Department of Anatomy, Cell Biology and Physiological Sciences

Chairperson: Saadé, Nayef
Emeritus Professor Jabbur, Suhayl
Professors: Al-Chaer, Elie; Bazarbachi, Ali; Bikhazi, Anwar; Birbari, Adel; El-Sabban, Marwan; Jurjus, Abdo; Mourad, Fadi; Saadé, Nayef
Associate Professor Saab, Raya
Assistant Professors: Abou-Kheir, Wassim; Daoud, Georges; Eid, Assaad; Nasr, Rihab; Zeidan, Asad
Associates: Barada, Kassem; Chidiac, Jose; Kibbi, Abdul-Ghani; Rebeiz Abdallah

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

Required MS courses in Biomedical Sciences track Anatomy and Cell Biology include: BIOC 323 (2 cr.); PHYL 310 (3 cr.); HUMR 309 (5 cr.); HUMR 308 (3 cr.); HUMR 314 (1cr.); HUMR 310 (2cr.).

HUMR 305  Cell and Tissue Biology  30.33; 3 cr.
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.

HUMR 306  Organ Histology  28.36; 3 cr.
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.

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. Required of all medical students. Offered to all graduate students in the department.

HUMR 308A  Neuroanatomy  28.39; 3 cr.
The neuroanatomy component of Neuroscience, IDTH 208. Offered to graduate students.
HUMR 309  Basic Histology  
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. **Offered to all graduate students in the department.**

HUMR 310  Biomedical Research Techniques  
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 be selected all or as one module per speciality as follows:**

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

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

- **HUMR 310 C  Mouse Models and in vivo Studies**  
  8.16; 1 cr.

HUMR 312  Anatomy Tutorial  
A guided literature review of special research topics.

HUMR 313  Directed Reading and Research  
Specific reading and research assignments under supervision of an adviser. **At the discretion of the thesis supervisor.**

HUMR 314/315  Research Seminar  
Presentation and discussion of timely research topics designated by members of the department.

HUMR 316  Principles of Electron Microscopy  
Lectures on, and demonstration of, basic techniques of electron microscopy. **Alternate years.**

HUMR 318  Principles of Histochemistry  
Lectures, demonstration, and laboratory work related to the principal techniques of histochemistry, including immuno-histochemistry. **Prerequisite: HUMR 305 or HUMR 309.**

HUMR 319  Biology of Nerve and Muscle  
Equivalent to IDTH 309. **See Interdepartmental Teaching.**

HUMR 346  Human Morphology for graduate students  
A course that includes the embryology component of HUMR 207, the whole of HUMR 246, and an experimental anatomy part.

HUMR 395A/B  Comprehensive Exam  
**Prerequisite: Consent of Adviser**

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

HUMR 260  Elective in Human Morphology  
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

Required MS courses in Biomedical Sciences track Physiology include: BIOC 325 (2 cr.); PHYL 300 (2 cr.); PHYL 310 (3 cr.); PHYL 302 (2 cr.); PHYL 308 (3 cr.); HUMR 305 (3 cr.); HUMR 314 (1 cr.); HUMR 310 (2 cr.); PHYL 304 (3 cr.).

PHYL 246 Human Physiology for Paramedical and Undergraduate Students 48; 4 cr.
A course that outlines fundamental principles of human physiology and the mechanisms governing the function of different body organs. Prerequisites: BIOC 246 and BIOL 201 (or BIOL 210).

PHYL 260 Elective in Physiology 0.180-360.
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.

PHYL 300 Homeostasis 32.6; 2 cr.
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. Offered to all graduate students in the department.

PHYL 302 Cardiovascular Physiology 31.6; 2 cr.
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. Offered to all graduate students in the department.

PHYL 304 Metabolism 32.12; 3 cr.
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. Offered to all graduate students in the department.

PHYL 308 Neurophysiology 31.27; 3 cr.
A course that investigates the physiology and various functions of the human nervous system. Offered to all graduate students in the department.

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. Offered to all graduate students in the department.

PHYL 311-312 Advanced Physiology 0.48; 2 cr.
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 0.64; 2 cr.
A guided laboratory course of the physical methods used in the major branches of physiology.
PHYL 317  Perspectives in the Physiological Sciences  32.0; 1 cr.  
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  12.9; 1 cr.  
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  0.32-66; 2 cr.  
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  0.64; 2 cr.  
A physiological literature survey covering a given subject in the field.

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

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

Neuroscience

Required MS courses in Biomedical Sciences track Neuroscience include: BIOC 325 (2 cr.); PHYL 310 (3 cr.); PHYL 308 (3 cr.); HUMR 305 (3 cr.); HUMR 308 (3 cr.); HUMR 314 (1cr.); HUMR 310 (3cr.).

IDTH 208  Basic Neuroscience  6 cr.  
See Interdepartmental Teaching.

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

PHYL 308  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  0 cr.  
Prerequisite: Consent of Adviser.