

MS in Medical Physiology

Required Course Descriptions

Total of 18 Credit Hours

(30 Credit Hours Required for the Degree)

Medical Physiology I and II (PHOL 481 and 482, 6 credit hours each, a total of 12 credit hours required):

1. All MS in Medical Physiology students are required to register for these two courses their first two semesters in the program (PHOL 481 fall semester and PHOL 482 spring semester).
2. These courses are held from 10:00 AM – 12:00 noon Monday, Tuesday, and Thursday in E-501.
3. We use the CWRU Blackboard course management system to communicate the course syllabus, Learning Objectives, reading assignments, and links to streaming video of all lectures to all students for all required courses in the program. Students will be oriented to this system at the department orientation session on the week before classes begin.
4. Students are expected to read the Learning Objectives and look over the assigned chapter(s) in *Medical Physiology* by Boron and Boulpaep (B&B) BEFORE class so that they are prepared to discuss the content with the faculty and other students. Please NOTE that Dr. Boron is Chair of our department, coordinator of the Respiratory Physiology block of this course, and co-course director of the Translational Physiology courses.
 - a. The 9 sections of B&B (corresponding to the 7 organ systems, Physiology of Cells and Molecules, and the Physiology of Everyday Life) will be covered over the two semesters.
 - b. The first 4 sections will be covered during the first semester and the last 5 sections during the second semester.
5. We have chosen CWRU faculty who are expert in each topic that is taught in this program. In this way, students will be exposed to more than 50 physiologists over the course of the program.
6. Faculty will prepare a set of Learning Objectives (LO's) for each class session. LO's are statements of what the students are expected to be able to do after each class. All test questions will be linked to these LO's.
7. Faculty have the academic freedom to present the material on a particular topic in the way they think best. It is expected that most class sessions will be primarily in a lecture format using PowerPoint to present graphical material.

8. A traditional white board, an overhead projector, and a computer with Internet connectivity are available to faculty for their presentations in E-501. The Panopto Deployed Solution for Lecture Capture will be used to capture both the video and audio of the faculty presentations as well as anything they project on the screen. Each lecture will be archived and made available to the students for playback on the Internet through Blackboard.
9. The TurningPoint Audience Response system is available in E-501. Faculty will stop once or twice during each hour of lecture to ask the students a multiple choice/true-false question. Students will answer the questions using the audience response system. Faculty will lead a discussion of the students' responses. The purpose of these questions is to help the students keep up with the material, to actively engage the material during the course of a lecture, and to help the faculty realize whether or not the important concepts are being understood by the students. These questions are formative and are not graded.
10. Each Monday (except for the first Monday of a block) at the beginning of class, a 15 minute, 10 question, formative, multiple choice/true-false quiz will be administered over the material covered during the previous week.
 - a. The faculty member coordinating the block will be responsible for creating these quizzes in consultation with the faculty giving the lectures.
 - b. Answers will be registered on Scantron forms and graded immediately after the quiz.
 - c. A copy of their Scantron form will be returned to each student at the end of lecture on the Monday of the quiz for their review. Students can indicate on their test booklets any issues they have with the designated correct answer. Faculty will review all issues registered by the students and re-grade the quiz if necessary.
 - d. Final grades on the quiz will be posted in Blackboard by the end of the day on Monday.
 - e. The grades on these quizzes will constitute 10% of the final grade for the course.
 - f. These quizzes are NOT secure and should be used to study for the block exams.
11. The teaching assistants for the courses will hold review sessions on Wednesdays between 10:00 AM and 12:00 noon when classes are not scheduled that day, on Sunday evenings (times to be announced), and at other times upon request.
12. The last Friday of each block is reserved for a two-hour examination over the content of the block.
 - a. These exams are multiple choice/true false in nature.
 - b. Correct answers are registered on Scantron forms.
 - c. Each student's Scantron form and a copy of the exam will be returned after all testing is over for the day for review by the students.

- d. The students can indicate on their test booklets any issues they have with the correct answers. Faculty will review all issues registered by the students and re-grade the test if necessary.
 - e. All exam questions are secure. Therefore, all testing materials must be returned after the review session.
 - f. The faculty organizing the block will be responsible for creating this examination with the help of the faculty teaching in the block.
 - g. The student's average score on these block exams (each block weighed by the number of weeks devoted to that block) will constitute 90% of their semester grade.
 - h. For each block, the teaching faculty design the exams to have a median grade of at least 85%. If the median on any exam is less than 85%, the faculty have the option to add points (referred to as a Difficulty Factor) to all students' grades to bring the class median to 85%.
 - i. Final block exam percentage grades will be uploaded to Blackboard by the end of the Friday when the exam is administered.
13. Final grades in the course are based on the block exam averages (90%, weighted by the number of weeks dedicated to each block) and the quiz averages (10%). The final grades are: A, 85% - 100%; B, 70% - 84%; C, < 70%.

Translational Physiology I and II (PHOL 483 and 484; 2 credit hours each, a total of 4 credit hours required):

1. All MS in Medical Physiology students are required to register for these two courses their first two semesters in the program (PHOL 483 fall semester and PHOL 484 spring semester).
2. These sessions are held on Fridays from 10:00 AM – 12:00 PM in E-501 except for the last week of a block. On the last week of the block, the class will meet on Wednesday from 10:00 AM – 12:00 PM in order to give students a study day between the last class of the block and the block exam.
3. The Medical Physiology courses are prerequisites for the Translational Physiology courses. It is expected that they will be taken concurrently, although students may take the Translational Physiology courses independently with the permission of the director of the program.
4. The faculty coordinating a Medical Physiology block will choose the clinical cases that they think will best complement the material taught in the Medical Physiology course.
 - a. Either a basic scientist or a clinical faculty member will give a 60-90 minute presentation on this topic.
 - b. The last 30-60 minutes of each class will be dedicated to students answering National Board-type clinical cases using the audience response system. The professor will discuss the answers and give insight into how an expert in the field

thinks about the question and goes about answering it. These questions are intended to help the students prepare for taking the National Board subject exam in May, an exam that the students must pass in order to earn their MS degree.

5. In the last week of each block, the Translational Physiology course will be moved from Friday to Wednesday.
6. All students are provided with the Kaplan Question Bank of National Board-type questions in Physiology and Neurophysiology. Students should use this question bank to help prepare for the Translational Physiology block exams.
7. On the last Friday of a block, a two-part, two-hour examination on the Translational Physiology block content will be administered immediately after the Medical Physiology exam.
 - a. The first part of this exam is made up of 10 multiple choice questions in the format of National Board clinical questions over the material covered in the lectures and in the clinical cases in Boron's "Medical Physiology" textbook. Students will register their answers using Scantron forms. This part of the exam constitutes 25% of the final block exam grade.
 - b. The second part of the exam is made up of 10 short answer/essay questions. Eight of these questions will be over the clinical cases presented in class. Two will be from the clinical cases presented in Boron's "Medical Physiology" textbook. This part of the exam constitutes 75% of the final block exam grade.
 - c. This is a secure examination and all testing materials must be returned at the conclusion of the exam.
 - d. The preliminary grade in the Translational Physiology course will be posted in Blackboard by the end of the Friday the exam is administered.
 - e. On the Monday following the exam, each student's test booklet, Scantron form, and the ideal answers to the 10 short answer/essay questions will be returned to the students for review immediately after Monday's Medical Physiology class.
 - i. Students may register any issues they have with the correct answers or their short answer/essay answers on the test booklet.
 - ii. Because this is a secure exam, all testing materials must be returned after the review session.
 - iii. Faculty will review all issues raised by the students and correct the answer key or adjust student scores appropriately.
 - iv. Final block exam scores will be posted in Blackboard by the end of Tuesday following the exam.
 - v. The faculty design the exams to have a median grade of at least 85%. If the median on any exam is less than 85%, the faculty have the option to add points (referred to as a Difficulty Factor) to all students' grades to bring the class median to 85%.

8. The final grade in the Translational Physiology course is determined by the average of the block exams, weighted by the number of weeks dedicated to each block. A, 85% - 100%; B, 70% - 84%; C, < 70%.

Physiology Seminar I and II (PHOL 499; 1 credit hour each, a total of 2 credit hours required):

1. All MS in Medical Physiology students must register for Physiology Seminar PHOL 499 in both the fall and spring semesters of their first year in the program.
2. Students are required to attend at least 75% of the weekly seminars sponsored by the Department of Physiology and Biophysics on Mondays from 4:00 PM – 5:00 PM and any other special seminars sponsored by the department (a sign-in sheet is provided just outside the auditorium). Students are expected to attend all of the Ph.D. dissertation seminars presented by Ph.D. candidates in the Department of Physiology and Biophysics.
3. Two papers that will be distributed to all students via Blackboard the week before the seminar.
 - a. One paper will be a review of the topic to be covered by the seminar.
 - b. The second paper will be a recent research paper published by the lab of the seminar speaker.
 - c. Students will take a 5-question quiz in Blackboard over the content of these papers by the beginning of the seminar.
 - d. Students are expected to read the papers before the seminar and be prepared to ask questions of the speaker during the seminar.
4. This is a pass/fail course. To pass the course, the students must:
 - a. Attend at least 75% of the seminars sponsored by the department
 - b. Pass 75% of the seminar quizzes posted in Blackboard (answering at least 4 of the 5 questions correctly).

Electives (total of 12 credit hours):

1. The required courses in the Department of Physiology and Biophysics total 18 credit hours. A total of 30 credit hours are required for the MS degree.
2. The remaining 12 credit hours can be obtained by taking any graduate level courses offered at the university at the 400 or higher level either inside or outside the Department of Physiology and Biophysics.
3. Students may only register for elective courses AFTER consultation with their Academic Advisor.

Requirements for successful completion of the MS in Medical Physiology Program:

1. Approximately two weeks after the last block exam in the Medical Physiology II (PHOL 482) and Translational Physiology II (PHOL 484) courses, all MS in Medical Physiology students will take the basic science subject exam in Physiology and Neurophysiology from the National Board of Medical Examiners (NBME).
 - a. To prepare for this exam, students should:
 - i. Review all the NBME-type questions presented during the Translational Physiology courses
 - ii. Review the Kaplan Question Bank questions.
 - b. The exam will be administered on the computers in E-324.
 - c. The department will pay the registration fee for this examination.
 - d. In order for a student to progress in the program (a condition for the degree), s(he) must pass this examination (the passing mark is anticipated to be the 50th percentile but may be adjusted downward at the discretion of the MS in Medical Physiology Administration Committee).
 - e. If a student does not pass the exam, they can retake the exam once more (at their expense - ~\$30.00) before the beginning of the subsequent fall semester and pass it at the same percentile established for the original exam.
2. Students must maintain a grade point average (GPA) **better than** 3.0 to graduate from the program. Two C's in any courses will constitute grounds for dismissal from the program.
3. If a student fails 2 pass/fail courses, this will constitute grounds for dismissal from the program.