

**Function of the Human Body
Spring Semester 2024**

OVERVIEW: Function of the Human Body builds upon core molecular and anatomical disciplines presented in the first semester. Major organ systems will be explored in an integrative fashion covering all aspects from physiology to metabolic biochemistry and nutrition. Emphasis is placed on understanding key concepts of normal physiological and biochemical systems in healthy humans. Selected aspects of pathophysiological processes will be discussed to illustrate how an understanding of normal function can be applied to clinical medicine. For students to succeed and perform their very best in this challenging course, it is mandatory for them to master the ability to read and interpret graphs and think logically. The need to wrestle with challenging concepts, verbalize mechanisms, and reconstruct graphs with peers cannot be overstated. Comprehension and mastery of integrated FHB materials will prepare students for second-year courses in the curriculum, the USMLE board exams part I, as well as the clinical years.

IMPORTANT COURSE POLICIES (see detailed description in relevant subsections):

- ❖ Attendance is required for ALL small group sessions, conferences, labs and simulations. Request for an excused absence must be made in writing to the Course Director and Dean of Student Affairs. Documentation will be required (see attendance section).
- ❖ Small group problem set answers will be posted within 24 hours of each small group (see small group sessions section).
- ❖ There are 4 sectional exams. Grades are based on TOTAL POINTS achieved from all exams (see exams and grading sections).
- ❖ A passing grade on all sectional exams is 70%. Passing grade on the remediation exam is 70% (see grading section).
- ❖ A minimum final grade of at least 60% is required to qualify for an opportunity to remediate a course failure (see remediation section).

COURSE GOALS:**A. MEDICAL KNOWLEDGE (assessed with multiple-choice question (MCQ) exams)**

- Explain the fundamental cell biological, histological and physiological properties of the major organ systems including: nervous system; cardiovascular and circulatory system with lymphatics and special circulations; pulmonary system; gastrointestinal system and metabolism; renal system; endocrine system; and male and female reproductive systems.
- Describe the regulation of each of the major organ systems by neural, endocrine, paracrine, and autocrine mechanisms and the signal transduction mechanisms employed.
- Explain the fundamental principles of positive and negative feedback and describe how manipulating feedback loops can be used in clinical diagnosis.
- Explain the membrane properties and ionic current mechanisms of excitable cells, and the function of action potentials in different types of excitable cells, including neurotransmission and excitation-contraction coupling.
- Discuss the autonomic nervous system and how it regulates the major organ systems.
- Explain the impact of dysfunction of each major organ system on the other systems.
- Explain the clinical tests commonly used to assess the normal function or pathology of the major organ systems, including blood tests, ECGs, biopsies, MRIs, spinal taps, respirometry, urinalysis, endocrine challenge tests, pregnancy tests.
- Describe the major macronutrients and critical minerals, compounds, amino acids and vitamins that are essential to balanced nutrition and whole-body energy balance, and the signs, symptoms, etiology and treatment/prevention recommendations for dietary deficiencies or excesses.

B. INTERPERSONAL AND COMMUNICATION SKILLS (assessed in small group settings and communication with faculty)

- Demonstrate the ability to effectively communicate and work collaboratively together with peers in the small group setting to successfully address problems of physiological significance.
- Contribute to the education of peers by actively engaging in small group discussion and problem-solving exercises.

C. PRACTICE-BASED LEARNING AND IMPROVEMENT (assessed through active participation in small groups)

- Critically self-evaluate performance in the course to identify strengths and personal limitations in either physiological knowledge or the ability to integrate physiological information to use in evaluation of cases; develop learning goals to address any deficiencies and actively seek out assistance from appropriate sources to successfully remediate these deficiencies.
- Participate in simulation sessions and self-evaluate performance and demonstrate ability to incorporate classroom knowledge of physiology into the clinical setting.

D. PROFESSIONALISM (assessed by Faculty and Course Director)

- Demonstrate professional behavior by completing all course requirements, including course evaluations, in a timely manner.
- Demonstrate professionalism by behaving in a professional, courteous, and respectful manner when engaged in course activities or interacting with course faculty and staff.
- Demonstrate responsibility and accountability by attending and being punctual at all required course activities.
- Demonstrate professional behavior by requesting any excused absence from required course activities well ahead of the scheduled date.
- Demonstrate professional behavior by responding to direct communication from the Course Director in a timely fashion, particularly in circumstances when a meeting is requested to discuss issues related to academic performance.
- Demonstrate professional and ethical behavior by honestly completing course examinations without attempting to seek an advantage by unfair means; and by reporting any unethical behavior of peers to the course administration.

FACULTY: The success of FHB depends critically on the many dedicated and experienced faculty who teach the course. Approximately fifty professional scientists and clinicians with demonstrated commitments to medical education cooperate in presenting lectures, facilitating small-group learning sessions, or leading laboratories and conferences. Individual faculty members are approachable and available for student questions. Students should feel free to contact the participating faculty directly via email with questions and requests for virtual meetings. Some faculty may elect to have established, fixed office hours via Zoom in addition to scheduled consultations.

SECTIONS: FHB is partitioned into four main sections, each of which is followed by a sectional examination every four to six weeks. As the course develops, students will recognize that unifying physiological principles keep recurring among the various organ systems. Students are encouraged to integrate the material as much as possible, minimizing the memorization of facts and maximizing a comprehension of concepts.

Section 1: Nerve, Muscle, Heart & Circulatory Physiology

Section 2: Pulmonary, Renal & Acid-Base Physiology

Section 3: Gastrointestinal, Metabolism

Section 4: Endocrine & Reproductive Physiology

TEXTBOOKS: The required textbook for this course is *Physiology* by Berne et al, 7th Ed. In addition, there are several **recommended** textbooks that are applicable to each topic (see list below). Class notes and/or PowerPoint slides with learning objectives will be posted online prior to each lecture. Sectional exam questions will be generated from lectures, conferences, and small group problems as well as other learning experiences within each section of the course. Students are **strongly encouraged** to read relevant materials in one of the recommended texts before coming to lecture. This practice will greatly enhance your understanding of the lecture being presented.

REQUIRED

- **Physiology** (Berne, Levy, Koeppen & Stanton, 7th edition, 2018, Mosby)

RECOMMENDED

- **Medical Physiology** (Boron and Boulpaep, 2003, Saunders)
- **Physiology** (Costanzo, 4th ed., Saunders)
- **Cardiovascular Physiology** ((McGraw Hill-Lange, 8TH ed., Mohrman and Heller)
- **Respiratory Physiology – The Essentials** (West, 9th ed., 2012, Lippincott)
- **Vander's Renal Physiology** (Eaton & Pooler, 7th ed., 2009, McGraw Hill)
- **Textbook of Biochemistry with Clinical Correlations** (Devlin, 7th ed., 2011, Wiley-Liss)
- **Endocrine Physiology** (McGraw Hill-Lange, 4th ed., 2013, Molina)

LEARNING EXPERIENCES: There are five types of learning experiences in FHB, enabling the student to approach the didactic material from various perspectives. Progress in the course is assessed by objective sectional examinations. A detailed FHB Course Schedule reports the session titles, times and locations for all activities within the course. This schedule should be followed carefully since planned variations occur from week to week.

- **Physiology Lectures**
- **Small Group Problem-Solving Sessions**
- **Conferences**
- **Simulations**
- **Lecture Review Sessions**

LECTURES: Lectures, with a few exceptions, will be live in person presentations. Fundamental concepts in cellular and organ system physiology and biochemistry will be presented. Each lecture will list Key Concepts and Learning Objectives to help focus your studying. The lectures will be recorded. Lecture videos, PowerPoint slides and handouts of each lecture will be posted in specific folders on LUMEN and accessible via Sakai. The folders will be populated with lecture materials as they become available and no later than the day of the specific lecture. Lecture recordings will be available on Lumen as they are processed. Recorded lectures from 2023 will be available. However, it is strongly encouraged that every attempt is made to attend lectures, as it facilitates direct interaction with the lecturing faculty and with student peers. In some cases, previously recorded lectures may be from faculty who are no longer teaching the material and should be considered as supplemental information.

Students can expect faculty to exhibit a desire to teach, provide clear explanations and answers to student questions, and a desire to effectively communicate knowledge about the function of the human body. Students should feel free to contact the participating faculty directly via email with questions and for scheduling of meetings. Some faculty may elect to have established, fixed, office hours via Zoom in addition to in person consultations. Office hours will be announced by the Course Coordinator when they become available.

SMALL GROUP PROBLEM-SOLVING SESSIONS (total = 20): Medical students will be assigned to one of twenty-four small groups, each consisting of six to seven students. Each small group session is scheduled for 90 minutes. The small groups will meet in assigned rooms (6 in total). There will be one - two faculty facilitators for each room. Facilitators will rotate in different rooms throughout the block, to facilitate student interaction with many different faculty as possible. Attendance is mandatory and will be taken at each session.

Small group problem sets will be available to students on Sakai 24 hours prior to the small group.

Small group problem set answers will be posted within 24 hours after each small group and no recap sessions provided. Lecturing faculty members responsible for each small group can be contacted with questions and clarifications.

CONFERENCES: Conferences are teaching sessions conducted in a live format. Conferences focus on specific topics in a mini-lecture, case study, and/or discussion format. These sessions are designed for more interactions between students and professors, offering students the opportunity to ask and answer questions. Conference handouts accompanying lecture notes allow students to prepare appropriately before attending these important sessions. Attendance is mandatory.

SIMULATIONS: We have a computer simulation designed to illustrate physiological principles and concepts in a dynamic and integrative format. These sessions are presented to the class together in a live format. Attendance is mandatory.

- ❖ **Cardiac Cycle and Heart Sound:** This computer simulation illustrates the dynamic changes in pressures and volumes of the heart and circulatory system during the normal cardiac cycle. We will also discuss the origins of heart sounds and cardiac murmurs.
- ❖ **Human Patient Simulator:** The Human Patient Simulator (Vince) will be used to illustrate the dynamic interactions of the heart and circulatory system under normal and pathological conditions.

LECTURE REVIEW SESSIONS: At the end of each sectional block and prior to the examination, voluntary reviews will be conducted by lecturing faculty in a live format and will not be recorded. Students having difficulty with the material are encouraged to contact individual faculty. One major mistake students make is that they fail to utilize their faculty in mastering difficult concepts. Students can evaluate their own understanding of the material by their ability to verbally explain physiological concepts to their peers.

EXAMS AND GRADING: There will be an exam following each of the four block sections. Concepts introduced in all sessions (lectures, small groups, conferences and simulations) will be represented on the sectional exams. Additionally, several questions in block exams II-IV which cover central key principles from material of previous blocks will be included. Questions on the exam are multiple choice and written in a board-style format. Exams will be administered in-person and students are expected to exercise the established code of conduct and academic integrity during the exam. Grading for each sectional exam will be determined by raw point totals, giving equal weight to each question. In other words, the grade will be calculated as total number of points (total number of correct answers) divided by the total number of possible points (total number of questions) in the course. The number of questions on each exam is proportional to the time spent on the individual topics (including lectures, small group sessions, conferences, labs and simulations). Typically, sectional exams have approximately 70-90 multiple choice questions, depending on the amount of material presented in each section of the course. After each exam, students will receive their total of number of correct answers. Final grading categories for the course will be absolute percent scores based on total number of points achieved from exams.

Example Student X:

Exam 1 = 80/87

Exam 2 = 75/80

Exam 3 = 88/90

Exam 4 = 82/87

Total points achieved = 325; Total possible points = 344; Final grade = $325/344 = 94.48\%$ = PASS

Note: Do not average the percentage from each exam because exams are not equally weighted.

The final grading scale is as follows:

PASS: 70% and above

FAIL: less than 70%

Students having difficulties with the course material and/or exams should seek advice on how to improve their performance from Dr. Mignery, Course Director and Dr. Kirk, Assistant Course Director.

Students who fail a block exam are allowed an opportunity to meet with the Course Directors and lecturing faculty to review missed questions and seek conceptual clarifications. Failed exam reviews are available up to the next block exam and up to two weeks after the fourth and final block exam. It is essential to be proactive and review failed exam questions within this window of opportunity. Remediating students (see below) will not be allowed to review exams and/or questions outside of this window.

REMEDIATION POLICY: Students who fail to achieve the minimum score required for a passing grade in the course **may** be allowed the opportunity to take a remediation exam.** The exam will be prepared by the course director in collaboration with the Associate Dean for Medical Education and will be a rigorous, yet fair assessment to ensure that the student has achieved sufficient mastery of the course content to be allowed to continue to the next academic level. Remediation exams will be administered at the end of the academic year and will be scheduled by the Office of Student Affairs and the Academic Center for Excellence in consultation with the Course Director. All remediating students will sit for the exam on the same date and time. Typically, the remediation exam is scheduled during the last two weeks of July. Students requiring remediation should meet with the Course Directors well in advance of the scheduled date of the exam to discuss both the format of the exam and their proposed study approach. It is highly encouraged that students meet with lecturing faculty from each course block to discuss concepts and address questions during their preparation for the remediation exam. As stated in "Exams and Grading", students may not review missed questions from previous block exams. Those students achieving a score of greater or equal to 70% on the remediation exam will have their F grade converted to a P*. Students who fail to successfully achieve the minimum passing score will be required either to repeat the course in its entirety, or alternatively, may be subject to automatic administrative action by the School, as outlined in the academic policy manual.

**Note: Students with a final cumulative course score of $\leq 60\%$ may be denied the opportunity to remediate their failure by an end-of-year exam and may instead be required to repeat the course. The decision to allow such students the opportunity to take a remediation exam will be made by the Student Promotions Committee following a recommendation provided by the Course Directors.

ATTENDANCE: The small group sessions are designed to foster interpersonal and communication skills within a healthcare team. Therefore, **attendance is mandatory** for all these sessions (noted by an * in the course schedule). Students are required to attend and actively participate in these sessions. Failure to attend and participate, as well as any unexcused absences will result in a "does not meet" for your professionalism grade.

NON-EMERGENT ABSENCES FROM REQUIRED ACTIVITIES: Non-Emergent Absences from Required Activities Petitions for approved absences for serious but non-emergent reasons from activities in which attendance is mandatory (e.g., examinations) must be submitted in writing to the Assistant Director for Student Affairs, at least thirty days prior to the start of the event for which the absence is requested. The Assistant Director for Student Affairs may decide to share the petition with the Course Director in order to determine if the excused absence may be granted. A student must have a serious reason for an excused absence or request for a change in an exam date/time. The petition should detail the nature of the conflict and available supporting documentation should be attached (e.g., copy of a jury summons or invitation to present a poster). **A petition for permission to be absent is a request that requires review and is not automatically approved simply by submission.** In granting permission,

the logistics and feasibility of rescheduling the missed academic activity are weighed and the student is notified of the decision.

Approval to reschedule an examination specifies a date later than the original test date on which the test must be taken. An examination cannot be rescheduled to a date earlier than the original exam date.

EMERGENCY OR UNEXPECTED ABSENCES: Students who are very ill or have other extenuating circumstances (i.e. death in the family) must contact the Dean for Student Affairs and the Course Directors, Drs. Mignery & Kirk, prior to missing an exam or other required activity to obtain an excused absence. Excused absences are granted according to University policy, proper documentation will be required, and no exceptions will be made. You must also notify Maureen Locklund, Course Coordinator, so that alternative arrangements can be made.

COMMUNICATION: Students will receive up-to-date information about the FHB course from the Course Director and/or Course Coordinator by direct emails to the entire class. Students should check their Loyola email accounts daily. Please be aware that emails sent from other email servers (i.e. gmail, yahoo, hotmail) might not be received by the intended faculty member due to Loyola spam filters. Clear and effective communications between faculty and students are not only necessary, but mandatory for fostering a positive learning experience.

COURSE COORDINATOR: The FHB course is supported by Maureen Locklund, Course Coordinator. Maureen is responsible for production and on-line posting of all course materials, examinations, evaluation forms, scheduling, etc.

Maureen Locklund, Medical Education Coordinator

Location: Education Office, SSOM Building 120, Room 310

Telephone (voice mail): (708) 216-7989

FAX: (708) 216-5318

Email: mlocklund@luc.edu

COURSE DIRECTOR: The Course Director is Dr. Gregory Mignery. Dr. Mignery should be contacted regarding any issues pertaining to FHB organization, attendance, grading, and other student concerns. He can be reached by email or telephone. All deliberations with students are held in strict confidence.

Dr. Gregory Mignery, Ph.D., Course Director

Location: Department of Cell and Molecular Physiology, CTRE, Room 535

Telephone (voice mail): (708) 216-1181

Email: gmigner@luc.edu

ASSISTANT COURSE DIRECTOR: The Assistant Course Director may be contacted for all matters relating to the course. All deliberations with students are held in strict confidence.

Dr. Jonathan Kirk, Ph.D., Assistant Course Director

Location: Department of Cell and Molecular Physiology, CTRE, Room 522

Telephone (voice mail): (708) 216-6348

Email: jkirk2@luc.edu