

**WAYNE STATE UNIVERSITY  
COLLEGE OF EDUCATION**

DIVISION: Kinesiology, Health and Sport Studies  
<http://www.kinesiology.wayne.edu>

PROGRAM AREA: Exercise and Sport Science

COURSE: KIN 3570 - Physiology of Exercise I

COURSE REF. NUMBER: 23100 (Lecture)  
23102 (Laboratory Section)

COURSE CREDIT: 3 Credits

SEMESTER/YEAR: Winter 2014

COURSE LOCATION/TIME: Lecture: Room 0540 APHS Bldg.  
Tuesday & Thursday: 10:40am-11:35am

Laboratory: 1225 APHS Bldg.  
Friday 10:40am - 12:30pm

INSTRUCTOR: Dr. Hermann-J. Engels

TEACHING ASSISTANT: Andrew Seaton ([dy4312@wayne.edu](mailto:dy4312@wayne.edu))

OFFICE ADDRESS: 2337 APHS Bldg.

OFFICE HOURS: Tuesdays & Thursdays: 8:30am - 10:30am  
Tuesdays: 3:00pm- 5:00pm  
and by appointment

OFFICE PHONE: (313) 577-5896

OFFICE E-MAIL: Hermann-J. Engels: [Engels@wayne.edu](mailto:Engels@wayne.edu)

COURSE DESCRIPTION: Basic physiological concepts as they relate to exercise and human performance. Practical applications incorporated into the laboratory component.

Prerequisite: Introductory Anatomy and Physiology (BIO 2870 or equivalent)

## COURSE OUTCOMES:

At the conclusion of the course the student will have an understanding of the:

1. field of exercise physiology and its place within the broader arenas of kinesiology and sports medicine.
2. cellular bioenergetic sources and pathways available to humans at rest and during various forms of exercise.
3. basic physiological responses during the recovery from exercise.
4. meaning of work, energy, and power and how to evaluate these characteristics in humans.
5. characteristics of the respiratory system and its responses to exercise, including alveolar and pulmonary ventilation.
6. basic components of the gas (O<sub>2</sub>, CO<sub>2</sub>) transport system.
7. cardiac and vascular responses to exercise, including blood pressure changes and blood flow redistribution during exercise.
8. structure and function of skeletal muscle, its relationship to human performance, and the nervous control of muscular activity.
9. general principles of physical training and the major physiological adaptations to training.
10. interaction between exercise, nutrition and weight control.
11. role of exercise and physical activity for fitness and health.
12. basic clinical and laboratory research techniques to evaluate human functional abilities, including cardiovascular and pulmonary characteristics, anaerobic and aerobic power, and body composition.
13. basic process and unique challenges of performing human experimental research in the area of exercise physiology.

REQUIRED TEXT: McArdle, W.D., Katch, F.I., & Katch, V.L. (2010). *Exercise Physiology. Energy, Nutrition, and Human Performance* (7<sup>th</sup> edition). Baltimore, MD: Lippincott, Williams & Williams.

## CLASS POLICIES:

This course uses a blend of instructional methods consisting of lecture and laboratory-based learning experiences. Students are expected to attend all lectures and laboratories regularly. At the discretion of the instructor, repeated late arrivals or leaving the classroom/laboratory early will result in a lowering of the course grade. All course-related laboratory sessions are conducted in a hands-on type learning atmosphere and require students to actively participate either as an experimental subject and/or a laboratory technician. Truncated PowerPoint presentation slides of lectures given and specific PDF handouts for the various exercise physiology laboratory sessions will be made available online for downloading through the Blackboard course website.

### Course Assignments:

It is recommended that students engage in self-directed readings of the appropriate pages in the accompanying course textbook to enhance the understanding of the exercise physiology concepts covered in the course. Students are also asked to purchase a 3-ring binder and to assemble the various PDF handouts made available online throughout the semester into an organized laboratory manual. Students are expected to complete all course work assignments indicated in the laboratory handouts as soon as the topic has been covered in the laboratory part of the class. This includes the necessary calculations, graphing of results, and answering of questions related to a given topic. It is mandatory that the laboratory manual is always kept up-to-date as it may be collected for review purposes anytime during the semester.

### Academic Dishonesty, Plagiarism and Cheating:

Academic misbehavior means any activity that tends to compromise the academic integrity of the institution or subvert the education process. All forms of academic misbehavior are prohibited at Wayne State University, as outlined in the Student Code of Conduct (<http://www.doso.wayne.edu/student-conduct-services.html>). Students who commit or assist in committing dishonest acts are subject to downgrading (to a failing grade for the test, paper, or other course-related activity in question, or for the entire course) and/or additional sanctions as described in the Student Code of Conduct.

- Cheating: Intentionally using or attempting to use, or intentionally providing or attempting to provide, unauthorized materials, information or assistance in any academic exercise. Examples include: (a) copying from another student's test paper; (b) allowing another student to copy from a test paper; (c) using unauthorized material such as a "cheat sheet" during an exam.
- Fabrication: Intentional and unauthorized falsification of any information or citation. Examples include: (a) citation of information not taken from the source indicated; (b) listing sources in a bibliography not used in a research paper.
- Plagiarism: To take and use another's words or ideas as one's own. Examples include: (a) failure to use appropriate referencing when using the words or ideas of other persons; (b) altering the language, paraphrasing, omitting, rearranging, or forming new combinations of words in an attempt to make the thoughts of another appear as your own.
- Other forms of academic misbehavior include, but are not limited to: (a) unauthorized use of resources, or any attempt to limit another student's access to educational resources, or any attempt to alter equipment so as to lead to an incorrect answer for subsequent users; (b) enlisting the assistance of a substitute in the taking of examinations; (c) violating course rules as defined in the course syllabus or other written information provided to the student; (d) selling, buying or stealing all or part of an un-administered test or answers to the test; (e) changing or altering a grade on a test or other academic grade records.

### Enrollment / Withdrawal Policy:

In the first two weeks of the (full) term, students can drop this class and receive 100% tuition and course fee cancellation. After the end of the second week there is no tuition or fee cancellation. Students who wish to withdraw from the class can initiate a withdrawal request on Pipeline. You will receive a transcript notation of WP (passing), WF (failing), or WN (no graded work) at the time of withdrawal. A WF grade will be awarded if the student is failing the course (based on work due to date) at the time the withdrawal is requested. A WN will be awarded if no materials have been submitted, and so there is no basis for a grade. The faculty member must approve the withdrawal request before it becomes final, and students should continue to attend class until they receive notification via email that the withdrawal has been approved.

Except for the medical withdrawal process, the last day to withdraw from the course will be the end of the 10<sup>th</sup> full week of classes (i.e., Saturday, March 22, 2014). Students enrolled in the 10th week and beyond will receive a grade. Because withdrawing from courses may have negative academic and financial consequences, students considering course withdrawal should make sure they fully understand all the consequences before taking this step. More information on this can be found at <http://reg.wayne.edu/students/information.php#dropping>

### Religious Observance Policy:

Because of the extraordinary variety of religious affiliations represented in the University student body and staff, the Wayne State University calendar makes no provision for religious holidays. It is University policy, however, to respect the faith and religious obligations of the individual. Students who find that their classes or examinations involve conflicts with their religious observances are expected to notify their instructors well in advance so that alternative arrangements as suitable as possible may be worked out.

### Attention Students with Disabilities:

If you have a documented disability that requires accommodations, you will need to register with Student Disability Services (SDS) for coordination of your academic accommodations. The SDS office is located at 1600 Adamany Undergraduate Library in the Student Academic Success Services department. SDS telephone number is 313-577-1851 or 313-202-4216 (Videophone use only). Once you have your accommodations in place, SDS staff will be glad to meet with you privately during office hours to discuss your special needs. Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at WSU. Please be aware that a delay in getting SDS accommodation letters for the current semester may hinder the availability or facilitation of those accommodations in a timely manner. Therefore, it is in your best interest to get your accommodation letters as early in the semester as possible.

Students who are registered with Student Disability Services and who are eligible for alternate testing accommodations such as extended test time and/or a distraction-reduced environment should present the required test permit to the professor at least one week in advance of the exam. Federal law requires that a student registered with SDS is entitled to the reasonable accommodations specified in the student's accommodation letter, which might include allowing the student to take the final exam on a day different than the rest of the class.

### Student Services

- The Academic Success Center (1600 Undergraduate Library) assists students with content in select courses and in strengthening study skills. Visit [www.success.wayne.edu](http://www.success.wayne.edu) for schedules and information on study skills workshops, tutoring and supplemental instruction (primarily in 1000 and 2000 level courses).
- The Writing Center is located on the 2nd floor of the Undergraduate Library and provides individual tutoring consultations free of charge. To obtain information on tutors, appointments, and the type of help they can provide for you, visit <http://clasweb.clas.wayne.edu/writing>.

### EVALUATION/ GRADING:

FINAL COURSE GRADES are determined from the student's performance in the following grading areas:

Grading Area	Possible Points	Percent of Total Grade
First Written Examination (sectional)	60	20%
Second Written Examination (sectional)	60	20%
Final Written Examination (cumulative)	90	30%
Active Laboratory Participation and Satisfactory Completion of Laboratory Exercises/Assignments	90	30%
Total	300	100%

Grades will be determined according to the following standard point system:

283 - 300 points = A	219 - 230 points = C
270 - 282 points = A-	210 - 218 points = C-
261 - 269 points = B+	201 - 209 points = D+
249 - 260 points = B	189 - 200 points = D
240 - 248 points = B-	180 - 188 points = D-
231 - 239 points = C+	less than 180 points = F

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LECTURE SCHEDULE

DATES	TOPIC
01/07-01/30	Introduction to Exercise Physiology Bioenergetics, Anaerobic and Aerobic Energy Pathways Recovery from Exercise Lactate Threshold, Respiratory Exchange Ratio Measurement of Energy, Work, and Power - Applications
Tuesday 02/04	*** FIRST WRITTEN EXAMINATION ***
02/06-03/04	Characteristics of the Respiratory System Alveolar and Pulmonary Ventilation, Gas Exchange and Transport Circulatory System and Exercise Cardiac Output, Blood Flow Distribution Electrocardiography, Blood Pressure Structure and Function of Skeletal Muscle Nervous Control of Muscular Activity
Thursday 03/06	*** SECOND WRITTEN EXAMINATION ***
03/10-03/14	University Closed - Spring Break
03/18-04/17	Prediction and Measurement of Human Work Capacity Design of Exercise Programs for Health and Fitness Body Composition Assessment Energy Balance, Weight Control Review for Cumulative Final Examination

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FINAL EXAMINATION - Wednesday, April 23<sup>th</sup> 2014, 10:40am - 1:10pm

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LABORATORY SCHEDULE

DATE	TOPIC	LAB #
01/10	Introduction to the Exercise Physiology Laboratory	1
01/17	Assessment of Anaerobic Power	2
01/24	Recovery Oxygen Consumption Oxygen Debt, Oxygen Deficit, EPOC	3
01/31	Selected Work Considerations	4
02/07	Examination of Pulmonary Function Characteristics	5
02/14	Resting Heart Rate and Blood Pressure Characteristics	6
02/21	Cardiovascular Adjustments to Acute Submaximal Exercise At Progressive Intensities and in the Recovery from Exercise	7
02/28	Muscular Functioning	8
03/07	Open Date	
03/14	University Closed – Spring Break	
03/21	Estimation of Aerobic Work Capacity Using Clinical Techniques Cycle Ergometry: Submaximal Exercise Heart Rate	10
03/28	Estimation of Aerobic Work Capacity Using Clinical Techniques Questionnaire Data and Post-Exercise Recovery Heart Rate	11
04/04	Skinfold Technique for the Evaluation of Body Composition	12
04/11	Body Composition Assessment using Hydrostatic Weighing	13
04/18	Integration and Review	14