

Department of: Health and Leisure **Course No.** HL 531

Title of Course: Advanced Exercise Testing **New:** X

- I. Catalog Description and Credit Hours:** Development of knowledge and skills necessary to conduct exercise tests in clinical settings. 2-hours lecture, 2-hours lab. (3 credit hours)
- II. Prerequisites:** HL 431 or HL 601 or consent of instructor
- III. Course Objectives:** Upon completion of the course the student will be able to:
- A. Demonstrate the ability to describe abnormal cardiorespiratory, hemodynamic, and metabolic responses to exercise testing.
 - B. Describe the differences in the physiological responses to various modes of ergometry.
 - C. Demonstrate the knowledge and skills necessary for interpreting medical history and physical examination results as they relate to exercise testing, including the potential effects of medications on test results.
 - D. Demonstrate the knowledge and skills necessary to conduct pretest procedures (i.e., calibration, resting measures, explanation of test procedures, scales, etc.).
 - E. Demonstrate the knowledge and skills necessary for administering an exercise test, including selection of appropriate protocol, termination criteria, and post-test procedures.
 - F. Demonstrate the knowledge and skills necessary for administering an exercise test for individuals with special considerations including adaptation of modes and protocols for individuals of varying stature, body type, disability, and fitness level.
 - G. Demonstrate the knowledge and skills necessary to monitor and interpret an electrocardiograph before, during, and after an exercise test.
 - H. Respond with appropriate emergency procedures to situations that may arise before, during, and after administration of an exercise test.
 - I. Identify biomechanical factors associated with various disease states, neuromuscular disorders, and orthopedic limitations as they relate to exercise testing.
- IV. Expectations of Students:** Each student will:
- A. Successfully complete all written examinations
 - B. Successfully complete all laboratory assignments and case studies
 - C. Demonstrate skills in an appropriate and timely manner at the request of the instructor during a practical examination
 - D. Participate as subjects during testing laboratories. Students will complete health history questionnaires and informed consent forms. Any student who is not classified as being at low risk will not be required to participate as a subject.¹

¹ The risk classification scheme to be used and the accompanying term 'at low-risk' is defined by the American College of Sports Medicine. The low-risk classification includes males younger than 45 years of age or females younger than 55 years, who demonstrate no symptoms for cardiovascular disease and have no more than one risk factor. All students are expected to participate; however, pursuant to the standard informed consent form used in the Exercise Physiology Laboratory at Southeast Missouri State University, participation is voluntary. Also, pursuant to the informed consent form the student will not be discriminated against due to their refusal to participate as subjects.

V. Course Content:	<u>Hours</u>
A. An overview of exercise testing and interpretation	1
1. Physiological measures	
2. Normal responses to incremental work	
3. Factors limiting exercise	
B. Measurements	17
1. Equipment calibration	
2. Electrocardiogram	
3. Analysis of expired gases	
a. Maximal oxygen consumption and peak oxygen consumption	
4. Oxygen consumption and work	
5. Cardiac output	
6. Oxygen pulse and stroke volume	
7. Blood pressure	
8. Ventilation-Perfusion Ratio	
9. Acid-base balance	
10. Laboratory	
C. Disorders limiting exercise	5
1. Heart diseases	
2. Pulmonary vascular diseases	
3. Ventilatory disorders	
4. Hemoglobin content and quality	
5. Chronic metabolic acidosis	
6. Muscle disorders and endocrine abnormalities	
D. Clinical exercise testing	25
1. Testing area and equipment	
2. Preparation	
3. Performing the exercise test	
a. Mode	
b. Protocol	
c. Symptom-limited maximum	
4. Test termination	
a. Normal and abnormal end-points	
b. Emergency action plan	
5. Preparing a report	
6. Laboratory	

- E. Interpretation 12
1. Normal cardiopulmonary responses to exercise testing
 2. Introduction to the flow chart approach to exercise test interpretation
 3. Pathophysiological responses in common disorders
 4. Grading severity of heart disease
 5. Diagnoses, evaluations, and estimates possible from cardiopulmonary exercise testing data

Total: 60 Hours

VI. Textbook:

Wasserman, K., Hansen, J., Sue, D., Casaburi, R., and Whipp, B. (1999) *Principles of Exercise Testing and Interpretation* (3rd edition). Baltimore: Lippincott Williams & Wilkins.

Thaler, M. (1999) *The Only EKG Book You'll Ever Need* (3rd edition). Baltimore: Lippincott Williams & Wilkins.

VII. Basis for Student Evaluation:

Grading will be based on the following:

	Undergraduate	Graduate
Examinations: midterm & final	40%	30%
Laboratory Assignments	30%	30%
Case Studies	20%	20%
Other Written Assignments	10%*	20%

*Examples of other written assignments include but are not limited to research summaries, research papers, or identification and justification for a selected exercise protocol.

Graduate students will complete extra case studies and will present these case studies to the class. In addition, graduate students will complete two research summaries as they relate to course topics. Graduate students will be responsible for leading group activities in the laboratory.