HHD 1042: Physiology of Exercise
Spring 2022

Course Hours:	T–Th 10:00-10:50 am (section 1030), T–Th 1:00-1:50 pm (section 1100) (along with zero-credit lab offered on T or Th; see 'Lab Syllabus')
Course Credits:	3
Course Room:	132 Trees Hall

Instructor:	Christopher E. Kline, PhD
Office:	Oak Hill Research Center 32 Oak Hill Court, Room 227 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 meeting (in-person/phone/Zoom)

Lab TA:	Keshav Mishra, BS
Office:	Trees Hall, Room 125
Email:	KEM318@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., HHD 1011 and 1012) and Physiology (e.g., HHD 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 01/24/2021 to avoid being charged*. Visit the University bookstore's website for additional details. This textbook can also be purchased from the publisher (e-book only) or Amazon (including the ability to rent), among other options.

Important note: Do NOT purchase the 8th edition of this textbook. It was just published in November 2021, and I have not yet had the chance to fully scrutinize its updated contents.

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. Use this link to access the various ways to contact them (phone, email, online help request, or 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 INSTRUCTIONAL FORMAT

Per the Provost's announcement, the first 2.5 weeks of this course will be taught remotely. Zoom links will be provided, and students will be expected to attend synchronously.

After the first 2.5 weeks, this course will be taught in person; synchronous remote access to the course (i.e., Zoom) will not be provided. Classes will not be recorded for review on Canvas. *During indoor in-person interactions, face coverings are required at all times.*

Because of the ongoing COVID-19 pandemic, modifications to the instructional format may be necessary. The University of Pittsburgh will indicate whether any modifications are made and the duration these modifications will in place.

If the instructor and the TA are unavailable due to illness or the need for isolation/quarantine, the class may be delivered remotely (i.e., Zoom). If this temporary switch to the instructional format becomes necessary, you will be notified as soon as possible.

ATTENDANCE POLICY

During this pandemic, it is extremely important that you abide by the public health regulations, the University of Pittsburgh's health standards and guidelines, and Pitt's Health Rules. These rules have been developed to protect the health and safety of all of us. Universal face covering is required in all classrooms and in every building on campus, without exceptions, regardless of vaccination status. This means you must wear a face covering that properly covers your nose and mouth when you are in the classroom. If you do not comply, you will be asked to leave class. It is your responsibility have the required face covering when entering a university building or classroom. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

If you become ill or need to isolate/quarantine, *inform the instructor as soon as possible* so that we can work out reasonable accommodations and opportunities to catch up on missed work.

Attendance is strongly encouraged for all class sessions. Consistent engagement with the course content will be important for successful completion of the course, and the best way to ensure engagement is attending class.

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: 9 quizzes will be assigned during the semester. Each 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, and matching 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.*

'Bonus' quizzes: Additional quizzes will be administered in person throughout the semester; these quizzes will NOT be announced in advance. Missing these quizzes will not count against the student; points earned will be considered bonus points and added to the next exam score.

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 in person.

Laboratory Reports: Grades for the laboratory section will be incorporated into this course. The main method of evaluation for labs will be lab reports. Details regarding the lab reports are available in the **Laboratory Syllabus**; 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.

**** Indicates remote instruction (01/11 through 01/25) due to Provost's announcement***

Week/Dates:	Session:	Topic/Activity:
Week 1 (Jan 11, Jan 13)	Tues lecture:	Intro/Structure & Function of Exerc Muscle (Ch 1)*
	Thurs lecture:	Structure & Function of Exercising Muscle (Ch 1)*
	Lab:	No lab
	Quiz:	Quiz 1 available on 01/14; due by 9:00 am on 01/18
Week 2 (Jan 18, Jan 20)	Tues lecture:	Bioenergetics & Muscle Metabolism (Ch 2)*
	Thurs lecture:	Bioenergetics & Muscle Metabolism (Ch 2)*
	Lab:	No lab
	Quiz:	Quiz 2 available on 01/21; due by 9:00 am on 01/25
Week 3 (Jan 25, Jan 27)	Tues lecture:	Bioenergetics & Muscle Metabolism (Ch 2)*
	Thurs lecture:	Review for Exam 1 *(first in-person class of semester)*
	Lab:	No lab
	Quiz:	No quiz
Week 4 (Feb 1, Feb 3)	Tues lecture:	**Exam 1** (covers Chapters 1-2)
	Thurs lecture:	Neural Control of Exercising Muscle (Ch 3)
	Lab:	Lab 1: Introduction/Circulatory Response to Exercise
	Quiz:	Quiz 3 available on 02/04; due by 9:00 am on 02/08

Week 5 (Feb 8, Feb 10)	Tues lecture:	Neural Control of Exercising Muscle (Ch 3)
	Thurs lecture:	Hormonal Control During Exercise (Ch 4)
	Lab:	Lab 1: Circulatory Response to Exercise (continued)
	Quiz:	Quiz 4 available on 02/11; due by 9:00 am on 02/15
Week 6 (Feb 15, Feb 17)	Tues lecture:	Hormonal Control During Exercise (Ch 4)
	Thurs lecture:	Energy Expenditure & Fatigue (Ch 5)
	Lab:	Lab 2: Anaerobic Power Assessment
	Quiz:	Quiz 5 available on 02/18; due by 9:00 am on 02/22
Week 7 (Feb 22, Feb 24)	Tues lecture:	Energy Expenditure & Fatigue (Ch 5)/Exam 2 Review
	Thurs lecture:	**Exam 2** (covers Chapters 3-5)
	Lab:	Lab 2: Anaerobic Power Assessment (continued)
	Quiz:	No quiz
Week 8 (Mar 1, Mar 3)	Tues lecture:	Cardiovascular System & Its Control (Ch 6)
	Thurs lecture:	Cardiovascular System & Its Control (Ch 6)
	Lab:	Lab 3: Prediction of Peak Power Output
	Quiz:	No quiz
Week 9 (Mar 8, Mar 10)	**No class—Spring Break**	
Week 10 (Mar 15, Mar 17)	Tues lecture:	Respiratory System & Its Regulation (Ch 7)
	Thurs lecture:	Respiratory System & Its Regulation (Ch 7)
	Lab:	Lab 3: Prediction of Peak Power Output (continued)
	Quiz:	Quiz 6 available on 03/18; due by 9:00 am on 03/22
Week 11 (Mar 22, Mar 24)	Tues lecture:	Cardiorespiratory Responses to Acute Exercise (Ch 8)
	Thurs lecture:	Cardiorespiratory Responses to Acute Exercise (Ch 8)
	Lab:	Lab 4: Respiratory Responses to Exercise
	Quiz:	No quiz
Week 12 (Mar 29, Mar 31)	Tues lecture:	**Exam 3** (covers Chapters 6-8)
	Thurs lecture:	Principles of Exercise Training (Ch 9)
	Lab:	Lab 4: Respiratory Responses to Exercise (continued)
	Quiz:	Quiz 7 available on 04/01; due by 9:00 am on 04/05
Week 13 (Apr 5, Apr 7)	Tues lecture:	Adaptations to Resistance Training (Ch 10)
	Thurs lecture:	Adaptations to Resistance Training (Ch 10)
	Lab:	Lab 5: VO_{2max} Assessment
	Quiz:	Quiz 8 available on 04/08; due by 9:00 am on 04/12
Week 14 (Apr 12, Apr 14)	Tues lecture:	Adaptations to Aerobic & Anaerobic Training (Ch 11)
	Thurs lecture:	Adaptations to Aerobic & Anaerobic Training (Ch 11)
	Lab:	Lab 5: VO_{2max} Assessment (continued)
	Quiz:	Quiz 9 available on 04/15; due by 9:00 am on 04/19
Week 15 (Apr 19, Apr 21)	Tues lecture:	Exercise in Hot and Cold Environments (Ch 12)
	Thurs lecture:	Exercise in Hot and Cold Environments (Ch 12)
	Lab:	No lab
	Quiz:	No quiz
Finals Week		**Exam 4** (covers Chapters 9-12) *Dates and times for final exams are TBD*

EVALUATION AND GRADING

Evaluation Category:	Proportion of Final Grade:
Exam One	17.5%
Exam Two	17.5%
Exam Three	17.5%
Exam Four	17.5%
Laboratory Reports (5 total)	20%
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 'HHD 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.

Equity, 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, visit the Civil Rights & Title IX Compliance web page.

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. 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.

HHD 1042 Laboratory Syllabus

Lab Room:	149 Trees Hall
Lab Section Hours:	Tu 11:00-11:50 am (section 1031) Tu 2:00-2:50 pm (section 1040) Th 11:00-11:50 am (section 1110) Th 2:00-2:50 pm (section 1105)
Lab TA:	Keshav Mishra, BS
Office:	Trees Hall, Room 125
Email:	KEM318@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** in the Lecture Syllabus.*

Week:	**Lab Content:**
1 (Jan 11 or Jan 13)	***no lab this week***
2 (Jan 18 or Jan 20)	***no lab this week***
3 (Jan 25 or Jan 27)	***no lab this week***
4 (Feb 1 or Feb 3)	Lab Introduction/Lab 1: Circulatory Response to Exercise
5 (Feb 8 or Feb 10)	Lab 1: Circulatory Response to Exercise (continued)
6 (Feb 15 or Feb 17)	Lab 2: Anaerobic Power Assessment; **lab report #1 due**
7 (Feb 22 or Feb 24)	Lab 2: Anaerobic Power Assessment (continued)
8 (Mar 1 or Mar 3)	Lab 3: Prediction of Peak Power Output; **lab report #2 due**
9 (Mar 8 or Mar 10)	***no lab this week** (spring break)*
10 (Mar 15 or Mar 17)	Lab 3: Prediction of Peak Power Output (continued)
11 (Mar 22 or Mar 24)	Lab 4: Respiratory Responses to Exercise; **lab report #3 due**
12 (Mar 29 or Mar 31)	Lab 4: Respiratory Responses to Exercise (continued)
13 (Apr 5 or Apr 7)	Lab 5: VO_{2max} Assessment; **lab report #4 due**
14 (Apr 12 or Apr 14)	Lab 5: VO_{2max} Assessment (continued)
15 (Apr 19 or Apr 21)	***no lab this week**;* **lab report #5 due**

LAB ATTENDANCE

Labs will only be offered in person; lab sessions will not be recorded via Zoom or be able to be viewed remotely. Students 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 masks, gloves (optional), disinfecting of all surfaces/supplies before and after use).*

LAB REPORT SUBMISSION AND GRADING

Five different labs will be completed as part of this course, and each lab will require a lab report to be written. *Each lab report should be should be submitted via Canvas as a Word document.*

Lab reports are due by the beginning of class 1 week after completion of each lab. Late submissions 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 20% of the total grade for HHD 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.

EXAMPLES:

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.

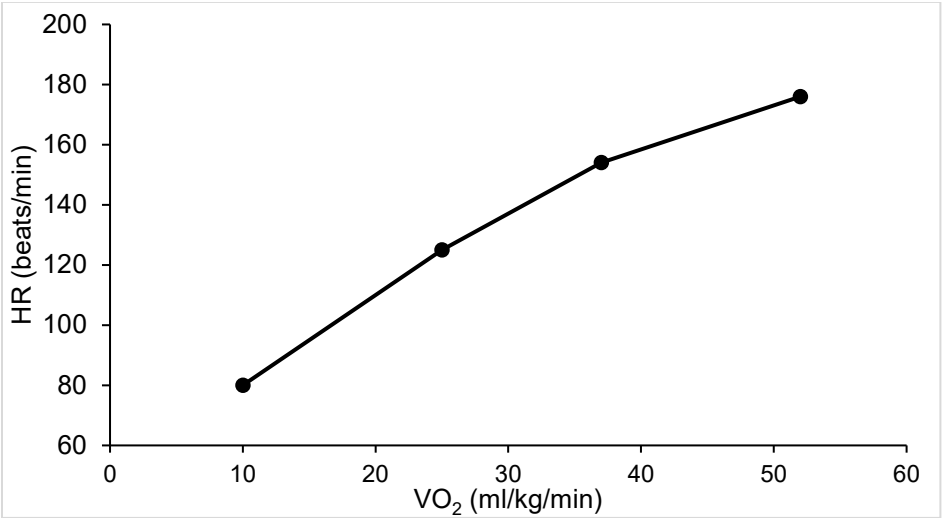

Figure 1. Heart rate response to graded treadmill exercise.