

Winona State University
Department of Health, Exercise & Rehabilitative Sciences

Course Syllabus - HERS 380 Fall 2009
Laboratory Methods in Exercise Science (3 S.H.)
Oral Communications Flag

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Web address: <http://course1.winona.edu/danderson/HERS380.htm>

Textbook: Exercise Physiology Laboratory Manual, fifth edition, Gene M. Adams.

Prerequisites: HERS 235 Professional Issues in Exercise Science, HERS 340 Physiology of Exercise, STAT 110 or STAT 210

This course is a USP Oral Communications Flag course:

Such courses are required to meet the following outcomes:

- a. Earn significant course credit through extemporaneous oral presentations.
- b. Understand the features and types of speaking in their disciplines.
- c. Adapt their speaking to field-specific audiences.
- d. Receive appropriate feedback from teachers and peers, including suggestions for improvement.
- e. Make use of the technologies used for research and speaking in the field.
- f. Learn the conventions of evidence, format, usage, and documentation in their fields.

These letters are used in the course calendar, course objectives, and throughout the syllabus to indicate places in the class where these outcomes are met.

Catalog description

A series of experiments designed to achieve competency in research methods, procedures, and instruments typically used in human performance laboratories. Offered each semester.

Major Focus & Objectives:

The major focuses are on understanding various exercise physiological concepts through laboratory experimentation, interpretation, and application of the results. This will provide competency for techniques pertinent to a laboratory environment for the exercise science major.

Major Objectives:

- A. Understand the importance of essential information, requirements of an informed consent, and the ability to orally communicate with patients/subjects. **(outcomes b, c, e, f)**
- B. Demonstrate proper conduct working with patients/clients including professionalism, respect for privacy, and communications. **(outcomes a, b, c, d, f)**
- C. Be able to take basic measurements (height & weight), environmental measures, and check calibration of basic laboratory equipment.
- D. Be able to correctly identify stop test indicators & determine contraindications for exercise.
- E. Be able to provide basic information and procedures to patients/clients prior to performing exercise tests. **(outcomes a, b, c, d, e)**

- F. Be able to properly conduct and interpret data using anaerobic tests such as the isometric handgrip strength test **(outcomes a, b, c, d, e)**
- G. Be able to properly conduct and interpret data using aerobic test such as the Åstrand bike test and VO₂ max test. **(outcomes a, b, c, d, e)**
- H. Be able to properly measure and interpret data for resting and exercise blood pressures. **(outcomes a, b, c, d, e)**
- I. Be able to properly measure heart rate using palpatory, auscultatory, and telemetry methods. **(outcomes a, b, c, d, e)**
- J. Be able to estimate body composition using BMI, girth methods, skinfold methods, and hydrostatic weighing. **(outcome a, b, c, d, e)**
- K. Be able to write using proper scientific notation and language. **(outcomes b, c, d, e, f)**

Course outline

- I. Introduction to working with subjects
 - A. Informed Consent
 - 1. Essential information
 - 2. Format
 - B. Proper conduct
 - 1. Professionalism
 - 2. Respect for privacy
 - 3. Communication skills
- II. Basic measurements and calibration
 - A. Height and weight
 - B. Environmental measurements
 - 1. Temperature
 - 2. Barometric pressure
 - 3. Humidity
 - C. Calibration of bicycle ergometer
 - D. Calibration of treadmill
 - E. Calibration of calipers and dynamometers
- III. Anaerobic Tests
 - A. Basic information and guidelines
 - B. Isometric Handgrip Strength Test
 - 1. Proper procedures
 - 2. Interpretation of results
- IV. Blood Pressure
 - A. Basic information and guidelines
 - B. Resting measurement
 - 1. Proper procedures
 - 2. Interpretation of values
 - C. Exercise measurement
 - 1. Modifications of Technique
 - 2. Interpretation of values
 - 3. Contraindications
 - 4. Modes of exercise
 - a. Bicycle ergometer
 - b. Treadmill
- V. Aerobic Tests
 - A. Basic information and guidelines

- B. Åstrand bicycle test
 - 1. Proper procedures
 - 2. Interpretation of results
- C. VO₂max test
 - 1. Proper procedures
 - 2. Equipment
 - 3. Contraindications
 - 4. Interpretation of results
 - 5. Modes of exercise
 - a. Bicycle protocols
 - b. Treadmill protocols

VI. Body Composition Assessment

- A. Body Mass Index
 - 1. Equipment
 - 2. Proper measurements & calculation
 - 3. Interpretation
- B. Girth Methods
 - 1. Equipment
 - 2. Proper measurements & calculation
 - a. 1-Girth method
 - b. 2-3 Girth method
 - 3. Sources of error
 - 4. Interpretation
- C. Skinfold Methods
 - 1. Equipment
 - a. Caliper types
 - b. Accuracy
 - c. Price
 - 2. Proper measurements & calculation
 - a. Male appropriate methods-athletic and sedentary populations
 - b. Female appropriate methods-athletic and sedentary populations
 - 3. Sources of error
 - 4. Interpretation
- D. Hydrostatic Weighing
 - 1. Equipment
 - a. Types of systems
 - b. Accuracy
 - c. Price
 - 1. Proper measurements & calculation
 - 2. Sources of error
 - 3. Interpretation

Health, Exercise & Rehabilitative Science Athletic Training Major Competencies & Proficiencies

Nutritional Aspects of Injuries and Illnesses (NU)

In order to demonstrate knowledge of the practice of athletic training, to think critically about the practices involved in athletic training, including the ability to integrate knowledge, skill and behavior, and to assume professional responsibility, the entry-level certified athletic trainer must possess an understanding of the nutritional aspects of injuries and illnesses. The use of learning objectives and outcomes in the nutritional aspects of injuries and illnesses ensures that the student is able to:

Cognitive Competencies

18. Describe the principles and methods of body composition assessment (e.g., skinfold calipers, bioelectric impedance, body mass index [BMI]) to assess a patient's health status and to monitor progress in a weight loss or weight gain program for patients of all ages and in a variety of settings.

Psychomotor Competencies

1. Assess body composition by validated technique (e.g., skinfold calipers, bioelectric impedance, BMI, etc.) to assess a patient's health status and to monitor progress during a weight loss or weight gain program.

*What I hear, I forget;
What I see, I remember;
What I do, I understand.
-Chinese Proverb*

Date	Topic	Chapter, pages
Aug 24	Introduction to the course	Ch 1 pp. 1-8; Ch 2 pp. 10-17,
Aug 25	Professional conduct, Subject interview, Consent forms	p. 301
Aug 27	Basic measurements; Introduction to the stethoscope & heart rate	Ch 3 pp. 21-29; Figure 14.4; pp. 138-140, 198
Aug 31	Resting blood pressure-Basic information (lecture)	Ch 16 pp. 169-177
Sept 1-3	Resting blood pressure (lab) (b, c, d, e, f) Human Subjects Module Due 9/3	
Sept 7	No Class – Labor Day	
Sept 8	Laboratory Report Guidelines – print web page before class	
Sept 10	Isometric handgrip strength test (lecture & lab) (b, c, d, e, f)	Ch 5 pp. 46-50

Date	Topic	Chapter, pages
Sept 14	Calibration of equipment (lecture)	p. 24 Box 3.2, p. 136 Box 14.2
Sept 15-17	Calibration of bike or treadmill (lab) (b, c, d, e, f) Resting Blood Pressure Laboratory Due 9/ 15	
Sept 21	Exercise blood pressure-basic information (lecture) Calibration assignment Due 9/21	Ch 17 pp. 182-187
Sept 22-24	Exercise blood pressure (lab) (b, c, d, e, f) Isometric Handgrip Strength Laboratory Due 9/24	
Sept 28	Written Exam 1 – Through calibration	
Sept 29	Practical Exam 1 - Resting Blood Pressure (a, c, d, e)	
Oct 1	Practical Exam 1 - Resting Blood Pressure (a, c, d, e)	
Oct 5	Body composition- Skinfold introduction (lecture)	Ch 25 pp 271-278
Oct 6-8	Skinfold measurements (lab) (b, c, d, e, f) Exercise Blood Pressure Laboratory Due 10/8	
Oct 12	Body composition estimation methods (lecture) Practical Communication Evaluation 1 Due	Ch 23 pp. 254-256 Ch 24 pp. 260-267
Oct 13	Girth measurements, Body Mass Index, & Bod Pod (lab) (b, c, d, e, f) http://www.bodpod.com/products/overviewBodpod	
Oct 15	Hydrostatic Weighing (lab) (b, c, d, e, f)	Ch 26 pp. 283-293
Oct 19	Review Day	
Oct 20	University Improvement Day – No Class	
Oct 22	Practical Exam 2 – Body Composition (a, c, d, e)	
Oct 26	Written Exam 2 – through body composition	
Oct 27	Practical Exam 2 – Body Composition (a, c, d, e)	
Oct 29	Practical Exam 2 – Body Composition (a, c, d, e)	
Nov 2	Åstrand Bike Test-Basic Information (lecture)	Ch 14 pp. 135-144
Nov 3-5	Åstrand Bike Test (lab) (b, c, d, e, f) Body Composition Laboratory Due 11/3	
Nov 9	VO ₂ max Introduction (lecture) Practical Communication Evaluation 2 Due	Ch 15 pp 149-165
Nov 10-12	VO ₂ max- Bike (lab) (b, c, d, e, f) Åstrand Bike Test Laboratory Due 11/12	
Nov 16	VO ₂ max-treadmill information & data interpretation (lecture)	
Nov 17-19	VO ₂ max- Treadmill (lab) (b, c, d, e, f)	
Nov 23	Practical Final Review	
Nov 24	Practical Final (a, c, d, e) VO₂max Laboratory Due	
Nov 27	No Class- Thanksgiving Break	
Nov 30	Written Final Review	
Dec 1	Practical Final (a, c, d, e)	
Dec 3	Practical Final (a, c, d, e)	

Dec 10 Final Exam-10:30 am –12:30 pm

Grades:

Human Subjects Education Module	25 pts
Exam 1 (50 pts-Practical, 100 pts-Written)	150 pts
Practical Communication Evaluation 1	20 pts
Exam 2 (50 pts-Practical, 100 pts-Written)	150 pts
Practical Communication Evaluation 2	20 pts
Lab Assignments (3 @ 20 pts)	60 pts
Calibration Assignment	10 pts
Final Exam (50 pts-Practical, 100 pts-Written)	150 pts
Total points	585 pts

A 526-585 (90-100%), B 468-525(80-89%), C 409-467 (70-79%), D 351-409 (60-69%), F 0-350 (0-59%)

Course Policies

1. **Exams:** Unless otherwise announced, all exams will be closed book and will consist of material discussed in class and assigned in class.

2. **Make-up exams** may be granted only in the following instances.

- Extreme illness (your own). Let me know about your condition as soon as possible. We will arrange necessary make-up work as your good health returns.

- Emergencies (i.e., car accident, death in the family). Again, get in touch with me as soon as possible, and we'll make suitable arrangements.

- Excused absences (i.e., athletic events which are excused by university officials). Make-up work must be arranged and completed **in advance**.

3. **Office Hours:** These are times when you have the opportunity to meet with me outside of class to discuss problems, progress, etc. Please use them. Of course, if these times conflict with your other courses, then you may certainly make an appointment to see me.

4. **A Note about Study Habits:** A good rule of thumb is to spend 2-3 hours of study time for each hour of classtime. This time should be spent in diligent study. Keep a record of questions that arise in your studies and get them answered either by yourself, a fellow student, or by me. Studying with a friend or in a group can be a very positive thing. Of course, this is provided that all participants are contributing.

5. **Attendance:** Attendance is **required** in order to learn skills as well as to collect data necessary for laboratory assignments. All students are expected to be prepared for the class by reading the assigned material **prior** to class. It is also expected that all students that are physically capable of participating in testing do so, and that they will dress appropriately for the activities. Appropriate dress is t-shirt, short or sweat pants, and sneakers. You may want to bring a towel to some of the exercise lab periods.

6. **Academic Integrity:**

At WSU, academic integrity is based on honesty. The University community requires that work produced by students in the course of their studies represents their personal efforts and requires that students properly acknowledge the intellectual contributions of others. (WSU 2008-20010 Undergraduate Catalog, p.27)

Policy violation examples (cheating, deception and misrepresentation, enabling academic dishonesty, fabrication, multiple submission, and plagiarism) may be found on page 27 of the WSU 2008-20010 Undergraduate Catalog.

Due process is explained on p. 28 of the WSU 2008-20010 Undergraduate Catalog. I highly recommend reading this section!

<http://www.winona.edu/coursecatalog/AcademicPolicies.asp>