

HPA 1042: Physiology of Exercise Spring 2021

Course Hours:	T–Th 10:00-10:50 am (section 1030), T–Th 1:15-2:05 pm (section 1100) (along with zero-credit lab offered on T or Th; see 'Lab Syllabus' below)
Course Credits:	3
Course Room:	121 Lawrence Hall (sec 1030), 324 Cathedral of Learning (sec 1100)
Instructor:	Christopher E. Kline, PhD
Office:	Physical Activity & Weight Management Research Center 32 Oak Hill Court Pittsburgh, PA 15261
Phone:	412-383-4027
Email:	chriskline@pitt.edu
Office Hours:	9:00-10:00 am Wednesdays, 12:00-1:00 pm Fridays, or by appointment; contact Dr. Kline to schedule a phone/Zoom meeting
Teaching Assistant:	Andrea Kozai, MS
Office:	Physical Activity & Weight Management Research Center 32 Oak Hill Court Pittsburgh, PA 15261
Phone:	412-383-4512
Email:	ack72@pitt.edu
Office Hours:	By appointment
Lab Assistant:	Mitchell Titchworth, BS
Office:	Trees Hall, Room 125
Email:	MLT90@pitt.edu
Office Hours:	By appointment

COURSE DESCRIPTION

This course, which consists of lecture and laboratory components, is intended to provide the undergraduate exercise science major with an overview of the principles of exercise physiology. Specifically, we will investigate the effects of exercise upon bodily systems and review the underlying physiological mechanisms that relate to improved physical performance and health.

COURSE REQUIREMENTS

PREREQUISITES: Prior coursework in undergraduate-level Anatomy (with laboratory; e.g., HPA 1011 and 1012) and Physiology (e.g., HPA 1033) is required for enrollment in this course.

REQUIRED TEXT: Kenney WL, Wilmore JH, Costill DL. *Physiology of Sport and Exercise* (7th ed.). Champaign, IL: Human Kinetics, 2020.

The digital version of this text is accessible on Canvas through Pitt's Inclusive Access program, with hardcopy versions available upon request. *If you do not want to access the text through this program, you must opt out by the add/drop deadline (02/05/2021) to avoid being charged.* Visit the University bookstore's website [for additional details](#). This textbook can also be purchased through the publisher ([hardcover](#), [loose-leaf](#), or [e-book](#)) or [Amazon](#), among other options.

REQUIRED TECHNOLOGY: This course will use the Canvas learning management system for posting lecture notes, submission of laboratory reports, and online quizzes and exams. Because of this, certain technology is required to adequately complete the course. In general, Canvas users will have the best experience with [Firefox](#) or [Chrome](#) (for Windows or Mac), or [Safari](#) for

Mac. Please make sure that you have access to a secure cable internet hookup for quizzes and exams. Wireless (Wi-Fi) connections are sometimes unreliable for these crucial tasks.

- Support for Students: There is a [Canvas Help Guide](#) available.
- Problems should be directed to the Technology Help Desk. Help is available 24 hours a day, 7 days a week, 365 days a year. Call 412-624-HELP, [submit a help ticket online](#), or have a [live online chat](#).

COURSE GOALS & OBJECTIVES

The course lectures, readings, laboratory sessions, quizzes, and exams are intended to provide opportunities for students to accomplish specific competencies related to the basic principles of exercise physiology.

After successful completion of this course, the student should be able to:

- Describe the structure and function of skeletal muscle;
- Discuss the physiology of human metabolism and bioenergetics that fuel human movement during exercise;
- Explain the structure and function of the endocrine and nervous systems at rest and the role they play in controlling and regulating movement during exercise;
- Determine energy expenditure at rest and during exercise;
- Detail the structure and function of the cardiovascular and respiratory systems at rest and their responses to exercise;
- Explain how the cardiorespiratory system responds to acute exercise and adapts to chronic exercise;
- Define and discuss the basic principles of exercise training (e.g., individuality, specificity, overload, detraining);
- Explain the physiological basis for commonly prescribed aerobic, anaerobic power, and muscular strength training regimens.

COURSE STRUCTURE

This course will utilize the Flex@Pitt instructional model. When appropriate to do so (based on the University's [operational posture](#)), we intend to offer in-person instruction for lecture and laboratory sections. The course rooms assigned to us have sufficient capacity for us to maintain proper distancing. We believe it is important to provide the option of in-person instruction; however, we acknowledge that in-person learning is not possible for some students during this pandemic. By utilizing the Flex@Pitt model, this course will strive to be as accommodating as possible while providing the best educational experience under these circumstances.

ATTENDANCE POLICY

In the midst of this pandemic, it is extremely important that you abide by public health regulations and University of Pittsburgh health standards and guidelines. While in class, at a minimum this means that you must wear a face covering and comply with physical distancing requirements; other requirements may be added by the University during the semester. These rules have been developed to protect the health and safety of all community members. Failure to comply with these requirements will result in you not being permitted to attend class in person and could result in a Student Conduct violation. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

Synchronous attendance is strongly encouraged for all lectures, whether in-person or remote. If you are unable to attend a lecture session 'live', you will be able to view a recorded version of the lecture on Canvas; in general, these recordings will be uploaded within 12 hours of the class. Due to the pandemic, attendance will not be *required* for the lectures; however, consistent engagement with the lectures will be important for successful completion of the course.

Likewise, engagement with the laboratory sessions will be important to grasp key concepts in this course. In-person attendance is strongly encouraged if feasible. Students who need to engage remotely will be able to participate during live Zoom sessions (with recordings available if unable to join synchronously). Additional lab details can be found in the Lab Syllabus.

In addition to the lectures and labs, *asynchronous opportunities for enrichment* will be available via Canvas and the textbook's web study guide. These enrichment opportunities will not count for/against the student in the course grades; the purpose of these opportunities is to provide students with additional ways to learn more about the field of exercise physiology.

METHODS OF EVALUATION

Quizzes: During most weeks, a quiz will become available on Canvas on Friday at 8:00 am and will be due at 9:00 am the following Tuesday. See the Course Schedule for specific quiz dates. Quizzes will feature a mix of true/false, multiple choice, matching, and short answer questions. The quizzes will be allowed to be completed using class notes. *The purpose of these quizzes is to encourage the review of course content on a consistent basis.*

Exams: Four exams will be completed in this course. The exams are spread out equally across the semester and are designed to be non-cumulative. Exams will be administered via Canvas and available to be taken any time between 8:00 am and midnight on the announced dates. Students will have 60 minutes to complete each exam. Due to the remote nature of exam administration, exams will be able to be completed using 'open notes'.

For both quizzes and exams: while 'open notes' are allowed, these evaluations are to be completed independently and without involvement of fellow classmates. Completing quizzes or exams with the help of classmates is considered cheating; see the 'Academic Policies' section to review the consequences of cheating.

Laboratory Reports: Four different labs will be completed as part of this course, and each lab will require a lab report to be written. Lab reports are due at the beginning of class 1 week following the completion of the lab, and should be submitted via Canvas. Late submissions will have points deducted 10% per day it is late. Details regarding the lab reports are available in the Laboratory Syllabus; specific dates for the labs can be found in the Course Schedule.

COURSE SCHEDULE

*The course schedule is tentative and may change at the discretion of the instructor.
Students are responsible for any changes made to the syllabus that are posted.*

Week/Dates:	Session:	Topic/Activity:
Week 1 (Jan 19, Jan 21)	Tues lecture:	Course Intro/Structure & Function of Exerc Muscle (Ch 1)
	Thurs lecture:	Structure & Function of Exercising Muscle (Ch 1)
	Lab:	No lab this week
	Quiz:	Quiz 1 assigned on 01/22; due by 9:00 am on 01/26
Week 2 (Jan 26, Jan 28)	Tues lecture:	Bioenergetics & Muscle Metabolism (Ch 2)
	Thurs lecture:	Bioenergetics & Muscle Metabolism (Ch 2)
	Lab:	Lab Introduction (remote only)
	Quiz:	Quiz 2 assigned on 01/29; due by 9:00 am on 02/02

Week 3 (Feb 2, Feb 4)	Tues lecture:	Bioenergetics & Muscle Metabolism (Ch 2)/Review
	Thurs lecture:	Exam 1 (covers Chapters 1-2)
	Lab:	Lab 1: Circulatory Response to Exercise
Week 4 (Feb 9, Feb 11)	Tues lecture:	Neural Control of Exercising Muscle (Ch 3)
	Thurs lecture:	Neural Control of Exercising Muscle (Ch 3)
	Lab:	Lab 1: Circulatory Response to Exercise (continued)
	Quiz:	Quiz 3 assigned on 02/12; due by 9:00 am on 02/16
Week 5 (Feb 16, Feb 18)	Tues lecture:	Hormonal Control During Exercise (Ch 4)
	Thurs lecture:	Hormonal Control During Exercise (Ch 4)
	Lab:	Lab 2: Prediction of Peak Power Output
	Quiz:	Quiz 4 assigned on 02/19; due by 9:00 am on 02/25
Week 6 (Feb 23, Feb 25)	Tues lecture:	<i>No Class—Pitt Self-Care Day</i>
	Thurs lecture:	Energy Expenditure & Fatigue (Ch 5)
	Lab:	No lab this week
	Quiz:	Quiz 5 assigned on 02/26; due by 9:00 am on 03/02
Week 7 (Mar 2, Mar 4)	Tues lecture:	Energy Expenditure & Fatigue (Ch 5)
	Thurs lecture:	Exam 2 (covers Chapters 3-5)
	Lab:	Lab 2: Prediction of Peak Power Output (continued)
Week 8 (Mar 9, Mar 11)	Tues lecture:	Cardiovascular System & Its Control (Ch 6)
	Thurs lecture:	Cardiovascular System & Its Control (Ch 6)
	Lab:	Lab 3: Aerobic Fitness Test-VO ₂ max
	Quiz:	Quiz 6 assigned on 03/12; due by 9:00 am on 03/16
Week 9 (Mar 16, Mar 18)	Tues lecture:	Respiratory System & Its Regulation (Ch 7)
	Thurs lecture:	Respiratory System & Its Regulation (Ch 7)
	Lab:	Lab 3: Aerobic Fitness Test-VO ₂ max (continued)
	Quiz:	Quiz 7 assigned on 03/19; due by 9:00 am on 03/23
Week 10 (Mar 23, Mar 25)	Tues lecture:	Cardiorespiratory Responses to Acute Exercise (Ch 8)
	Thurs lecture:	Cardiorespiratory Responses to Acute Exercise (Ch 8)
	Lab:	No lab this week
Week 11 (Mar 30, Apr 1)	Tues lecture:	Exam 3 (covers Chapters 6-8)
	Thurs lecture:	Principles of Exercise Training (Ch 9)
	Lab:	Lab 4: Respiratory Responses to Exercise
Week 12 (Apr 6, Apr 8)	Tues lecture:	Principles of Exercise Training (Ch 9)
	Thurs lecture:	Adaptations to Resistance Training (Ch 10)
	Lab:	Lab 4: Respiratory Responses to Exercise (continued)
	Quiz:	Quiz 8 assigned on 04/09; due by 9:00 am on 04/13
Week 13 (Apr 13, Apr 15)	Tues lecture:	Adaptations to Resistance Training (Ch 10)
	Thurs lecture:	Adaptations to Aerobic & Anaerobic Training (Ch 11)
	Lab:	No lab this week
	Quiz:	Quiz 9 assigned on 04/16; due by 9:00 am on 04/20
Week 14 (Apr 20, Apr 22)	Tues lecture:	Adaptations to Aerobic & Anaerobic Training (Ch 11)
	Thurs lecture:	Exam 4 (Covers Chapters 9-11)
	Lab:	No lab this week

EVALUATION AND GRADING

Evaluation Category:	Proportion of Final Grade:
Exam One	20%
Exam Two	20%
Exam Three	20%
Exam Four	20%
Laboratory Reports (4 total)	10%
Quizzes (9 total; lowest quiz will be dropped)	10%

The following grading scale will be used to determine final course grades:

Letter grade:	Percentage:	Letter grade:	Percentage:
A	≥ 93.00%	C	73.00 to 76.99%
A-	90.00 to 92.99%	C-	70.00 to 72.99%
B+	87.00 to 89.99%	D+	67.00 to 69.99%
B	83.00 to 86.99%	D	63.00 to 66.99%
B-	80.00 to 82.99%	D-	60.00 to 62.99%
C+	77.00 to 79.99%	F	< 60%

Incomplete (I) or G Grades:

Students must complete all course requirements to receive a grade for this course. In the event of extenuating personal circumstances, such as a medical emergency or a death in the family, an I grade (incomplete course work) or G grade (course work unfinished because of extenuating personal circumstances) may be awarded to signify unfinished course work. *G grades will not be an option for students who fall behind in the course for non-emergency reasons.* Students assigned I or G grades are required to complete course requirements no later than one year after the term in which the course was taken. After the deadline has passed, the I or G grade will remain on the record, and the student will be required to re-register for the course if it is needed to fulfill requirements for graduation.

COURSE COMMUNICATION

- Canvas will be the primary source for all course-related communication and materials, including lecture notes, quizzes, exams, and announcements.
- Announcements may be supplemented by messages sent by the instructor to the students' Pitt e-mail addresses (i.e., xxxx@pitt.edu). As a result, *it is the student's responsibility to check his or her Pitt e-mail address regularly.*
- Dr. Kline can best be reached via e-mail. To ensure a prompt reply, please include 'HPA 1042' in the subject line. Please allow up to 1 full business day for a response.

TEACHING SURVEY

Students will be asked to complete a *Student Opinion of Teaching Survey*. Surveys will be sent via Pitt e-mail and appear on your Canvas page during the last three weeks of class. Your responses are anonymous. Please take time to thoughtfully respond; your feedback is important to me and future offerings of this course. Read more about these surveys [here](#).

ACADEMIC POLICIES

Course Policies:

Any student caught cheating (includes any form of academic dishonesty such as copying answers, taking quizzes/exams with another students, plagiarism, etc.) will result in an automatic "F" in this course. Additionally, the student will be reported to the appropriate university officials, and it will go on file in the student's academic record.

University Policies:

Academic Integrity

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic. For hands-on practice, complete the [Understanding and Avoiding Plagiarism tutorial](#).

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services \(DRS\)](#), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Accessibility

The Canvas LMS platform was built using the most modern HTML and CSS technologies and is committed to W3C's Web Accessibility Initiative and [Section 508](#) guidelines. Specific details regarding individual [feature compliance](#) are documented and updated regularly.

Diversity and Inclusion

The University of Pittsburgh does not tolerate any form of discrimination, harassment, or retaliation based on disability, race, color, religion, national origin, ancestry, genetic information, marital status, familial status, sex, age, sexual orientation, veteran status or gender identity or other factors as stated in the University's Title IX policy. The University is committed to taking prompt action to end a hostile environment that interferes with the University's mission. For more information about policies, procedures, and practices, see:

<https://www.diversity.pitt.edu/civilrights-title-ix-compliance/policies-procedures-and-practices>.

I ask that everyone in the class strive to help ensure that other members of this class can learn in a supportive and respectful environment. If there are instances of the aforementioned issues, please contact the Title IX Coordinator, by calling 412-648-7860, or e-mailing titleixcoordinator@pitt.edu. Reports can also be filed online: <https://www.diversity.pitt.edu/make-report/report-form>. You may also choose to report this to a faculty/staff member; they are required to communicate this to the University's Office of Diversity and Inclusion. If you wish to maintain complete confidentiality, you may also contact the University Counseling Center (412-648-7930).

Copyright Notice

Course materials may be protected by copyright. United States copyright law, 17 USC section 101, et seq., in addition to University policy and procedures, prohibit unauthorized duplication or retransmission of course materials. See [Library of Congress Copyright Office](#) and the [University Copyright Policy](#).

Statement on Classroom Recording

“To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student’s own private use.”

Department of Health and Human Development Student Grievance Policy:

If a student feels that they have been treated unfairly by the instructor with regard to their grade or other aspects of their course participation, there are a series of steps that should be taken in an attempt to resolve this matter. These include the following:

1. The student should first inform the instructor of the course of the issue in an attempt to resolve this matter. If the course is taught by a Teaching Assistant, Graduate Student, or Part-Time instructor, their faculty supervisor should also be informed of this matter. The student should bring this issue to the attention of the instructor in a timely matter and should maintain a record of interactions that occurred with the instructor regarding the matter in question. The course instructor should take necessary steps to address the concern raised by the student in a timely matter and should maintain a record of the interactions that occurred with the student regarding this matter.
2. If, after reasonable attempts to resolve the matter, the matter is not resolved in a manner that is deemed to be acceptable to the student, the student retains the right to file a grievance. This grievance is to be filed with the Department Chair in the form of a written document that can be submitted via email or campus mail. This document should include the following:
 - a. Student’s name
 - b. Student contact information (email, address, telephone number)
 - c. Information on the course for which the grievance applies (course title, course number, instructor name)
 - d. A copy of the course syllabus that was provided to the student by the instructor
 - e. Detailed description of the grievance and additional information the student feels is pertinent to this matter.

After receiving this information, the Department Chair will inform the student if additional information is needed, as appropriate will discuss this matter with the student and the instructor, and will issue a decision in a timely manner.

3. If the student is not willing to accept the decision of the Department Chair, the student will be informed that they can request an additional review of this matter through the Office of the Dean of the School of Education. If the student decides to pursue this, the student should contact the Associate Dean for Student Affairs & Certification in the School of Education at the University of Pittsburgh.

HPA 1042 Laboratory Syllabus

Lab Room: 149 Trees Hall
Lab Section Hours: Tu 11:05-11:55 am (section 1040)
Tu 2:20-3:10 pm (section 1201)
Th 11:05-11:55 am (section 1110)
Th 2:20-3:10 pm (section 1105)

Lab Assistant: Mitchell Titchworth, BS
Office: Trees Hall, Room 125
Email: MLT90@pitt.edu
Office Hours: By appointment

LAB SCHEDULE

*The laboratory session schedule is tentative and may change at the discretion of the instructor.
The lab schedule is also integrated into the overall Course Schedule earlier in the syllabus.*

Week:	Lab Content:
1	**no lab this week**
2	Lab Introduction (remote only)
3	Lab 1: Circulatory Response to Exercise
4	Lab 1: Circulatory Response to Exercise (continued)
5	Lab 2: Prediction of Peak Power Output; lab report #1 due
6	**no lab this week**
7	Lab 2: Prediction of Peak Power Output (continued)
8	Lab 3: Aerobic Fitness Test-VO ₂ max; lab report #2 due
9	Lab 3: Aerobic Fitness Test-VO ₂ max (continued)
10	**no lab this week** ; lab report #3 due
11	Lab 4: Respiratory Responses to Exercise
12	Lab 4: Respiratory Responses to Exercise (continued)
13	**no lab this week** ; lab report #4 due
14	**no lab this week**

LAB ATTENDANCE

Students who attend labs in person will work in small groups to collect data and follow the instructions for each lab while under the direct supervision of the Laboratory TA. *All in-person lab activities will include appropriate COVID risk mitigation strategies (e.g., social distancing, face and eye masks, gloves, disinfecting of all surfaces/supplies before and after use).*

Students who are unable to attend labs in person will have the ability to participate in labs remotely by viewing live Zoom recordings of labs. Recordings will be available for those unable to attend in-person or remotely. Students unable to attend labs in person will be provided data and be expected to complete lab reports.

LAB REPORT GRADING

Lab reports are due at the beginning of class 1 week after completion of each lab and should be submitted via Canvas. Lab reports submitted late will have 10% per day deducted from the grade.

Lab reports will be graded based upon a rubric tailored for each lab; points will vary for each report, but the grade for each report will be based out of 100 (e.g., 40 out of 45 would receive a score of 89). Grades on lab reports are worth 10% of the total grade for HPA 1042.

Guidelines for Writing Lab Reports

1. Do not use subjects' names in lab reports. Use a number or letter to identify individual subjects. For example, Subject 1 or female subject A.
2. Always include units of measurements for each variable. For example, HR (beats/min) or VO₂ (ml/kg/min).
3. Data may be presented in Figures or Tables.
4. Each figure and table should be given a number and title (see examples below). The dependent variable should be placed on the vertical or y-axis and the independent variable should be placed on the horizontal or x-axis. Independent variables are factors that are manipulated or controlled. Dependent variables change with or depend on the independent variables.
5. Lab reports must be typed and double-spaced; reports are due **1 week** after completion of the lab (see Lab Schedule).
6. Lab reports should include the following sections:
 - a. Results;
 - b. Discussion of the results (answer discussion questions).
7. Place the results **before** the discussion of the results.
8. Each student must write his or her own report.

Table 1. Subject characteristics.

Variable:	Men (n = 5)	Women (n = 4)
Age (yr)	23 ± 2	21 ± 2
Height (cm)	180 ± 12	162 ± 18
Weight (kg)	75 ± 4	65 ± 3

Values are means ± standard deviation.

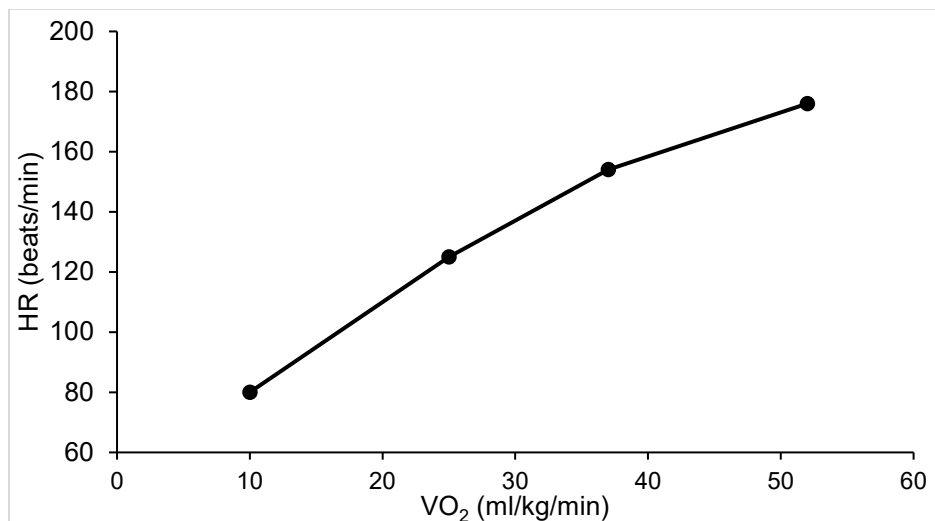


Figure 1. Heart rate response to graded treadmill exercise.