PEP 476/508: EXERCISE TESTING AND INTERPRETATION

Division of Physical Performance and Development

Semester:	Spring 2006
Class Time/place:	MWF 10:00 - 10:50 am, Room B100
Instructor:	Suzanne Schneider, Ph.D.
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Graduate Assistant:	Young
Email:	sschneid@unm.edu
Office Hrs:	MWF 11:00 to 12:00, 1:00 to 2:00
	Other days/hrs available by appointment
Web Site:	www.unm.edu/~sschneid
Prerequisites:	PEP 326 (Ex Phys), PEP 470 (Designs), PEP 475 (EKG)

Course Description:
Exercise testing and interpretation is a vital component of the laboratory skills needed by an exercise physiologist. This course provides the academic information that is involved in exercise testing for healthy persons and for patients with known or suspected disease. Students will have the opportunity to learn and observe the basic components of exercise testing during a variety of exercise conditions. The course is designed primarily for students interested in a career in cardiac rehabilitation although other clinical conditions will be discussed as well. The testing guidelines and procedures will concur with those of the American College of Sports Medicine and the American Heart Association.

Rationale:
The employment of exercise physiologists who possess an undergraduate or Masters degree in Exercise Science occurs primarily in the fitness or a clinical exercise laboratory setting. These employment opportunities are based on the need to conduct exercise tests in "apparently healthy" or "at risk" individuals. To do this task correctly and safely, the student is required to have extensive practice in exercise testing, know the correct procedures to follow, and how to correctly interpret the results of these tests. This course is closely associated with the College of Education Mission in "the study and practice of education through teaching, research, and service." It is the goal of the Exercise Science Program and College of Education to "prepare students for participation in a complex and challenging society." The mission of the college of education is posted at www.unm.edu/~educ/mission.htm.

Course Objectives:
To acquire:

1. Knowledge of the theories behind exercise testing
2. Knowledge of the guidelines provided by the American College of Sports Medicine and the American Heart Association for exercise testing
3. Competencies in administering submaximal and maximal exercise tests using appropriate exercise modes in various cardiovascular disease populations

Instructional Format
Three 50-minute sessions/week consisting of lecture instruction, laboratories, or demonstrations using various multimedia (CD-ROM, software, overhead, etc.) outlets. The laboratory experiences and case studies allow students the opportunity to incorporate the theoretical

information into practical application. Guest lecturers may be invited to share clinical experiences. Quizzes may be given at the beginning or end of the class to reinforce course material. Case studies and EKG strips will be given for practice outside of class.

Texts (required):
Ellestad, M.H. ***Stress Testing: Principles and Practice.*** Edition 5. Oxford University Press, New York, 2003. (You may use Edition 4, it is much cheaper but pages will not correspond with class assignments).

American Heart Association. ***Handbook of Emergency Cardiovascular Care. 2002, Pocket guide. Newer edition is out. Can use the older edition.***

Huff, J. ***ECG Workout.*** 4th Edition. Lippincott, 2002.

Recommended Text:
ACSM. ***ACSM's Guidelines For Exercise Testing and Prescription. (7th ed).*** Williams & Wilkins, 2006.

Other Useful Texts:
American Heart Association. ***Guidelines 2004 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.*** ISBN 0-87493-325-0. (Can use 2000 or 2004 edition available in Medical Bookstore).

Robergs R.A. and S.O. Roberts. ***Exercise Physiology: Exercise, Performance and Clinical Applications.*** McGraw Hill, Inc., St. Louis, 1997.

Roberts S., R.A. Robergs and P. Hansen. ***Clinical Exercise Testing and Prescription: Theory and Application.*** CRC Press, 1997.

Nieman D.C. ***Exercise Testing and Prescription: A Health-Related Approach (5th ed.).*** Mayfield Publishing Company, Mountain View, CA, 2003.

Grading:

97 - 100	A+	73 - < 77	C
93 - < 97	A	70 - < 73	C-
90 - < 93	A-	67 - < 70	D+
87 - < 90	B+	63 - < 67	D
83 - < 87	B	60 - < 62	D-
80 - < 83	B-	< 60	F
77 - < 80	C+		

Evaluation:

Group Projects	30 pts (15 pts each for Part I and Part II)
Exam 1	20 pts
Exam 2	20 pts
Exam 3	20 pts
Labs (3)	5 pts each
Participation	5 pts

No make-ups on exams, assignments, or projects without written medical (or similar) excuse. Assignments and projects are due on the date specified. If late, points are deducted.

Group Projects and extra-credit option:

Group Project, Part 1: Students will self-select into groups of 3 or 4. Depending on the number of graduate students, one graduate student will serve as leader for each group. Each group should choose one student to be the "patient" who will be screened for occult cardiovascular disease. The group should select the most appropriate testing modality and protocol, and perform a stress test complete with EKG monitoring and metabolic gas analysis measurements. The pre-exercise screening should include a medical history, cardiovascular risk assessment, consent form, PAR-Q, and resting heart rate and blood pressure. Exercise measurements should include heart rate, blood pressure, pulse oximetry, oxygen consumption and EKG. Exercise interpretation should include VO_2max measurement or prediction (depending on cardiovascular risk factors and subject preference), anaerobic threshold, and EKG evaluation for rate, rhythm, conductance disturbances and ST segment changes. The results should be presented in a clinical report format, which includes all results, a description and rationale for the testing protocol used, and an interpretation of the findings. Part I is due before Spring Break. Explain the role of each person involved in this project.

Group Project, Part II: Each group (groups of 3-4 students) should choose a hypothetical subject from a special patient population, e.g., elderly woman with osteoporosis, middle-aged man recovering from a myocardial infarction, obese child, stroke victim, spinal cord-injured patient, elderly man with severe arthritis, young black athlete with hypertension, young female with exercise-induced asthma, cardiac transplant patient, patient with a pacemaker, etc. (The populations should be cleared with me first so there are no duplications among groups). Each group should prepare a written report (5-10 pages double-spaced) and an oral presentation (10-min, power point) with the following format:

1. Background information on the disease: how common is it, what are the physical changes associated with the disease, and what are the health implications?
2. Background information on how this disease might affect your ability to conduct and interprete the results from an exercise test- how might their response differ from a person of similar age/gender.
3. Background information on why it might be particularly good or bad, for this person to participate in a frequent exercise prescription. (e.g., mild aerobic exercise might reduce blood pressure in mild hypertensives).
4. Testing Method: design a stress testing protocol for your patient. Include rationale for your selection of mode, progression, measurements, termination criteria, and special things to watch out for during the exercise test.
5. Exercise Prescription: design an exercise prescription for your patient; explain your rationale?
6. Explain the role of each person involved in this project

Use all the resources you can muster to complete this assignment- literature review, interview physicians, interview patients with the disease, use your experiences from student internships, and direct experimentation (within limits!!).

Written reports for Part II are due at the last class session and oral presentations will be given during the final two weeks of the class. Topics should be cleared with me before Spring Break.

Special Needs: Qualified students with special needs should see me as soon as possible.

Professional Courtesy: Please make sure you turn off all cellular phones and audio-activated pagers in class. Students are expected to be on time for class and stay till the end of class.

Academic Integrity: Academic dishonesty defined from the UNM Student Code of Conduct: "dishonesty in quizzes, tests or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or other professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records." The Exercise Science faculty supports the importance of academic integrity. A student violating academic dishonesty guidelines will receive an "F" for the course. A second violation will result in the student being withdrawn from the Exercise Science program.

Class Participation: Class participation or involvement in other aspects of the class (lab experiences, etc.) by students is considered to be an integral part of this course and essential for learning.

Consultation: If you have questions, or need help, please see me ***promptly!*** I am available to discuss class lecture material, other aspects of the class, or to simply chat about life! Please don't wait until it is too late to get clarification or help.

PEP 476/508: Exercise Testing and Interpretation
***Tentative* Course Schedule**

Week	Date	Topic	Readings
1	1/18	Course introduction / History of stress testing	Chapt 1
	1/20	Normal exercise EKG response	Chapt 12 (190-191) Huff, (rev chapt 1-5)
2	1/23	Abnormal exercise EKG response	Chapt 12 (192-207; 215-219; (234-235) Huff, pg 20
	1/25	EKG lab	Lab 1
	1/27	lab discussion	
3	1/30	Physiology of cardiac ischemia	Chapt 3 (43-53: 64-73)
	2/1	Ischemia w/o CAD/silent ischemia	Chap 17, 19
	2/3	Normal cardiovascular response to exercise	Chapt 2
4	2/6	Indications of cardiovascular disease	Chapt 4 Chapt 6 (111-123)
	2/8	Metabolic Lab	Lab 2
	2/10	Lab discussion	
5	2/13	Contra-indications of exercise testing	Chapt 5 ACSM guidelines
	2/15	Case study/Exam review	
	2/17	**Exam 1**	
6	2/20	Clinical Stress testing	Chapt 8
	2/22	Predictive implications of exercise testing	Chapt 14 (271-277)
	2/24	Guest lecture?	
7	2/27	Blood pressure during exercise	Chapt 18
	3/1	Blood pressure lab	Lab 3
	3/3	lab discussion	
8	3/6	Anti-arrhythmic drugs	Chapt 23 (490-491), AHA
	3/8	Other drugs	Chapt 23 (492-506), AHA
	3/10	Drug review (videos)	
9		***SPRING BREAK-No Classes 3/13-17***	
		Group Project Part I is due! ***Group Project Pt II topic is due***	
10	3/20	Bradyarrythmias	Chapt 13 (254-268), Huff (Chapt 8) AHA
	3/22	Tachycardias	

			Chapt 13 (241-254), Huff (Chapt 9), AHA
	3/24	Asystole, Pulseless electrical activity	AHA
11	3/27	Skills practice	rev Huff EKGs
	3/29	Case studies/review	
	3/30	**Exam 2**	
12	4/3	Exercise and pulmonary disease	
	4/5	Metabolic abnormalities and exercise	Chapt 23 (481-490)
	4/7	Exercise and peripheral vascular diseases	
13	4/10	Exercise in other special populations	Huff, Chapt 10
	4/12	Cardiac rehabilitation	Chapt 20 (377-379) ACSM
	4/14	Guest lecture?	
14	4/17	Stress testing in children	Chapt. 21(381-406)
	4/19	Stress testing in women	Chapt 15
	4/21	Stress testing in athletes	Chapt 20 (367-377)
15	4/24	Echocardiography	Chapt 7
	4/26	Radionuclide stress testing	Chapt 21 (413-428)
	4/28	Team Presentations	
16	5/1	Team Presentations	
	5/3	Team Presentations	
	5/5	Review/***Group Project Pt II written report is due!***	

Final Exam: Monday, May 8th, 10-12.

Reading Assignments:

For Ellestad:
Undergrads: only responsible for reading the assigned pages
Grads: read the whole chapters to see how much you can understand

Additional Assignment:
It is expected that all students in this class will have current CPR certification with AED familiarization. A special class session will be arranged for those who need training.