

# Department of Anatomy, Cell Biology and Physiological Sciences

Chairperson:	Al-Chaer, Elie D.
Emeritus Professor:	Bikhazi, Anwar
Professors:	Al-Chaer, Elie D.; Barada, Kassem; Bazarbachi, Ali; Birbari, Adel; El-Sabban, Marwan; Jurjus, Abdo; Mourad, Fadi; Muhtasib, Hala
Associate Professors:	Abou-Kheir, Wassim; Eid, Assaad; Jurjus, Rosalyn A.; Nasr, Rihab; Saab, Raya
Assistant Professors:	Daoud, Georges; Lawand, Nada B.; Nassar, Dany; Obeid, Makram; Zeidan, Youssef
Associates:	Darwish, Hala; Husari, Ahmad; Kibbi, Abdul-Ghani; Nassif, Joseph; Rebeiz, Abdallah
Adjunct:	Massaad, Charbel

The department offers three disciplines of study, which are Human Morphology, Physiology, and Neuroscience. Each discipline provides courses to medical, graduate, nursing, nutrition, paramedical and undergraduate students.

The graduate program is broad, leading to a master's degree (MS) or doctoral degree (PhD) in Biomedical Sciences. Students with a BS degree or its equivalent in mathematics, biology, physics, or 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

Required courses for the discipline of Human Morphology include: PHYL 310 (3 cr.), HUMR 305 (3 cr.), HUMR 306 (3 cr.), HUMR 308 (3 cr.), HUMR 314 (1 cr.) and HUMR 310 (A&C, 2 cr.).

**HUMR 244 Introduction to Human Biology 32.0; 2 cr.**  
An introductory course that meets the needs of a diverse group of students who are preparing for careers in allied health sciences, medical technologies or other nonmedical careers like psychology or biomedical sciences; it introduces students to the very basic terms and concepts in anatomy, histology and physiology. The course covers the basic biology of the cells, tissues and organs of the human body.

**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.

**HUMR 248 Human Anatomy and Physiology 60.30; 5 cr.**  
A course that aims to provide a strong foundation for understanding the structural

complexities of the human organism and the related physiological functions. The course, as conceived, will integrate structure and function and offer practical advantages in fine-tuning the balance between anatomy, histology and physiology. In addition, clinical correlations will be included for a vertical integration in addition to horizontal integration. *Prerequisite: HUMR 244.*

**HUMR 305 Cell and Tissue Biology 30.33; 3 cr.**  
Consists of the first half of Basic Histology, HUMR 209, covering cells and tissues. *Open to all graduate students.*

**HUMR 306 Organ Histology 28.36; 3 cr.**  
Consists of the second half of Basic Histology, HUMR 209, covering organs and systems. Open to graduate students. *Prerequisite: HUMR 305 or equivalent.*

**HUMR 307 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. *Open to all graduate students.*

**HUMR 308 Neuroanatomy 28.39; 3 cr.**  
The neuroanatomy component of Neuroscience, IDTH 208A. *Open to all graduate students.*

**HUMR 309 Basic Histology 58.69; 6 cr.**  
A study of the cells, tissues and organs of the human body at the level of light and electron microscopes, utilizing traditional and advanced methodologies. Structure is related to function with some clinical application. Required of all medical students. *Open to all graduate students in the department.*

**HUMR 310 Biomedical Research Techniques 28.46; 3 cr.**  
A guided laboratory course in research methods used in cell biology and physiology. Open to graduate students.

The course is made of three modules that can all be selected or can be selected as one module per specialty as follows:

**HUMR 310A Cell Biology Techniques 10.15; 1 cr.**

**HUMR 310B Genomics and Proteomics 10.15; 1 cr.**

**HUMR 310C Mouse Models and In Vivo Studies 8.16; 1 cr.**

**HUMR 312 Anatomy Tutorial 0.64; 2 cr.**  
A guided literature review of special research topics.

**HUMR 313 Directed Reading and Research 0.32-66; 2 cr.**  
Specific reading and research assignments under supervision of an advisor. *At the discretion of the thesis supervisor.*

**HUMR 314/315 Research Seminar 0.32; 1 cr.**  
Presentation and discussion of timely research topics designated by members of the

department.

**HUMR 346 Human Morphology for Graduate Students 48.32; 4 cr.**  
A course that includes the embryology component of HUMR 307, HUMR 246 and an experimental anatomy part.

**HUMR 395A/B Comprehensive Exam 0 cr.**  
*Prerequisite: Consent of advisor.*

**HUMR 399 MS Thesis 9 cr.**  
**A/B/C/D/E**  
Original research under faculty supervision leading to the MS degree.

**HUMR 260 Elective in Human Morphology 0.180-360 cr.**  
An elective for Medicine III and IV in which the student can select one or more disciplines within the department including applied immunology, general surgical anatomy, radiographic anatomy, experimental neuroanatomy, neuromuscular disorders, techniques for study of cells and tissues and experimental neuropathology. *One to two months.*

## Physiology

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Required courses for the discipline in Physiology include PHYL 300 (2 cr.), PHYL 302 (2 cr.), PHYL 304 (3 cr.), PHYL 308 (3 cr.), PHYL 310 (3 cr.), HUMR 305 (3 cr.), HUMR 314 (1 cr.) and HUMR 310 (A&C, 2 cr.).

**PHYL 246 Human Physiology for Paramedical and Undergraduate Students 48; 4 cr.**

The course outlines fundamental principles of human physiology and the mechanisms governing the function of different body organs. *Prerequisite: BIOL 201 or BIOL 210.*

**PHYL 346 Human Physiology 48; 4 cr.**

The course outlines fundamental principles of human physiology and the mechanisms governing the function of different body organs in the setting of a series of lectures and discussions. *Prerequisite: BIOL 201 or BIOL 210.*

**PHYL 260 Elective in Physiology 0.180-360 cr.**

The course 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.*

**PHYL 300 Homeostasis 32.6; 2 cr.**

The course 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. *Open to all graduate students.* The course consists of two modules:

**PHYL 300A Pulmonary Physiology 10.15; 1 cr.**

**PHYL 300B Renal Physiology 10.15; 1 cr.**

**PHYL 302 Cardiovascular Physiology 31.6; 2 cr.**  
The course presents the cardiovascular system 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. Open to all graduate students.

**PHYL 304 Metabolism 32.12; 3 cr.**  
The course 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. *Open to all graduate students.*

**PHYL 308 Neurophysiology 31.27; 3 cr.**  
The course reviews the physiology and various functions of the human nervous system. *Open to all graduate students.*

**PHYL 310 General Physiology: Cellular Mechanisms 32.16; 3 cr.**  
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. *Open to all graduate students.*

**PHYL 311-312 Advanced Physiology 0.48; 2 cr.**  
A guided study (experimental and theoretical) of the literature of major topics in physiology, alongside the different research topics being conducted in the department. This course is conducted as a seminar, and it acts as a Virtual Laboratory Rotation. *Open to all graduate students.*

**PHYL 313-314 Physical Methods in Physiological Research 0.64; 2 cr.**  
A guided laboratory course of the physical methods used in the major branches of physiology.

**PHYL 390 Directed Reading and Research 0.32-66; 2 cr.**  
Assignments based on the research interests of the graduate student and the advisor, aimed at formulating an original research project.

**PHYL 391-392 Projects in Physiology 0.64; 2 cr.**  
A guided study (theoretical and experimental) of different research topics performed at AUB-FM. This course will introduce you to diverse fields of study and it will cover research topics on cancer, stem cells, pain, cardiovascular diseases, diabetes, neuroscience, development and others. In addition, you will learn about the tools and methods that are employed in each specific field and topic. This course is primarily intended for Master and PhD candidates in the Faculty of Medicine but may also be applicable to candidates within the biomedical (basic and clinical) research field in other faculties. This course is designed to offer students, through various components of lectures, presentations, discussions, assignments and literature analysis, a broad overview of the latest research discoveries, their potential applications and results interpretation. This course will act as a virtual rotation for Master and PhD candidates. *Open to all graduate students.*

**PHYL 395A/B      Comprehensive Exam** **0 cr.**  
*Prerequisite: Consent of advisor.*

**PHYL 399              MS Thesis** **9 cr.**  
**A/B/C/D/E**  
 Original research under staff supervision, leading to the MS degree.

## Neuroscience

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Required courses for the discipline in Neuroscience include PHYL 310 (3 cr.), PHYL 308 (3 cr.), HUMR 305 (3 cr.), HUMR 308 (3 cr.), HUMR 310 (A&C, 2 cr.) and HUMR 314 (1 cr.).

**IDTH 208              Basic Neuroscience** **6 cr.**  
*See Interdepartmental Teaching.*

**HUMR 308              Neuroanatomy** **28.39; 3 cr.**  
 The neuroanatomy component of Neuroscience, IDTH 208. *Open to all graduate students.*

**PHYL 308              Neurophysiology**  
 Similar to PHYL 208 and IDTH 308B. *Open to all graduate students.*

**HUMR 261/              Elective in Basic Neuroscience** **0.180-360 cr.**  
**PHYL 261**  
 The objective of this elective is to involve students in a basic research project as part of the on-going studies in the neuroscience research laboratories of the department. *Open to Medicine III and IV students, graduate students in the combined MS-MD program and visiting medical students.*

**IDTH 395A/B              Comprehensive Exam** **0 cr.**  
*Prerequisite: Consent of advisor.*