Faculty of Medicine and Medical Center (FM/AUBMC)
Faculty of Medicine and Medical Center (FM/AUBMC)

Officers of the Faculty

Peter F. Dorman  President of the University
Ahmad Dallal  Provost, ex-officio
Mohamed H. Sayegh  Vice President for Medical Affairs and the Raja N. Khuri Dean of the Faculty of Medicine
Ziyad Ghazzal  Deputy VP/Dean and Associate Dean for Clinical Affairs
Kamal Badr  Associate Dean for Medical Education
Ali Bazarbachi  Associate Dean for Basic Research
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Samia Khoury  Associate Dean for Translational and Clinical Research
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Salim Kanaan  Director of Admissions, ex-officio
Lokman Meho  University Librarian, ex-officio

Faculty Administrative Support

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Rana Alley  Director of Public Relations
May Al-Kassar  Institutional Review Board Administrator
Nadine Chatila  Director of Medicine Business Unit
Abdul Latif Daouk  System Administrator and Programmer
Lara El-Khoury  External Medical Affairs Officer
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Mahmoud Harb  Medical Education Unit Coordinator
Maha Wazzi Istanbulli  HR Generalist- Faculty of Medicine
Rania Jaber  Graduate Medical Education Officer
Hala Kaid Bey  Research and Grants Education Manager
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
• University of Montpellier (France) (as of August 3, 2007)

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.

Table 1. Premedical core course requirements and credit equivalents according to Lebanese Baccalaureate Program Subject

<table>
<thead>
<tr>
<th>Subject</th>
<th>Biology</th>
<th>Chemistry</th>
<th>Physics</th>
<th>Economics and Sociology</th>
<th>Literature and Humanities</th>
<th>Remaining Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Sciences</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>11-15</td>
</tr>
<tr>
<td>General Sciences</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>3-5</td>
</tr>
<tr>
<td>Economics and Sociology</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Literature and Humanities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>3-5</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>9</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>30-39</td>
</tr>
</tbody>
</table>

Table 2: Recommended premedical core courses according to field of study at AUB

<table>
<thead>
<tr>
<th>Premedical Requirements</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>English (6 Cr)</td>
<td>ENGL 203 (3 Cr) ENGL204 (3 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Humanities + Social + Sciences (6 Cr)</td>
<td>Fulfilled by the general education requirements of the University which include 6 credits in the humanities/6 credits in CVSP courses and 6 social sciences credits</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Biology * (7 Cr)</td>
<td>BIOL 101 (3 Cr) or equivalent</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>BIOL 200 (4 Cr) or BIOL 201 (4 Cr)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PHYS 101 (4 Cr) + PHYS 105 (1 Cr) or equivalent</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PHYS 204 (3 Cr) + PHYS 204L (1 Cr) or PHYS 205 (3 Cr) + PHYS 205L (1 Cr)</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PHYS 211 (3 Cr) + PHYS 211L (1 Cr)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>PHYS 210 (3 Cr) + PHYS 210L (1 Cr)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chemistry (15 Cr)</td>
<td>CHEM 101 (3 Cr) + CHEM 101L (1 Cr) or equivalent</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CHEM 201 (3 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CHEM 211 (3 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CHEM 212 (3 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CHEM 210 (2 Cr)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>CHEM 225 (4 Cr)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

* 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.

* Biology 200 is a very general course that does not prepare students well for the MCAT. Biology 201 and 202 provide better preparation, and students are advised to take both courses.
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 47–72.

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 and second years, 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, a student 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 courses.

A student in the third or fourth year who fails 50 percent or more of clerkship hours may be asked to repeat the year or withdraw from the faculty. A student who fails less than 50 percent of clerkship hours may be asked to do remedial work and pass the re-examinations, repeat a
clerkship, repeat the year, or leave the faculty. At the discretion of the committees concerned, 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.

Graduate Study in the Basic Medical Sciences
PhD in Biomedical Science

Graduate Studies in Biomedical Sciences
The graduate program in Biomedical Sciences is designed to provide a multidisciplinary educational and training environment that will prepare students for independent research and teaching careers. It is centered in the Faculty of Medicine, where investigative collaborations among basic and clinical scientists are fostered. The program emphasizes concepts and state-of-the-art techniques of molecular and cellular medicine, and integrates students into the extensive and rapidly expanding translational research programs. Students may choose a discipline of study from the several research areas/programs offered by the Faculty of Medicine.

For general requirements about graduate study at AUB refer to the Admissions section on pages 33–46 of this catalogue.

MS Disciplines
• Biochemistry: refer to page 427
• Human Morphology: refer to page 422
• Microbiology and Immunology: refer to page 436
• Pharmacology and Therapeutics: refer to page 457
• Physiology: refer to page 424
• Neurosciences (Interfaculty): refer to page 521

Admission to MS Programs
• Admission as a regular student: refer to page 40
• Admission on probation: refer to page 41

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 equivalent to nine credits. The thesis must be presented and defended to the satisfaction of the examining 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.

**PhD Program**

**Mission**

The mission of the Doctoral Program in Biomedical Sciences (DBMS) is to provide excellent educational and research opportunities for students to develop into independent researchers and educators who will enrich the research and teaching output from Lebanon, the Middle East and beyond. The program will provide the students with the theoretical foundations and the special skills and attitudes that will allow them to develop their critical thinking and creative potential, conduct high caliber research in the biomedical sciences, contribute to the advancement of science, uphold the principles of intellectual honesty, and become leaders in their chosen fields of study.

**Program Objectives**

Students are expected to:

- Design and pursue pertinent research into biomedical science questions, by devising and implementing a research plan to test a novel hypothesis;
- Generate and analyze data critically, and utilize such analysis in devising, revising and/or refining a research plan;
- Communicate findings, in both oral and written formats, through presentations at scientific meetings, publications in peer-reviewed journals, and tutoring of junior students;
- Demonstrate knowledge and integration of the fundamental principles of the various biomedical sciences;
- Demonstrate theoretical and practical expertise in a specific field of research in the biomedical sciences;
- Appreciate the complexity and the volume of emerging new scientific information and its technical components, and be able to cope with it and manage one’s learning efficiently and effectively;
- Appreciate the importance of openness, teamwork and integrity in the advancement of knowledge through research.
PhD Disciplines

- Biochemistry and Molecular Genetics
- Cell Biology of Cancer
- Microbiology and Immunology
- Neurosciences Program
- Nutrition
- Pharmacology and Toxicology
- Physiology

Academic Governance

Oversight of the BMSD Program occurs at three different levels: at the PhD Program Committee level with faculty representation from the department and Program of Study and the Coordinator of the PhD Program; at the Faculty of Medicine Dean’s Office, represented by the Faculty of Medicine Graduate Studies Committee, and at the university level through the Board of Graduate Studies

Admission Requirements

Admission to the program will be on a competitive basis. Students eligible for admission to the DBMS must have a sound academic record (85% or its equivalent in the major field of study) and a demonstrated, genuine interest in biomedical research.

Minimum requirements for admission into the program are:

- Eligible applicants should hold an MS degree or their equivalent in Biology, Physics, and Chemistry as well as other degrees in Biomedical Sciences or related disciplines [Medical Doctor (MD), Pharmacist (Pharm D or equivalent), Veterinarian Doctor (VMD), Dental Doctor (DMD, DDS)].
- Provide three letters of recommendation.
- Score a minimum of 1100 in the general Graduate Record Examination (GRE) (verbal English subject and quantitative Mathematics). GRE record is valid for 3 years.
- MD applicants can use their MCAT scores.
- Students from non-English-speaking countries must show proficiency in the English language (refer to catalogue section on English Language Proficiency Requirement page 37).
- Provide a personal statement (500 words maximum).
- Be interviewed by the PhD Committee members.
- Be recommended for admission by the PhD Committee.

Financial Support

The PhD program offers, on a selective basis, substantial support which fully covers tuition and includes a monthly stipend and housing. In return, students are expected to help in teaching and in proctoring exams.
Program Requirements

Fifty credit hours of course work beyond the Bachelor’s program, or 29 credit hours of course work beyond the Master’s program are required. To fulfill course requirements, 16 required core courses (34 credits), in addition to elective courses are offered. A maximum of 21 credit hours may be transferred from the Master’s work if considered within the scope of the program. Students are expected to register for 24 credits of thesis.

Upon admission into the program, each student will be advised by the coordinator of the PhD program. After the first year, each student will have selected a thesis adviser who will design the set of elective courses to meet the student’s research interests and career goals. 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 coordinator of the PhD program 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.

Core Courses

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 321</td>
<td></td>
<td>Nucleic Acids and Basic Genetics</td>
</tr>
<tr>
<td>BIOC 322</td>
<td></td>
<td>Protein Biochemistry</td>
</tr>
<tr>
<td>BIOC 323</td>
<td></td>
<td>Cellular Metabolism and Regulation</td>
</tr>
<tr>
<td>PHYL 310</td>
<td></td>
<td>Cell Physiology and Biophysics</td>
</tr>
<tr>
<td>BIOC 325</td>
<td></td>
<td>Receptor and Signal Transduction</td>
</tr>
<tr>
<td>HUMR 305</td>
<td></td>
<td>Cell and Tissue Biology</td>
</tr>
<tr>
<td>EPHD 310</td>
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<td>Biostatistics</td>
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<tr>
<td>BIOM 491</td>
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<td>Laboratory Rotation</td>
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<tr>
<td>HUMR 310</td>
<td></td>
<td>Methods in Biomedical Sciences</td>
</tr>
<tr>
<td>PHRM 315</td>
<td></td>
<td>Principles of Pharmacology</td>
</tr>
<tr>
<td>BIOM 385</td>
<td></td>
<td>Research Ethics</td>
</tr>
<tr>
<td>HUMR 314</td>
<td></td>
<td>Seminar and Journal Club</td>
</tr>
<tr>
<td>PHYL 302 *</td>
<td></td>
<td>Cardiovascular Physiology</td>
</tr>
<tr>
<td>IDTH 308A *</td>
<td></td>
<td>Neuroanatomy</td>
</tr>
<tr>
<td>IDTH 308B *</td>
<td></td>
<td>Neurophysiology</td>
</tr>
<tr>
<td>PHYL 300 *</td>
<td></td>
<td>Pulmonary – Renal</td>
</tr>
<tr>
<td>PHYL 304 *</td>
<td></td>
<td>GL – Endocrine – Reproductive</td>
</tr>
</tbody>
</table>

* Students must choose at least one of these courses as elective.

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MBIM 309 or MBIM 310</td>
<td></td>
<td>Basic Microbiology</td>
</tr>
<tr>
<td>MBIM 310</td>
<td></td>
<td>Basic Immunology</td>
</tr>
<tr>
<td>HUMR 314</td>
<td></td>
<td>Seminar and Journal Club</td>
</tr>
<tr>
<td>BIOM 375</td>
<td></td>
<td>Principles of Learning and Assessment</td>
</tr>
<tr>
<td>IDTH 301</td>
<td></td>
<td>Scientific Communication</td>
</tr>
<tr>
<td>Advanced Courses in</td>
<td></td>
<td>Specialized Field of Studies</td>
</tr>
</tbody>
</table>
Course Descriptions

BIOM 375  Principles of Learning and Assessment  28, 0; 2 cr.
This course provides students with the theoretical background and approaches to teaching science at the university level with emphasis on the nature of science and learner cognition. In addition, students are expected to apply principles and techniques of teaching and assessment of science in a teaching context. This course is a core course for PhD students in Biomedical Sciences and it is elective for MS students. First semester.

BIOM 385  Research Ethics  15, 0; 1 cr.
This course introduces the fundamentals of responsible conduct of research, emphasizing the ethical practice of human research. The course recaps history of ethical principles, the development of research codes of conduct and ethical practices, familiarizes students with the different kinds of ethical issues that they might come across throughout their careers, and allows scholars to reflect critically about what it means to be an ethical and responsible researcher. Summer semester.

BIOM 480  Qualifying Exam Part I: Comprehensive Exam  0 cr.
All students admitted to the PhD program must successfully complete a comprehensive examination. The purpose of the comprehensive exam is to ascertain the student’s knowledge in his/her field of specialization and related areas. The exam will cover major topics from within the concentration area and related fields. Students who do not pass the comprehensive exam may, upon the recommendation of the thesis committee, take it for a second time in the following semester. Failure on the second attempt will result in the student’s discontinuation from the PhD program.

BIOM 481  Qualifying Exam Part II: Defense of Thesis Proposal  0 cr.
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. 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.
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 laborator y 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.*

BIOM 499     PhD Thesis      24 cr.
A/B/C/D/E
In partial fulfillment of the requirements for the degree of Doctor of Philosophy, a student must submit a thesis (equivalent to 24 credit hours) that is expected to make a significant and original contribution to his/her field of research.

**PhD Thesis Requirements**

**Thesis Committee**
The PhD Thesis Committee should consist of at least five members where two members should be from outside AUB and the chair of the PhD Thesis Committee should be a full professor and different from the thesis adviser.

**Thesis Defense**
After qualifying as a PhD candidate, the student will focus on the doctoral research with continued participation in seminars. 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.

**Publication Requirements**
PhD students should have published or have in press one journal publication and one abstract in an international conference related to their thesis topics.

**Candidacy and Residency Requirements**
All students admitted to the PhD program must successfully complete qualifying exam part I (written) and qualifying exam part II (oral defense of thesis proposal).

To satisfy the minimum residency 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. The requirements for the degree of Doctor of Philosophy must be completed within a period of 5 years after joining the PhD program. Extension beyond of 5 years period will require Graduate Council approval upon the recommendation by the Faculty Graduate Studies Committee.
Graduation Requirements

To earn a PhD degree in Biomedical Sciences, a student must fulfill the following graduation requirements:

• Attain a minimum cumulative average of 85 at the PhD level;
• Pass qualifying exams part I and II;
• Pass the PhD thesis defense;
• Satisfy the minimum residency requirements;
• Have a publication in a leading international journal, based on the PhD research;
• Have at least one accepted abstract in an international conference, based on the PhD research;
• Satisfy all pertinent AUB regulations.

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 between August 12 and August 18, the date of the start of classes set at September 3, 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 August 20. 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 6 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.

• 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.

• 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 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 nonenrolment 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

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### Third Year

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Graduate Catalogue 2014–15
### 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. The course runs throughout the year and is closely integrated with the organ-system based courses being studied by the students, to integrate clinical and basic science knowledge and skills.

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.

Second Year

IDTH 225  The Liver and Gastrointestinal System  40.40; 4 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the liver and gastrointestinal tract. In addition, concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of this system.

IDTH 226  The Cardiovascular System  40.40; 4 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the cardiovascular system. In addition, concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of this system.
IDTH 227 The Respiratory System 40.40; 4 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the respiratory system. In addition, concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of this system.

IDTH 228 The Kidneys and Urinary System 40.40; 4 cr.
An integrated course that covers the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the kidneys and urinary system. In addition, concepts in social medicine and global health, preventive medicine, epidemiology and medical ethics are explored in relation to diseases of this system.

IDTH 229 The Skin 20.20; 2 cr.
This course integrates the anatomy, histology, physiology, pathology, pathophysiology and pharmacology related to the skin. Basic concepts are presented in which students are expected to learn the scientific basis of the normal physiology and pathology of the skin and its appendages including hair and nails as well as mucosal surfaces. Mechanisms of disease causation are illustrated with clinically relevant examples. Concepts in preventive medicine, epidemiology and medical ethics are explored in relation to diseases of the skin.

IDTH 230 Brain and Cognition 80.80; 8 cr.
This course is intended to provide preclinical medical students with an integrated approach to the structure and function of the nervous system. Basic principles of neuroanatomy, neurocytology, neuroembryology, neuroradiology, neurophysiology, and neurology will be related to the function of the normal and diseased human nervous system, and the action of drugs. Concepts in social and preventive medicine, epidemiology and medical ethics are explored in relation to diseases of the nervous system.

IDTH 231 Human Development and Psychopathology 40.40; 4 cr.
This is a multidisciplinary course that integrates human development, psychopathological processes and their underlying neural circuitries along with basic and clinical psychopharmacology and relevant ethical, professional and public health issues. It teaches psychopathology through a lifespan approach and uses a variety of teaching/learning techniques such as didactics, team based learning, case studies, and workshops.

IDTH 232 Research Design and Development 10.80; 3 cr
The aim of the course is to provide the opportunity to learn and apply research methods to investigate a local health problem. It will provide a hands-on research experience, building on the basic knowledge and skills learned in the Fundamentals of Medical Research course in Year 1. Students will learn the phases of the research process from conception to design, to implementation. Through a combination of class sessions, meetings with research advisors and independent work, students, in groups, will identify a local health problem that is of particular interest to them, and will design and conduct a study relevant to it.

IDTH 233 Physicians Patients and Society – II 20.20; 2 cr
This course explores medicine, illness, and suffering as seen through the lens of bioethics, spirituality in medicine, palliative care, and the nursing experience. It will bring together information related to the biophysical, psychological, humane, spiritual and social factors of illness - a holistic approach that focuses on the patient as a person.
**IDTH 224**  **Clinical Skills – II**  **20.50: 3 cr**
This course is a continuation of IDTH 213 and further develops the students’ communication skills, history taking, physical examination and clinical reasoning. It runs throughout the year and is closely aligned with the organ-system based courses being studied by the students in year 2 of medical school, to integrate clinical and basic science knowledge and skills.

**IDTH 225**  **Learning Communities – II**  **0.30: 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.

**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.