

PHYSIOLOGY OF EXERCISE

Description of course: Exploration of fundamental concepts in exercise physiology, including the physiological effects of both acute and chronic physical exercise. Focus will be on systems physiology, integrative responses, and the significance of these effects for health and performance.

Faculty:

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Office hours: Tuesday 2-4 pm, or by appointment.

All questions concerning lab procedures or schedules should be directed to your laboratory instructor. The list and contact information for each lab section will be posted on the course blackboard site.

Times: Monday, Wednesday, Friday at 10:00-10:50 in Willamette 100

Prerequisites: HPHY 314 and HPHY 317 are prerequisites for this course. We will build upon and expand on the concepts covered in HPHY 314 and the techniques learned in HPHY 317. Even if you did well in 314 and 317, it is advisable that you review material from these courses that pertain to upcoming topics in this course, as this background is fundamental to understanding the material covered this term.

Required reading: This course uses a custom textbook available at the UO bookstore. The textbook contains 10 chapters that have been extracted from Exercise Physiology: Theory and Application to Fitness and Performance (Powers & Howley, 5th edition, 2004). In addition, the custom textbook contains supplemental material for the course that is not available elsewhere.

Additional reading materials will be assigned as they become relevant during the term. Most of these reading assignments will be made available via the course blackboard site.

Blackboard site:

The majority of information for this course and the lab will be conveyed to you via the course blackboard site. Consequently, you should be sure to consult it every day or so. In addition to this syllabus, such things as important announcements, quizzes, lecture handouts, and other materials will be available on the blackboard site.

Library reserves: The following useful textbooks are placed on reserve in the Science Library:

- f Exercise Physiology: Theory and Application to Fitness and Performance (Powers & Howley, 5th edition, 2004). 2 copies.
- * Exercise Physiology: Energy, Nutrition, and Human Performance (McArdle, Katch, & Katch, 5th edition, 2001).
- ^ Physiology of Sport and Exercise (Wilmore & Costill, 2nd edition, 2004).

Laboratory project: For the first part of the term you will complete 4 labs. The purpose of these labs is to teach you how to answer questions in exercise physiology and how to use the equipment. Over the next 5 weeks you will be completing a research project in which you will construct a protocol and collect data to answer a specific question and hypothesis. During these 5 weeks, the lab will be available for your group to come in to collect data. You are not required to come to lab every week during this time, but **do not wait until the last minute to collect data.** There will be a sign-up sheet for your group to checkout specific equipment for a given time period. The purpose of the research project is to introduce you to hypothesis-driven research and to develop critical thinking skills in exercise physiology as well as to allow you to be creative and explore topics that are of interest to you.

For your projects, you will work in groups of 3-4 students. Your group may consist of anyone in the class (you are not restricted to your lab section). The assignment is to develop a research project for which you can make measurements with equipment available to you in the physiology lab that you have used throughout the term. Your group needs to generate a **specific question and hypothesis** that you will answer using your methodology. Using your data, your group will then need to interpret the data and draw conclusions based on your data. In order to successfully do this, you will need to do a literature review. Your group needs to be familiar with what the current data and literature says about your topic and what conclusions other investigators have drawn based on their data. Remember, successful research does not always mean that your data supports your hypothesis or coincides with what other investigators have found.

The lab project will count towards a significant component of your final grade. Your grade on the lab project will be based on your individual participation, your group's literature review, preliminary abstract (this is a brief summary of your project including hypothesis, methods, results, and conclusion), and final poster presentation. The poster presentations will be graded based on the information presented in the poster (title, hypothesis, methods, results, discussion, graphs, tables, ease of interpretation, correct interpretation of data) and the group's oral presentation of the poster (showing knowledge of protocol and results, explaining the reasoning behind experimental design, understanding the physiological concepts behind your experiment).

Basis for grading: Grades will be assigned based upon the following assessments:

	Points each	Points total	Percent of grade
Lecture			60% of total
Quizzes	10	50	5%
Midterm exam		250	25%
Final exam		300	30%
Lab			40% of total
Quizzes	10	30	3%
Write-ups	25	100	10%
Project literature review		25	2.5%
Project abstract		25	2.5%
Project poster		200	20%
Project participation		20	2%
Total		1000	100%

There will be 5 quizzes on the lecture material. The goal of the quizzes is to expose students to the types of questions that will be asked on exams. Quizzes will be posted on Blackboard for you to print out on a Monday and due, at the start of lecture, the following Friday (see schedule below for exact dates). The quizzes are open-note, open-book, group efforts. No late quizzes will be accepted, and you must be there to hand in your quiz.

Final letter grade assignment will be based on the following percentages of total available points: A* 2 97; A > 93; A" 2 90; B* a 87; B 2 83; B' 2 80; C* 2 77; C 2 73; C 2 70; D* 2 67; D 2 63; D 2 60; F < 60. If the overall class' average falls below 80%, or if the highest score in the class falls below 97%, these grade assignments may be adjusted. Undergraduate students who choose the pass/no pass grading option must earn a grade of C' or better to pass the course; graduate students must earn a B or better to pass.

Student workload and expectations: Students will be expected to attend all class and lab sessions. In addition, student workload will include significant out-of-class preparation such as readings from the textbook and other assigned reading, preparation for laboratory exercises, and the development of a laboratory project with a group of students. It is expected that students will arrive prepared for in-depth discussions of the course material on an advanced undergraduate level. Students will also be expected to set up and complete the laboratory exercises based on the laboratory handouts.

The order of discussion topics presented in the book is not the one we will always follow. Furthermore, we will cover some information in class that is not covered in the textbook. In some cases, the chapters in the book will be in greater depth than the lectures. In others the reverse will be true. We will try to create the best connection between the two that we can. The best approach to the lectures is to come to class, and to prepare before the class meets. You can always be sure that the information given in the Blackboard site represents the most current information and can be relied upon. The best approach to the book is to look at it as an alternative way to present material that can help by filling in some of the details that might be excluded from the lectures. On a practical note, since the goal of the course is to understand the material in as great a depth as possible, required reading should be considered a source of exam questions.

SCHEDULE OF INSTRUCTIONAL THEMES AND ASSIGNMENTS

- Week 1** *Overview of Exercise and Sport Physiology; Measurement of Work*
Read: Chapter 1 and 6
Lab: Quantifying work and energy. You should have formed your project groups by the end of the week. You may form groups with anyone in the class but your group must be either 3 or 4 students.
- Week 2** *Energy Expenditure and Bioenergetics*
Read: Chapter 3 **Quiz #1 due Friday in lecture**
Lab: Measurement of oxygen consumption and carbon dioxide production. Your group must turn in a brief proposal of your research project on Friday. This should include: names of all group members and lab sections, a specific question, a rationale, and a specific hypothesis.
- Week 3** *Metabolism and Responses to Acute Exercise*
Read: Chapter 4 **Lab:** Response to dynamic large muscle-mass exercise.
- Week 4** *Hormonal Response to Exercise*
Read: Chapter 5 **Quiz #2 due Friday in lecture**
Lab: Response to isometric small muscle-mass exercise. Your group must turn in an outline of the methods that you will use to answer your question and test your hypothesis plus your group must turn in a brief literature review for your project on Friday.
- Week 5** *Neuromuscular Adaptations to Resistance Training*
Read: Chapter 8 **Lab:** Work on laboratory projects
- Week 6** *Cardiovascular Response to Exercise* **Midterm on Monday**
Read: Chapter 9 **Quiz #3 due Friday in lecture**
Lab: Work on laboratory projects
- Week 7** *Respiratory Response to Exercise*
Read: Chapter 10 **Lab:** Work on laboratory projects
- Week 8** *CVR Adaptations to Exercise Training; Temperature Regulation*
Read: Chapter 12 **Quiz #4 due Friday in lecture**
Lab: Work on laboratory projects
- Week 9** *Physiology of Training: Performance and VO_{2max}*
Read: Chapter 13
Lab: Final week for data collection on laboratory projects. Your group must turn in an abstract (brief summary of your data, results, and your analysis of the data, i.e., what conclusions can you draw from the data, physiological relevance, etc.) on Friday. If you are still collecting data this week, it does not need to be included in your summary.
- Week 10** *Optimizing Performance in Sports*
Memorial Day is Monday, so no class on Monday. **Quiz #5 due Friday in lecture**
Lab: Presentation of laboratory projects. Wednesday 9:30-noon. (Location to be announced)
- Cumulative Final Exam is at 10:15am on Friday. There will be NO final exams given early... make your summer plans with this in mind!**