
The Nada Suhail Muasher Endowed Scholarship Fund
The Nemra and Helene Chamoun Scholarship
The Ousseimi Foundation Scholarship
The Peggy Smith Scholarship
The Peter Hanna Malik Scholarship
The Ramiz Mikdashi Endowed Scholarship
The Salomon Scholarship for Study in the Humanities and Social Sciences
The State of Qatar Endowed Scholarship
The Suad Hussein Juffali Endowed Scholarship
University Student Faculty Committee Scholarship
USFC 2003 Endowed Scholarship Fund
USFC Endowed Hardship Fund
Violette Haddad Khelfy Memorial Endowed Scholarship
WAAUAB Jaddah Chapter Endowed Scholarship
WAAUAB Jeddah Chapter Scholarship
WAAUAB-Dubai And Northern Emirates Endowed Scholarship
WAAUAB-Dubai And Northern Emirates Scholarship
WAAUAB North Texas Dallas Chapter Scholarship
Wael Nohad Chehab Endowed Scholarship for Business
Wahida Fansa Scholarship
Walid and Nada Abushakra Endowed Scholarship
Walid Joumblatt Scholarship
William and Aida Haddad Endowed Scholarship for Engineering
William Mitri Endowed Scholarship
Women’s Auxiliary Nursing Scholarship
Women’s League Scholarship Fund For Handicapped Students at AUB
Women’s Scholarship Fund
Yervant Jidejian Memorial Scholarship
Yumna Hoss Sukkar Scholarship
Yusef Abu Khadra Endowed Scholarship
Yusef Abu Khadra Scholarship in Engineering Management
Yusuf and Najat Zarour–Dubai Alumni Endowed Scholarship
Yusuf Mamsour Scholarship
Fellowships

Anonymous Pierre Amin Gemayyel End Doctoral Fellowship in FEA
Antoun Saadeh Endowed Doctoral Research Fellowship-FAS
John Waterbury Endowed Fellowship Fund
Louise L. Massabki Fellowship-Scholarship
Mohamad Makhzoumi Endowed Fellowship Fund
Nayel Al Harith Endowed Fellowship
Nizam Shammas Fellowship
The CCC PhD Fellowship in Manufacturing
The Indevco Fellowship Fund
Zahem Endowed Fellowship

University Prizes and Awards

Murad al-Akl Awards: First prize $150 and second prize $100, awarded on a competitive basis for the best essay, speech, or debate on the subject of “How I Can Serve My Fellow Man.”

Abdul Hadi Debs Endowment Award for Academic Excellence: Three awards not exceeding $1,000 each to graduating students, preferably at the graduate level, in the Faculty of Agricultural and Food Sciences, the Faculty of Arts and Sciences, and the Faculty of Engineering and Architecture. Candidates have an outstanding academic record and have demonstrated their research capabilities through a paper, project, or thesis deemed by the faculty to be worthy of publication.

Abdul Hamid Hallab REP Service Excellence Award: ($1,000) awarded to full time AUB faculty or staff who served on at least one REP project during the fiscal year.

Rosemarie S. Haggar Music Award: ($1,000) awarded to students in the AUB Choir to be used to support a musical performance or for supervised education and research experience outside AUB.

Penrose Award: Non-cash honorary awards made to the outstanding graduate of each faculty on the basis of scholarship, character, leadership, and contribution to university life.

Dean Thomas M. Sutherland Prizes: Awarded annually at graduation to outstanding Faculty of Agricultural and Food Sciences graduates. For undergraduate excellence, $500 to the recipient of the Penrose Award for the year. For graduate excellence, $1,000 to the MS graduate with the thesis judged best overall for design, research, presentation, and contribution to its field.

Faculty of Arts and Sciences

Shehadeh Abboud Memorial Excellence Award in English Language: $1,000 awarded to a graduating senior student majoring in English with the highest average in the major English courses during his/her undergraduate studies.

HE Ghassan Al-Rashash Excellence Award in Political Studies: The prize ($500) will be awarded to a graduating student with the highest average in the graduate program in Political Studies.

Sheikh Fawzi Azar Memorial Prize: $200 awarded to student(s) in SBS with a commendable paper or study submitted to the department. Annual balance will be used for the purchase of educational materials and subscription to scientific journals.

Educators’ Endowed Award in Education: $1,000 awarded to one or two outstanding students in the Education Department in the acknowledgement of their achievement. These students should have shown innovation, performed community service and had an average of 75 or above.

Fuad Said Haddad award in Education: $1,000 awarded to the graduate MA student in Education with the best thesis as selected by the Education department of the Faculty of Arts and Sciences.

Makhlouf Haddadin Award for the Outstanding Chemistry Undergraduate Student: $500 awarded at the end of each academic year to a graduating senior chemistry student who has demonstrated research capabilities through a paper or project and has an excellent academic record.

Makhlouf Haddadin Award for Outstanding Chemistry Graduate Student: $500 awarded at the end of each academic year to a graduating MS chemistry student who has demonstrated research capabilities through a paper or project and has an excellent academic record.

Philip K. Hitti Prize: Awarded in books to the senior student in the Faculty of Arts and Sciences who, in the judgment of the president of the University, the dean of the faculty, and the chairman of the department concerned, exemplifies in his/her academic career the scholarly spirit of AUB at its best.

Nicholas Jabre Prize: Awarded on the basis of academic excellence at the discretion of the dean.

Nadim Khalaf Memorial Award: $500 awarded at the end of each academic year to the graduating senior student in economics with the highest average in economics during his/her undergraduate studies at AUB.

Mrs. Jinan Majzoub Excellence Award in English Literature: The prize ($500) will be awarded to a graduating student with the highest average in the graduate program in English Literature.
Samir Makkadissi Award in Economics: The prize will be awarded to the project/thesis during the academic year that best fits the criteria for selection.

The Muhanna Foundation in Mathematics Award of Excellence: $1,000 awarded annually to the most outstanding senior Lebanese student in the Department of Mathematics.

Hussein Oueini Memorial Award: $4,000 divided equally between a graduating senior student in PSPA with the highest average and the best thesis written during the same academic year, as recommended by the department and dean.

Penrose Award: Non-cash honorary awards made to the outstanding graduate of each faculty on the basis of scholarship, character, leadership, and contribution to university life.

Amal Saidi Memorial Prize: $500 awarded to a graduating senior excelling in the subject of anthropology or sociology.

The Majida Siniora Memorial Prize in Humanities: $1,500 awarded to a top graduate senior in arts and humanities at the Faculty of Arts and Sciences.

Eli Khoury Award: awarded to one or more graduating students in the Department of Fine Arts and Art History with highest academic achievements.

Lebanon Renaissance Award: to one or more graduating students in political studies, economics, social and behavioral sciences, public administration or history with highest academic achievements.

William Van Dyck Endowed Award in Biology: to the graduating senior student with the highest average.

Computer Science Undergraduate and Graduate Award: $1,500 to the "Best Undergraduate Student" and $1,500 to the "Best Graduate Student".

Faculty of Engineering and Architecture

AREEN Projects award for excellence in Architecture and Design: Six prizes of $2,000, $1,500, and $1,000, awarded to six students based on projects they submit to the department and who are chosen upon the recommendation of a jury. The recipients should have a cumulative average of at least 80 in architecture and design courses during the last four semesters. The graduation project's purpose should be to serve the community in Lebanon, and should demonstrate outstanding and distinctive creativity and aesthetic value.

Farouk W. Agha Excellence Award: $1,000 awarded to a graduating student with a BE degree in Mechanical or Civil Engineering who accumulated the highest average during his/her period of study at AUB.

Fawzi W. Azar Award: $10,000 awarded annually toward the tuition of one or more fifth-year student(s) in the architecture program of the Faculty of Engineering and Architecture based on a project they present in their fourth year that is deemed best by a special jury.

Dean’s Award for Creative Achievement: Awarded to a student in each of the main programs of the Faculty of Engineering and Architecture (architecture, graphic design, civil engineering, computer and communications engineering, electrical engineering, and mechanical engineering) who has demonstrated outstanding creativity in his/her approach to academic work.

Faculty of Health Sciences

Graduate Academic Achievement Award: Non-cash honorary award in recognition of excellence in academic performance. Awarded to a student in the MPH program and a student in the MS programs.

Distinguished Graduate Award: Non-cash honorary award in recognition of excellence in academic performance and community service. Awarded to a senior FHS student.

Distinguished MLS Graduate Award: Non-cash honorary award in recognition of excellence in Medical Laboratory skills with good academic performance. Awarded to a senior student in the Medical Laboratory Sciences program.

Distinguished Graduate Award for Community Service: Non-cash honorary award in recognition of excellence in community service with good academic performance. Awarded to a senior FHS student.

Penrose Award: Non-cash honorary awards made to the outstanding graduate of each faculty on the basis of scholarship, character, leadership, and contribution to university life.

The Kiram Siniora Memorial Prize in Health Sciences: $1,500 awarded to a top graduate senior from the Faculty of Health Sciences.
Faculty of Medicine

Mrs. Robert J. Lewis Memorial Award: For the best paper written during the current year on neuroscience.

Franklin Thomas Moore — Ethel Jessup Memorial Prize: Established by the children and friends of Dr. and Mrs. Franklin T. Moore; awarded to the senior medical student who has shown the highest proficiency in obstetrics and gynecology or, lacking such, in any department, and in the student’s personal life a dedication to humanity, a zeal for truth, and a belief in God.

Penrose Award: Non-cash honorary awards made to the outstanding graduate of each faculty on the basis of scholarship, character, leadership, and contribution to university life.

Dr. Munib Shahid Award: Given annually to the fourth year medical student demonstrating the best performance in internal medicine and a mature character.

Nimr Tuqan Memorial Prize in Pathology: In memory of the late Dr. Nimr Tuqan. To be awarded to the student of Medicine II who excels in his/her work in the Department of Pathology.

Women’s Auxiliary Nursing Students Award: Full tuition for a needy and outstanding student in the School of Nursing.

Anoir Hamoud Makarem Nursing Award: ($1,000) awarded to Nursing students from Ain Wa Zein, Lebanon.

Suliman S. Olayan School of Business

Dr. Emile Ghattas Memorial Award: A cash prize of $1,000 awarded to the best graduating student in the Bachelor of Business Administration program.

Penrose Award: Non-cash honorary awards made to the outstanding graduate of each faculty on the basis of scholarship, character, leadership, and contribution to university life.

The Aida Siniora Memorial Prize in Business: $1,500 awarded to a top graduate senior from the Suliman S. Olayan School of Business.

Fenicia Bank Excellence Award in Finance: $2,500 awarded to a graduating business student, with BBA degree-finance concentration, having the highest average, and on financial aid.

Fenicia Bank Leadership Award in Finance: $2,500 awarded to a Lebanese business student, in his/her last year of BBA study, pursuing a finance concentration, with excellent academic record and demonstrated leadership qualities, and on financial aid.

Quantum Communications Award in Business: to one or more graduating students in Business with highest academic achievements.

Current and Endowed Research Funds

AGSC Research and Outreach
The Joseph and Ilham Cicippio Endowed Research Fund at FAFS
Dar Al-Handasah (Shair & Partners) Endowed Fund For Research In Engineering
The Harik Research Fund

Farouk K. Jabre Fund for Biomedical Research
Salim A. Salam Endowment Fund
Maroun Semaan Research Fund for Graduate Students
Mikati Endowed Research Fund for Corporate Social Responsibility
FAS Endowed Research Fund
Khaled Y. Daoouk Research Fund
Sheikh Khaldoun Barakat Research Fund
Telus Research Fund
The Hani Salaam Research Fund (CAMES)
ASHRAE Research Fund
Byblos Bank OSB Faculty Research and Development Fund
Faculty List
Faculty List

Deans Emeriti
Daghri, Nuhad, PhD, Iowa State University, AVSC
Cortes, Nadim, MD, AUB; Internal Medicine, Endocrinology and Metabolism, Pharmacology and Toxicology

Professors Emeriti
Dagher, Ibrahim, MD; AUB; Surgery, Cardiothoracic
Fakhry, Majid, PhD; University of Edinburgh; Philosophy
Haddad, Fuad Sami, MD; AUB; FRCS; Canada; Surgery, Neurosurgery
Iliya, Raja, PhD; University of Texas, Austin; Civil and Environmental Engineering
Issa, Philip, MD; Université Saint Joseph; Radiation Oncology
Kawar, Nasri, PhD; Pennsylvania State University, Agricultural Sciences
Khalaief, Wadad, RN, MSN; Boston University; Medical Surgical Nursing
Khoury, Farid, MD; AUB; Laboratory Medicine
Makarem, Selwa, PhD; Columbia University; Nursing
Makdissi, Samir, PhD; Columbia University; Economics
Mavromatis, Harry, PhD; Princeton University; Physics
Muwafi, Amin, PhD; University of Florida; Mathematics
Nabnout, Nasser, PhD; University of Texas; Microbiology and Immunology
Nassif, Rafi, MD, AUB; MPH, Yale University; Laboratory Medicine
Obied, Sami, MD; AUB; Clinical Surgery, General
Sakkal, Fateh, PhD; University of Manchester; Mechanical Engineering
Shehadi, Samir, MD; AUB; Surgery, Plastic and Reconstructive
Shwayri, Edmond, MD; AUB; Internal Medicine, Nephrology
Tamous, Raja, PhD; Massachusetts Institute of Technology (MIT), Nutrition and Food Sciences
Yff, Peter, PhD; University of Illinois; Mathematics

Faculty Members
Abbas, Jaber, MD; AUB; Clinical Associate Professor; Surgery, General Surgery, Surgery
Abbas, Oussama, MD; AUB; Assistant Professor of Clinical Dermatology, Dermatology
Abboud, Ali, MS; Toulouse School of Economics, France; Instructor; Agricultural Sciences
Abboud, Miguel, MD; AUB; Professor; Pediatrics and Adolescent Medicine, Hematology-Oncology
Abbyad Weir, Christine, PhD, RN, WHNP; University of Texas at Austin; Clinical Assistant Professor; Nursing
Abchee, Antoine, MD; AUB; Associate Professor of Clinical Medicine; Internal Medicine, Cardiology
Abdallah, Hanin, PhD; Virginia Polytechnic and State University; Senior Lecturer; Management, Marketing and Entrepreneurship
Abdallah, Sawsan, MD; AUB; Clinical Associate; Pediatrics and Adolescent Medicine
Abd-el-Baki, Jasmine, MB; AUB; Clinical Associate; Dermatology
Abdelnoor, Alexander, PhD; University of Michigan; Professor; Experimental Pathology, Immunology and Microbiology
Abdelnoor, John, MD; AUB; Clinical Associate; Surgery, Orthopedic Surgery
Abdel-Rahman, Abdel-Fattah, PhD; McGill University; Professor; Geology
Abdul Malak, Assem, PhD; University of Texas, Austin; Professor; Engineering Management Program
Abdulrahim, Sawsan, PhD; University of Michigan; Associate Professor; Health Promotion and Community Health
Abbedini, Reza, BA; Tehran Art University; Assistant Professor; Architecture and Design
Abdiad, Firas, MD; AUB; Instructor of Clinical Surgery; Surgery, General Surgery
Abdiad, Mohamad, PhD; Purdue University; Assistant Professor; Nutrition and Food Sciences
Abi Fakher-Saab, Faysal, MD; Universidad Del Zulia; Clinical Associate; Diagnostic Radiology
Abi Fakhr, Lina, PhD, MSN; University of Phoenix, Arizona; Assistant Professor; Nursing
Abi Khuzam, Faruk, PhD; Syracuse University; Professor; Mathematics
Abi-Rafeh, Randa, MS; AUB; Instructor; Chemistry
Abi-Saad, George, MD; AUB; Professor of Clinical Surgery; Surgery, General Surgery
Abi-Saleh, Bernard, MD; Lebanese University; Assistant Professor of Clinical Medicine; Internal Medicine, Cardiology
Abou Assi, Samar, DDS; University of Saint Joseph; Clinical Associate; Otolaryngology and Head and Neck Surgery
Abou Chebel, Naji, MD; University of Saint Joseph; Clinical Instructor; Otolaryngology and Head and Neck Surgery
Abou Dagher, Gilbert, MD; AUB; Assistant Professor of Clinical Emergency Medicine; Emergency Medicine
Abou Faysal, Ibrahim, PhD; Massachusetts Institute of Technology; Associate Professor; Electrical and Computer Engineering
Abou Ghali, Kamel, PhD; Kansas State University; Professor; Mechanical Engineering
Abou Jaoude, Ramzi, MD; University of Saint Joseph; Clinical Associate; Pediatrics and Adolescent Medicine
Abou Jaoudi, Nadim, DCD; St. Joseph University, Clinical Associate, Otolaryngology and Head and Neck Surgery
Abou-Kheir, Wassim, PhD; Albert Einstein College of Medicine, Yeshiva University; Assistant Professor; Anatomy, Cell Biology and Physiological Sciences
Abou Najm, Majdi; PhD; Purdue University; Assistant Professor; Civil and Environmental Engineering
Abouchacra, Kim, PhD; Pennsylvania State University; Associate Professor of Clinical Otolaryngology; Otolaryngology and Head and Neck Surgery
Abou Zied, Maya, PhD; Massachusetts Institute of Technology; Assistant Professor; Civil and Environmental Engineering
Abou Zied, Nuhad, MD; AUB; Assistant Professor of Clinical Neurology; Neurology, Multiple Sclerosis
Abu-Alfa, Ali, MD; AUB; Professor; Internal Medicine, Nephrology and Hypertension
Abu Haydar, Fadlo, MD; AUB; Clinical Associate Professor; Internal Medicine, Gastroenterology
Abu Jawdeh, Youssif, PhD; Faculty of Agronomic Science, Belgium; Professor; Agricultural Sciences
Abunna, Yaser, MLA; PhD candidate; University of Massachusetts Amherst; Visiting Assistant Professor; Landscape Design and Ecosystem Management
Abu-Musa, Antoine, MD; AUB; Professor of Clinical Obstetrics and Gynecology; Obstetrics and Gynecology
Abu-Husayn, Abdal Rahim, PhD; AUB; Professor; History and Archaeology
Abu-Jawdeh, Siham, PhD; AUB; Lecturer; Arabic
Abu-Khuzam, Hazar, PhD; University of California; Professor; Mathematics
Abu-Raslan, Walid, MBBS; Baghdad University; Clinical Associate; Pediatrics and Adolescent Medicine
Abu-Saad Huijer, Huda, PhD, RN, FEANS; FAAN; University of Florida, Gainesville; Professor; Nursing
Abu Salem, Fatmeh, PhD; Oxford; Associate Professor; Computer Science
Abu-Sitta, Ghassan, MBChB; University of Glasgow; Instructor of Clinical Surgery; Surgery, Plastic and Reconstructive Surgery

Adra, Abdallah, MD; AUB; Assistant Professor of Clinical Obstetrics and Gynecology; Obstetrics and Gynecology

Adra, Marina, RN, BSN, MS; AUB; Clinical Assistant Professor; Nursing

Afvah, Nada, MS; AUB; Research Associate, Nutrition and Food Sciences

Afshin, Nadim, MD; AUB; Clinical Senior Lecturer; Surgery, Orthopedic Surgery

Affifi, Rima, PhD; St. Louis University; Professor; Health Promotion and Community Health

Afiouni, Fida, PhD; Sorbonne, Paris 1 University; Assistant Professor; Management, Marketing and Entrepreneurship

Ala, Saleh, PhD; University of Toronto; Professor; Arabic

Alabd-Ramada, Mamdouha, MD; University of Saint Joseph; Adjunct Clinical Associate Professor; Pathology and Laboratory Medicine

Ahmad, Mohammad, PhD; Queen's University Belfast; Associate Professor; Chemical Engineering Program

Alarazani, Camille, MD; Padova University; Clinical Instructor; Family Medicine

Ajami, Habib, MD; Damascus University; Clinical Associate, Surgery

Akel, Madeleine, MD; AUB; Clinical Associate; Family Medicine

Akel, Samir, MD; AUB; Clinical Associate Professor, Surgery, Pediatric Surgery; Clinical Associate, Pediatrics and Adolescent Medicine

Akkary, Haitham, PhD; Portland State University; Associate Professor, Electrical and Computer Engineering

Aki, Elie, MD; Saint Joseph University; Associate Professor; Internal Medicine

Akoory-Dirani, Leyla, PhD; Paris 5 University; Assistant Professor of Clinical Psychiatry, Psychiatry, Psychology and Psychopathology

Al-Akl, Nayla, MS; Harvard University's Graduate School of Design; Lecturer; Landscape Design and Ecosystem Management

Ali-Alaoui, Adnan, PhD; Georgia Institute of Technology; Professor; Electrical and Computer Engineering

Al-Aqeel, Aida, MD; Kuwait University; Adjunct Professor; Biochemistry and Molecular Genetics

Al-Dewachi, Omar, PhD; Harvard University; MD; Baghdad University; Assistant Professor; Epidemiology and Population Health

Alameddine, Ibrahim, PhD; Duke University; Assistant Professor; Civil and Environmental Engineering

Al-Amin, Hassan, MD; AUB; Adjunct Clinical Associate Professor, Psychiatry

Al-Awar, Ghassan, MD; AUB; Assistant Professor of Clinical Medicine; Internal Medicine, Infectious Diseases; Experimental Pathology, Immunology and Microbiology

Al-Chaer, Elie, PhD; University of Texas; Professor; Anatomy, Cell Biology and Physiological Sciences

Al-Ghoul, Mazen, PhD; McGill University; Professor; Chemistry

Al-Hakim, Abbas, PhD; University of North Carolina; Assistant Professor; Mathematics

Al-Halees, Zouhair, MD; King Saud University Medical School; Adjunct Clinical Professor; Surgery, Pediatric Cardiovascular and Thoracic Surgery

Al-Harthy, Howayda, PhD; Harvard University; Professor; Architecture and Design

Al-Hroub, Anis, PhD; University of Cambridge; Associate Professor; Education

Al-Kutoubi, Aghiad, MD; Damascus University; Professor; Diagnostic Radiology

Alam, Samir, MD; AUB; Professor; Internal Medicine, Cardiology

Alameddine, Mohamad, PhD; University of Toronto; Assistant Professor; Health Management and Policy

Alami, Ramzi, MD; AUB; Assistant Professor of Clinical Surgery; Surgery, General Surgery

Alamiddine, Kawser, MD; Lebanese University; Clinical Associate; Emergency Medicine

Alany, Nour, RN, MSN; AUB; Clinical Instructor; Nursing

Ali-Hassan, Rola, MD; AUB; Clinical Associate; Internal Medicine

Ali-Jouroudi, Wael, MD; AUB; Assistant Professor; Internal Medicine, Cardiology

Alam, Souha, MD; AUB; Clinical Associate, Ophthalmology

Al-Sayed, Amany, MA; University of British-Columbia; Instructor; English

Al-Taki, Muhayeddine, MD; AUB; Instructor of Clinical Surgery; Surgery, Orthopedic Surgery

Altheib, Tamer, MD; Clark University; Assistant Professor; Education

Amyuni, Mona, PhD; Université de Paris - Sorbonne; Senior Lecturer; Civil and Environmental Engineering

Anhoury, Patrick, DMD; Boston University; Clinical Associate; Otolaryngology and Head and Neck Surgery

Anouz, Abdel Latef, PhD; Aston University; Assistant Professor; Business Information and Decision Systems

Antar, Ghassan, PhD; Ecole Polytechnique; Associate Professor; Physics

Antoun, Jumana, MD; AUB; Assistant Professor of Clinical Family Medicine; Family Medicine

Antoun, Randa, PhD; University of York; Lecturer; Political Studies and Public Administration

Apaydin, Marina, PhD; University of Western Ontario; Assistant Professor; Management, Marketing and Entrepreneurship

Arabi, Asma, MD; Hassan II University; Assistant Professor of Clinical Medicine; Internal Medicine, Endocrinology and Metabolism

Arabi, Mariam, MD; AUB; Assistant Professor of Clinical Pediatrics and Adolescent Medicine; Pediatrics and Adolescent Medicine, Cardiology

Arif, Ali, MD; AUB; Clinical Associate; Pediatrics and Adolescent Medicine

Araj, George, PhD; AUB; Professor; Pathology and Laboratory Medicine

Arkhi, Reina, PhD; City University of New York; Assistant Professor; Business Information and Decision Systems

Arman, Victor, PhD; Stanford University; Assistant Professor; Business Information and Decision Systems

Arasogli, Aida, MA; University of London; Instructor; Civilization Sequence Program

Arawi, Thalia, PhD; Warnborough University; Assistant Professor; Internal Medicine, Medical Ethicist

Arayssi, Thurayya, MD; AUB; Adjunct Clinical Associate Professor; Internal Medicine, Rheumatology

Arbib, George, DDes; Harvard University; Associate Professor; Architecture and Design

Arevian-Bakalian, Mary, RN, BSN, MPH; AUB; Clinical Associate Professor; Nursing

Ariss, Timani-Majd, MD; University of Saint Joseph; Assistant Professor of Clinical Pediatrics and Adolescent Medicine; Pediatrics and Adolescent Medicine, Ambulatory

Arnauot, Samir, MD; Craiova University, Romania; Associate Professor of Clinical Medicine; Internal Medicine, Cardiology

Arnold, Lisa, PhD; University of Louisville; Assistant Professor; English

Ardall, Hassan, PhD; Wayne State University; Professor; Electrical and Computer Engineering

Asmar, Daniel, PhD; University of Waterloo; Assistant Professor; Mechanical Engineering

Assad-Salha, Neville, MA; Momash University; Assistant Professor; Fine Arts and Art History

Atawi, Samir, MD; AUB; Clinical Assistant Professor; Obstetrics and Gynecology

Atiyeh, Bishara, MD; AUB; Professor; Surgery, Plastic and Reconstructive Surgery

Attie, Paul, PhD; University of Texas; Associate Professor; Computer Science

Atweh, Samir, MD; MS; AUB; Professor; Neurology

Avant, Doyle, MFA; New York University; Instructor, English

Awaida, May, PhD; University of Leicester; Lecturer; Psychology

Awad, Mariette, PhD; University of Vermont; Assistant Professor; Electrical and Computer Engineering
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Institution</th>
<th>Title</th>
<th>Discipline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batley, Nicolas, MD</td>
<td></td>
<td>Medical University of South Carolina</td>
<td>Assistant Professor of Clinical Family Medicine</td>
<td>Family Medicine</td>
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<td>Bauer, Christopher, PhD</td>
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<td>Baydoun, Elias, PhD</td>
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<td>Baytiiyeh, Hoda, PhD</td>
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<td>Education</td>
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<td>Bazartbachi, Ali, MD</td>
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<td>Paris 7 University</td>
<td>Professor, Internal Medicine, Hematology- Oncology, Associate</td>
<td>Anatomy, Cell Biology and Physiological Sciences</td>
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<td>Bazi, Tony, MD</td>
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<td>Assistant Professor of Clinical Obstetrics and Gynecology</td>
<td>Obstetrics and Gynecology</td>
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<td>Bazzi, Louay, PhD</td>
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<td>Massachusetts Institute of Technology</td>
<td>Associate Professor</td>
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<td>Boulain-Rahme, Diana, MD</td>
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<td>Berjawi, Ghina, MD</td>
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<td>Associate Professor of Clinical Radiology</td>
<td>Diagnostic Radiology</td>
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<td>Beydoun, Ahmad, MD</td>
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<td>AUB</td>
<td>Professor</td>
<td>Neurology, Epilepsy</td>
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<td>Bikhazi, Anwar, PhD</td>
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<td>University of Michigan</td>
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<td>Anatomy, Cell Biology and Physiological Sciences</td>
</tr>
<tr>
<td>Birbiri, Adel, MD</td>
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<td>Professor (on tenure appointment)</td>
<td>Internal Medicine, Nephrology and Hypertension, Anatomy, Cell Biology and Physiological Sciences</td>
</tr>
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<td>Bitar, Elias, MD</td>
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<td>Clinical Associate, Surgery</td>
<td>General Surgery</td>
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<td>Bitar, Fadi, MD</td>
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<td>Professor</td>
<td>Pediatrics and Adolescent Medicine</td>
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<td>Bitar, Khalil, PhD</td>
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<td>Yale University</td>
<td>Professor</td>
<td>Surgery</td>
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<td>Bitar, Mohamad, MD</td>
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<td>AUB</td>
<td>Associate Professor of Clinical Otolaryngology</td>
<td>Otolaryngology and Head and Neck Surgery, Pediatrics, Clinical Associate, Pediatrics and Adolescent Medicine</td>
</tr>
<tr>
<td>Bizri, Abdul-Rahman, MD</td>
<td></td>
<td>University of Damascus</td>
<td>Assistant Professor of Internal Medicine</td>
<td>Internal Medicine, Infectious Diseases</td>
</tr>
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<td>Bornedal, Peter, PhD</td>
<td></td>
<td>University of Copenhagen</td>
<td>Professor</td>
<td>Civilization Sequence Program</td>
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<tr>
<td>Bou Akl, Imad, MD</td>
<td></td>
<td>AUB</td>
<td>Instructor of Clinical Medicine, Internal Medicine, Pulmonary and Critical Care</td>
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<tr>
<td>Bou Hamad, Imad, PhD</td>
<td></td>
<td>HEC</td>
<td>Assistant Professor</td>
<td>Business Information and Decision Systems</td>
</tr>
<tr>
<td>Bou Khalil, Pierre, MD</td>
<td></td>
<td>AUB</td>
<td>Associate Professor of Clinical Pathology</td>
<td>Pathology and Laboratory Medicine</td>
</tr>
<tr>
<td>Bou Nasser, Makram, PhD</td>
<td></td>
<td>University of Birmingham</td>
<td>Lecturer, Agricultural Sciences</td>
<td></td>
</tr>
<tr>
<td>Boustaaty, Rose-Mary, MD</td>
<td></td>
<td>AUB</td>
<td>Professor</td>
<td>Pediatrics and Adolescent Medicine</td>
</tr>
<tr>
<td>Bouwars, Rose-Mary, MD</td>
<td></td>
<td>University of Oklahoma</td>
<td>Instructor</td>
<td>Biochemistry and Molecular Genetics</td>
</tr>
<tr>
<td>Bouzeineddine, Amal, PhD</td>
<td></td>
<td>Boston University</td>
<td>Lecturer, Education</td>
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<tr>
<td>Brassier, Ray, PhD</td>
<td></td>
<td>University of Warwick</td>
<td>Associate Professor</td>
<td></td>
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<tr>
<td>Bright, Martin, PhD</td>
<td></td>
<td>University of Cambridge</td>
<td>Assistant Professor</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Bualuan, Hayat, PhD</td>
<td></td>
<td>University of Saint Joseph</td>
<td>Lecturer, Civilization Sequence Program</td>
<td></td>
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<tr>
<td>Bulbul, Muhammad, MD</td>
<td></td>
<td>AUB</td>
<td>Clinical Professor, Surgery, Urology</td>
<td></td>
</tr>
<tr>
<td>Cash, Keith, PhD</td>
<td></td>
<td>University of Manchester</td>
<td>Professor, School of Nursing</td>
<td></td>
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<tr>
<td>Chaaban, Farih, PhD</td>
<td></td>
<td>University of Liverpool</td>
<td>Professor, Electrical and Computer Engineering</td>
<td></td>
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<tr>
<td>Chaaban, Jad, PhD</td>
<td></td>
<td>University of Toulouse</td>
<td>Assistant Professor</td>
<td>Agricultural Sciences, Chaaya, Monique, DPH, Johns Hopkins University, Professor, Epidemiology and Population Health</td>
</tr>
<tr>
<td>Chahine, Hala, PhD</td>
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<td>Senior Lecturer</td>
<td>Agricultural Sciences</td>
</tr>
</tbody>
</table>
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Harkous, Samer, PhD; USEK; Lecturer; University Preparatory Program
Hartwig, Alexander, PhD; University of North Carolina; Assistant Professor; English
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Kazarian, Shafe, PhD; University of Western Ontario; Professor; Psychology

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