
SYLLABUS: HDPE 545 - Graduate Exercise Physiology Fall Semester 2007

INSTRUCTOR: Dan Heil, Ph.D.
TELEPHONE: 994-6324
LAB PHONE: 994-6325

OFFICE: Romney 103
OFFICE HOURS: W 2-4, H 9-10:50 AM
E-Mail: dheil@montana.edu

PREREQUISITES: Students should have taken an undergraduate or graduate course in exercise physiology (e.g., HDPE 322 and HDPE 545, respectively), or by permission from the instructor.

MEETING TIMES:

Lecture: MWF 9:00-9:50 am, Romney Curriculum Lab (CL)

REQUIRED MATERIALS:

Articles: Copies of original research articles, research review articles, and several book chapters will be available on electronic reserve. **THESE MATERIALS WILL SERVE AS THE PRIMARY TEXT FOR THIS COURSE.** Hard copies are no longer available in the library.

Optional Text: *Exercise Physiology - Human Bioenergetics and its Applications* (4th Edition) by George A. Brooks, Thomas D. Fahey, and Kenneth M. Baldwin (2005). McGraw-Hill, San Francisco, CA.

**This text is available for purchase at the MSU Bookstore and is an EXCELLENT reference text, even if you already have an exercise physiology book.*

Additionally, any other exercise physiology text would be useful as a reference.

COURSE OBJECTIVES:

The objective of the first part of this course is to expand upon concepts commonly introduced in exercise physiology courses at the undergraduate level. Specifically, these concepts will be used to derive a generalized mechanistic model that explains the basis for maximizing human endurance performance. To achieve this goal, the instructor will rely heavily on readings from the current literature and participation from the students. The objective of the second part of this course is familiarize students with some of the physiology instrumentation in the Movement Science Laboratory. This will be followed up with a research project where students will write a research paper based upon data collected and analyzed in the lab (data will be collected as a group while the research papers will be written by student's separately).

ATTENDANCE POLICY:

Not attending class during student presentations will effect a student's grade in the following manner: **The highest letter grade a student can achieve will drop one letter grade for each unexcused absence after one (i.e. 2 absences and an 'A' drops to a 'B', 3 absences and an 'A' drops to a 'C',...).** After five unexcused absences the student will automatically fail the course regardless of their academic standing in the class.

ASSIGNMENTS:

Students will be given reading assignments from the articles available on electronic reserve. It is the student's responsibility to keep up with these assignments. If it becomes apparent that a majority of students are not reading the assignments, the instructor reserves the right to give scheduled AND unscheduled quizzes.

****ASSIGNMENTS WILL NOT BE ACCEPTED LATE****
****NO EXCEPTIONS****

GRADING POLICY: Grades will be computed as follows:

1. Unit Exams (count on 2 or 3)75%
2. Research Paper25%
<hr/>	
Total.....	100%

The percentage of points earned relative to the total possible points available will be used to compute grades at the end the semester according to the grading scale shown below:

90.0 - 100%	A
87.6 - 89.9%	B+
80.0 - 87.5%	B
77.6 - 79.9%	C+
70.0 - 77.5%	C
67.6 - 69.9%	D+
60.0 - 67.5%	D
<60.0	F

NOTE: Exams will be scheduled outside of normal lecture hours for a period of 2.0 hours. The exams are all essay and many student comments have led to this change in exam format. The exact time for each exam will be announced in lecture.

Unexcused makeup tests will NOT be given, so plan ahead!!! In the case of sickness, a doctor's note is necessary to excuse an extended absence. Students can receive an automatic "F" under the following conditions:

1. Student accumulates 5 or more unexcused absences.
2. Student does not turn in a final paper.
3. The student is found guilty of **academic misconduct**. Examples of such conduct are cheating, plagiarism or other breaches of academic integrity, such as fabrication, facilitating or aiding academic dishonesty, theft of instructional materials or tests, theft of laboratory equipment, alteration of grades or files, and forgery.

HDPE 545 Reading List

Review: Chapters 1-4 (Brooks, Fahey, and Baldwin - *Exercise Physiology*, 4th ed).

1. Introduction to the Generalized Endurance Performance Model

2. Modeling physical performance:

Electronic Reserve:

Olds (2001)
Craib et al. (1996)
Farrell et al. (1979)
Pate & Branch (1992)
Di Prampero et al. (1979)
Olds et al. (1995)
Heil (2005)

3. Efficiency or Economy - How to best describe human movement energetics:

Review: pgs. 54-58

Electronic Reserve:

Gaesser and Brooks (1975)
Cavanagh and Kram (1985)
Cavanagh and Kram (1985)
Morgan & Craib (1992)
Daniels and Daniels (1992)
Too (1988)
Too (1991)
Heil et al. (1995)
Heil et al. (1997)
Cavanagh and Williams (1992)

4. Defining the “effectiveness” of skeletal muscle contraction:

Review: Chapter 17.

Electronic Reserve:

Muscle Mechanics Handouts
Rassier et al. (1999)
Koh (1995)

5. Influence of carrying a weight on human movement energetics:

Electronic Reserve:

Taylor et al. (1980)
Rundell and Szmedra (1998)

6. Influence of flexibility on economy:

Review: pgs. 481-487

Electronic Reserve:

Craib et al. (1996)

7. Influence of muscular strength/power on economy:
Review: Chapters 19, 20.
Electronic Reserve:
 - Johnson et al. (1997)
 - Hoff et al. (1999)
 - Spurrs et al. (2003)

8. Factors determining maximal oxygen uptake ($\dot{V}O_{2MAX}$):
Review: Chapter 16.
Electronic Reserve:
 - Bassett and Howley (2000)
 - Berglund and Hemmingson (1987)
 - Stray-Gundersen et al. (2001)

9. Defining the lactate and ventilatory thresholds:
Review: pgs. 213-218, 226-234, 503-507.
Electronic Reserve:
 - Farrell et al. (1979)
 - Hagberg and Coyle (1983)
 - Powers et al. (1983)

10. Measures of power output as determinants of endurance performance:
Electronic Reserve:
 - Coyle et al. (1991)
 - Hawley and Noakes (1992)
 - Heil et al. (2001)
 - Heil et al. (2004)
 - Mahood et al. (2001)
 - Sharp et al. (1982)
 - Morgan et al. (1989)
 - Billat et al. (2003)

11. Body mass scaling and the generalized endurance model:
Electronic Reserve:
 - Heil et al. (2001)
 - Nevill et al. (2004)

12. Other issues...
 - Truemax 2400 Operators Guide

HDPE 545 - RESEARCH PAPER

In lieu of a final exam, students in HDPE 545 are responsible for writing a research paper that is related to some topic covered in lecture. Lab reports should be structured in the following manner (*page numbers are provided for reference and indicate a MINIMUM - NOT a maximum - requirement for each section*):

I. Introduction (1 page). This section should contain practical and theoretical background which is relevant to the topic evaluated in the lab. Somebody reading your paper (other than your professor) should be able to read your Introduction section and be completely briefed on the lab's background. The last paragraph of the introduction should contain a sentence describing the *purpose* of the lab. For example, "*Therefore, the purpose of this lab was to*".

II. Methodology (1-2 pages). This section describes how the tests were conducted. This should be separated into at least two separate sections entitled "**Procedures**" and "**Instrumentation**". Other section titles or subsection titles are also allowable. The Procedure section describes the how the tests were actually performed, what was measured, and how it was measured. In contrast, the Instrumentation section describes only the equipment that was used for testing. **DO NOT SIMPLY LIST THE EQUIPMENT, TELL ME HOW AND WHY IT WAS USED!**. Someone who has no knowledge of the test should be able to read the methodology section and replicate your experimental results.

III. Results (½-2 pages, not including tables & graphs). This section simply **describes the results** that were found from testing, as well as a detailed description of the subjects who were tested. The test results can be presented in tables, graphs, text format, or a combination of all of these. Computer generated graphs and tables are preferred, but neatly hand drawn tables and graphs will also be accepted. Tables and graphs used in the reported must be referred to in the text. **DO NOT EXPLAIN YOUR RESULTS - THIS SHOULD OCCUR IN THE NEXT SECTION!!!**

IV. Discussion (2-3 pages). This is where you **explain** your results. Did you observe what you expected? If not, why? Do the subject characteristics have anything to do with your observations? Were the results "normal" or "abnormal"? Your discussion should include a discussion of known or theoretical physiological mechanisms that are related to your observations. **Be sure to relate your findings to the original research articles that you found in your literature search.**

V. Conclusions (<1 page). The conclusions section should be a single paragraph that summarizes the entire paper.

VI. References (<1 page). References to the literature (original research articles only) should be included in this section that are used in the discussion. **YOUR PAPER NEEDS A MINIMUM OF FIVE (5) REFERENCES, 3 OF WHICH MUST NOT HAVE BEEN DISCUSSED IN CLASS.**

*****A photocopy of each reference cited should be included with each lab report when turned in. THIS IS MANDATORY!**

**Research Papers are due by 5:00 pm on Wednesday
December 12th, 2007**

MSSE Manuscript Format Guidelines

<These guidelines were copy-and-pasted below for your convenience>

Manuscript Requirements

The manuscript shall be formatted so that it is printed on one side; set in Times Roman font with 12-point font size; has margins of 1 in on top and bottom, 1.5 in on right & left; and is double-spaced throughout.

Order of Manuscript

An original investigation should contain the following items and satisfy the given specifications.

Title Page

1. Title of no more than 85 characters, including spaces. Do not use a complete sentence as a title.
2. Full names of the authors—Only those investigators who contributed substantially or who had a primary role in the research represented in the manuscript should be listed as authors. Manuscripts listing more than six (6) authors should provide justification. The Editor-in-Chief reserves the right to request that the author list be reduced.
3. Institutional affiliation of each author clearly identified
4. Corresponding author name, mailing address, telephone, fax, and e-mail information
5. Running title of no more than 45 characters, including spaces

Abstract

1. Limit of 275 words, including numbers, abbreviations, and symbols
2. Structure states purpose, methods, results, and conclusion

Key Words

1. Four (4) to six (6) words following the abstract
2. Should not repeat terms or phrases from the title

Introduction

1. State clearly the purpose and hypothesis of the study
2. Provide relevant references
3. Do not exhaustively review the subject

Methods

1. Present subject information
2. Describe the experimental subjects and their controls

3. Identify the methods, apparatus, and procedures employed with sufficient details to allow others to reproduce the results
4. Provide references for established methods and statistical procedures
5. Provide rationale for use and include a description of possible limitations for utilized methods not well known
6. Document statistical significance when appropriate and include detailed statistical analyses, mathematical derivation, or computer programs in an appendix
7. Spell out numbers below 10 and express numbers 10 and greater numerically when used in plain text.

Results

1. Present findings of the study in the text, tables, or figures. Be sure to include appropriate labeling of tables and figures along with figure captions and legends.
2. Do not include the same data in tables and figures

Discussion

1. Emphasize the original and important features of the study and avoid repeating all the data presented within the results section
2. Incorporate the significance of the findings and the relationship(s) and relevance to published observations
3. Provide only those conclusions that are supported by the study.

Acknowledgments

1. Identify funding sources
2. Identify external reviewers, if any
3. Current contact information of corresponding author
4. Contact for reprints, if any

References

The format for references is that which has been adopted by the United States National Library of Medicine and employed in Index Medicus. For those not included in Index Medicus, adhere to the form established by the American National Standard for Bibliographic References. References must be alphabetized, numbered, and cited in the text by numbers, rather than in the order of use. Examples of the types of references are as follows:

1. Books

- American College of Sports Medicine. Guidelines for Exercise Testing and Prescription. Philadelphia, PA: Lea and Febiger, 1986, pp. 158–161.
Paffenbarger, R. S., R. T. Hyde, and A. L. Wing. Physical activity and physical

- fitness as determinants of health and longevity. In: Exercise, Fitness, and Health. C. Bouchard, R. J. Shephard, T. Stephens, J. R. Sutton, and B. D. McPherson (Eds.) Champaign, IL: Human Kinetics, 1990, pp. 33–48.
2. Doctoral Dissertations—Crandall, Craig. Alterations in human baroreceptor reflex regulation of blood pressure following 15 days of simulated microgravity exposure. Doctoral Dissertation. University of North Texas HSC, Dept. of Physiology, Fort Worth, Texas, August 1993.
 3. Government Reports—U.S. Department of Health and Human Services. Healthy People 200: National Health and Disease Prevention Objectives (full report, with commentary). Washington, DC: Department of Health and Human Services, Publication 91:50212, 1991, pp. 91–125.
 4. Journal Articles—Blair, S. N., N. M. Ellsworth, W. L. Haskell, M. P. Stern, J. W. Farguhar, and P. D. Wood. Comparison of nutrient intake in middle-aged men and women runners and controls. *Med. Sci. Sports Exerc.* 12:310–315, 1981.
 5. Software Manuals—SAS Institute. SAS/STAT Software: The PHREG Procedure, Version 6. Cary, NC: SAS Institute Inc., 1991, pp 1054.
 6. Conference Proceedings: Conference proceedings can be used only if the publication has an ISBN or ISSN number. This information must accompany the reference—Matthie J. R., P. O. Withers, M.D. Van Loan, and P. L. Mayclin. Development of a commercial complex bio-impedance spectroscopic (CBIS) system for determining intracellular water (ICW) and extracellular water (ECW) volumes. In *Proceedings of the 8th International Conference on Electrical Bio-impedance*. Kuopio, Finland: University of Kuopio, Finland, ISBN:952-90-3999-9, pp. 203–205, 1992.
 7. Abstracts—An abstract can be cited when it is the only source of information.

Comment: Internet sources, Master of Science theses, personal communications, or other unpublished material *are not acceptable as references*. There should not be more than 30 references for original investigations. Review articles are limited to 50 references. All book references require page numbers. Examples to follow for corporate authors, chapters, editors, center publication, etc., can be observed in the *British Medical Journal* 1:1334–1336, 1978. Journal abbreviations should follow the abbreviations of Index Medicus published by the Library of Congress. Use of et al.—If fewer than seven authors are listed, all should be mentioned. When seven or more authors are named, list only the first three.

Figure Captions

1. Provide a caption for each figure
2. List captions together following references section

Technical Guidelines

Terminology and Units of Measurement

To promote consistency and clarity of communication and to avoid ambiguity, it is directed that authors use standard terms generally acceptable to the field of exercise science and sports medicine

The units of measurement shall be Système International d'Unités (SI). Permitted exceptions to SI are heart rate—beats per min; blood pressure—mm Hg; gas pressure—mm Hg. Authors should refer to the British Medical Journal 1:1334–1336, 1978) and the Annals of Internal Medicine (106:114–129, 1987) for the proper method to express other units or abbreviations. When expressing units, authors must locate the multiplication symbol midway between lines to avoid confusion with periods; e.g., ml·min⁻¹·kg⁻¹.

The basic and derived units most commonly used in reporting research in this Journal include the following:

mass—gram (g) or kilogram (kg); force—newton (N); distance—meter (m), kilometer (km); temperature—degree Celsius (°C); energy, heat, work—joule (J) or kilojoule (kJ); power—watt (W); torque—newton-meter (N·m); frequency—hertz (Hz); pressure—pascal (Pa); time—second (s), minute (min), hour (h); volume—liter (l), milliliter (ml); and amount of a particular substance—mole (mol), millimole (mmol). Selected conversion factors: 1 N = 0.102 kg (force); 1 J = 1 N·m = 0.000239 kcal = 0.102 kg·m; 1 kJ = 1000 N·m = 0.239 kcal = 102 kg·m; 1 W = 1 J·s⁻¹ = 6.118 kg·m·min⁻¹.

Formulas and Equations

Formulas and equations should be kept to a minimum and always presented in a single line. Presentation in the text as requires hand composition and adds an additional line of space. All unusual characters must be accompanied by a definition or explanation. The names of Greek letters should be written in the margin of the text.

Figures

Medicine & Science in Sports & Exercise® will accept either camera-ready art work and/or figures submitted on disk for manuscripts accepted for publication. Illustrations submitted on disk can be in Microsoft Word, Corel WordPerfect, Microsoft Excel, or Microsoft PowerPoint. Captions are required for all figures.

Tables

Tables must be typed single-spaced and should be designed to fit a one-column width (3¼ inches) or a two column width (7 inches).

Each table shall have a brief caption; explanatory matter should be in below the table. The table shall contain means and the units of variation (SD, SE, etc.) and must be free of nonsignificant decimal places.

Abbreviations used in tables must be consistent with those used in the text and figures. Definition symbols should be listed in the order of appearance, determined by reading horizontally across the table and should be identified by standard symbols.