

Cardiovascular Testing and Exercise Prescription – KINS 153

Semester: Fall 2007

Lecture Day & Time: M-W 1:00 –1:50 PM Room: SLN 2002

Laboratory Day & Time: M 2:30 – 5:00 PM: W 2:30 – 5:00 PM: T 2:45pm – 5:15pm Room: SLN 2022

Units: 3

Instructor: Roberto Quintana

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Office Hours: Tues 11:45-2:45 pm or by appointment

Office: SLN 2014

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Prerequisite: Physiology of Exercise – KINS 152

Course Description: This course is designed to develop the necessary skills and knowledge to develop a program of exercise testing and exercise prescription for healthy and diseased populations (children, elderly, pregnant women, and patients w/ cardiac disease, diabetes, hypertension, obesity, pulmonary disease, and PVD). The focus of this course will be to prepare exercise science students for the Health Fitness Instructor™ and Exercise Specialist™ certifications administered by American College of Sports Medicine.

Required Texts:

- 1) Shade, B. Fast & Easy ECGs: A Self-Paced Learning Program. McGraw Hill, St Louis, Mo, 2007.
- 2) American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription, 7th Edition. Lippincott, William & Wilkins, Baltimore, MD, 2005.
- 3) Heyward, V. Advanced Fitness Assessment & Exercise Prescription 5th Edition. Human Kinetics, Champaign, IL, 2006.

Recommended Texts:

- 1) American College of Sports Medicine. ACSM's Resource Manual for Guidelines for Exercise Testing & Prescription, 5th Edition. Williams and Wilkins, Baltimore, MD, 2005.
- 2) American College of Sports Medicine. ACSM's Certification Review Manual. Lippincott Williams & Wilkins, Baltimore, MD, 2005.
- 3) Costill, D.L. & Wilmore, J.H. Physiology of Sport & Exercise, 3rd Edition. Human Kinetics, Champaign, IL, 2004.

Additional Required Materials: Spirometry Filter (Bookstore – Merchandise Section), Blood Pressure Cuff & Stethoscope, ECG Caliper, Clear Metric Ruler, Calculator (not your cell phone), & Exercise Clothes

Course Objectives*:

- 1) An understanding of **anatomy** and **physiology** of the **human body** in response to both **acute and chronic exercise**.
- 2) **Physiological differences** between **genders and normal physiologic changes** associated with **aging**.
- 3) **Pathophysiology** of common **chronic diseases** (cardiac disease, diabetes, hypertension, obesity, pulmonary disease, and PVD).
- 4) An understanding of **electrocardiography** (EKG) and its application in exercise testing.

- 5) To be able to recognize with EKG: **normal sinus rhythm, arrhythmias, chamber enlargement, intraventricular conduction defects, myocardial ischemia and infarction.**
- 6) Knowledge of **health appraisal, risk assessment, and safety of exercise** for both **healthy individuals** and **special populations** (children, elderly, pregnant women, and patients w/ cardiac disease, diabetes, hypertension, obesity, pulmonary disease, and PVD).
- 7) An understanding of **exercise testing and exercise prescription** in the **fitness and clinical settings** with regard to **professional standards and criteria** (American College of Sports Medicine, American College of Physicians, American Association of Cardiovascular and Pulmonary Rehabilitation, American Heart Association, and Centers for Disease Control).
- 8) Demonstrate necessary skills to perform the following: **exercise tests for strength, power, and cardiovascular endurance and capacity** for both **healthy individuals** and **special populations** (children, elderly, pregnant women, and patients w/ cardiac disease, diabetes, hypertension, obesity, pulmonary disease, and PVD).
- 9) Demonstrate the skills needed for **blood pressure monitoring, and body composition, flexibility, and pulmonary function testing.**
- 10) **Exercise prescription and programming** for both **healthy individuals** and **special populations** (children, elderly, pregnant women, and patients w/ cardiac disease, diabetes, hypertension, obesity, pulmonary disease, and PVD).

***A summary of these objectives is found in ACSM's Guidelines for Exercise Testing and Prescription, 7th Edition, Appendix F, under certification requirements for Health Fitness Instructor™ and Exercise Specialist™.**

Evaluation:**

| | | |
|--|------------------------|-------|
| 1) Lecture Grade: | 2 ECG Exams x 50 pts | = 100 |
| | 2 ACSM Exams x 100 pts | = 200 |
| 2) Laboratory Grade*: | 8 Reports x 10 pts | = 80 |
| | 2 Lab Exams x 35pts | = 70 |
| | Client Lab Report | = 30 |
| 3) Class attendance, tardiness, quizzes, & participation | | = 20 |
| 4) Total Points | | = 500 |

Participation and Due Dates for Assignments/Exams

All students are required to participate in class discussions and laboratories. **Practice online ECG questions** are assigned each week for the first half of the semester. **Exam dates will be announced in class at least week and half before the tests therefore it is the responsibility of the students to be aware of this information.** **Missed exams or quizzes or assignments cannot be made up.** The only exceptions to these rules must be made in person by office appointment prior to test/quiz date.

Cheating Policy

If a student is caught cheating or attempting to cheat they will automatically receive an “F” for the class and be reported to CSUS Administration for disciplinary action. This includes having similar answers, cheat sheets,

peering, talking, and holding up exams or any other behavior which facilitates cheating. No calculators or phones or scanners/cameras are allowed during the exams.

Grading

A > 90 B > 80 C > 70 D > 60 F < 60

Plus or minus grades will be assigned. Grades may be adjusted if the class average falls below 75%.

Tentative Lecture\Laboratory Timetable**:

| <u>Week:</u> | <u>Topic</u> | <u>Chapter Assignment</u> |
|--------------|---|--|
| 1 | Introduction, Cardiovascular Anatomy and Physiology | ECG Ch 1 & 2 |
| 2 | ECG Basic Electrophysiology Lab 1: ACSM Risk Stratification, BP, + Pretest Clinical | ECG Ch 2 & 3 ACSM Ch 1-3 AFA Ch 1, 2 & A |
| 3 | ECG Basic Components Lab 2: Circum., Skinfold & Hydrostatic Weighing | ECG Ch 4, 5, 6, 7 ASCM Ch 4 AFA Ch 8-9, D, & E |
| 4 | ECG Sinus & Atrial Dysrhythmias ECG MIDTERM I Lab 3: Submax Exercise Testing + Metabolic Calculations Exercise Prescription | ECG Ch 8 & 9 ECG Ch 1-7 ACSM Ch 4, 7, D AFA 3, 4, 5, & B |
| 5 | ECG Junctional + Ventricular Rhythms Lab: ACSM Practical Exam ACSM MIDTERM I | ECG Ch 10-11 ACSM Ch 1-4, 7, D AFA 1-5, 8-9, B, D, & E <i>ACSM CR Ch 4, 6, 8, 9, 11, A</i> ACSM Ch 1-4, 7, D AFA 1-5, 8-9, B, D, & E <i>ACSM CR Ch 4, 6, 8, 9, 11, A</i> |
| 6 | ECG AV Blocks & Electrical Axis Lab 4: Clinical Pre-exercise Evaluation (Risk Strat + PFT) | ECG Ch 12-13 ACSM Ch 2-3 |
| 7 | ECG 12 Lead – Hypertrophy, BBB & Preexcite Lab 5: EKG GXT Stress Test | ECG Ch 14 ECG pages 61-71 ASCM Ch 5-6 |
| 8 | ECG 12 Lead – Myocardial Ischemia & Infarction Lab 6: Interpretation of Clinical Exercise Test + Ex Rx | ECG Ch 15 ACSM Ch 6 + 8 |
| 9 | ECG MIDTERM II Lab 7: Human Performance Testing – VThreshold / Lactate Thresh | ECG Ch 8-15 |
| 10 | ACSM Cardiac Patients and Exercise Laboratory 8: Altitude & Exercise or Prolonged Exercise Physiology | ACSM Ch 8 |
| 11 | ACSM Special Populations Lab: Exercise Test Practicum | ACSM Ch 9 |

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|----|--|--|
| 12 | ACSM Special Populations Lab: Exercise Test Practicum + Report DUE | ACSM Ch. 9 |
| 13 | ACSM Special Populations Lab: Exercise Test Practicum + Report DUE | ACSM Ch 9 |
| 14 | ACSM Elderly Patients and Children Lab: Exercise Test Practicum + Report DUE | ACSM Ch. 10 |
| 15 | Review and Catch Up!!!!!!!!!!!!!!!!!!!! Lab: Exercise Test Report DUE | |
| 16 | Finals Week ACSM MIDTERM II (last 75 min of final exam period) | ACSM Ch 5-10 <i>ACSM CR 4, 8, 12</i> |

****All Provisions in this syllabus are subject to revision. Any revisions will be announced in class. All such announcements shall constitute adequate notification to all class members whether present or not. It is the responsibility of the student to remain apprised of all class matters.**

Laboratory Guidelines

The laboratory portion of this class is a valuable tool in giving you a “hands on” approach to learning some of the concepts presented in class. **Participation in the labs is a must so bring appropriate exercise clothing to all labs. *If a student misses more than 1 lab they will have their overall lab grade deducted a letter grade per each additional absence. Quizzes are given each laboratory covering ACSM material except for the weeks of the exams.**

Laboratory Report

The laboratory assignments should be concise and be no longer than 2-3 written pages not including tables, graphs, or appendix. Laboratory assignments should be written using a word processor program and be written scientifically – concise, in third person, and past tense (make sure your writing is clear and logical). If you have trouble writing in this format please take advantage of the **CSUS Writing Center** at 278-6356 Calveras Hall - Room 128 or <http://www.csus.edu/writingcenter>. All laboratory assignments are **due** at the **beginning** of the next schedule laboratory and must include the following:

- A) **Introduction (0.5 point)** - all the required information for this section must be included to receive credit
Title of Experiment/Lab:
Your Name:
Names of those in your group:
Lab section:
Date:
Purpose: Summary of the objectives of the laboratory assignment in your own words.
- B) **Methods (0.5 points)** - all the required information for this section must be included to receive credit
Subject Characteristics: a) name

- b) age
- c) height
- d) weight
- e) activity/fitness level
- f) ethnicity (if necessary for calculations)

Environmental Conditions:

- a) barometric pressure
- b) temperature
- c) relative humidity

Procedures: If you attach a copy of the lab handout you may just write, “As stated in lab handout”. *If there is a modification to the laboratory procedures, state what was changed and give a rationale for it.*

C) Data Analysis & Results (4 points)

This is where you will include answers to all calculations from the lab. The **answers/results must be in table/graph format**. If you have trouble making tables or graphs on the computer, please see us for a quick tutorial on how to make table or graphs on Excel. Each table or figure must have a **caption** explaining the table or figure. All values/x-y axis should have **labels** as to what they are and **units** for **full credit**.

D) Discussion (5 points)

In this section, list and answer the questions for the laboratory. All **answers** to the discussion questions must be correct and answered in 3 to 4 **complete sentences to receive full credit**. Also, any **symbols or equations** used in your answer must be **explained and defined**.

E) Appendix (must be attached to be graded)

This is where you will attach worksheets, calculations pages, lab handouts, and extra credit articles (1 pt per lab maximum)

Practicum

Each student is required to demonstrate knowledge and skills in physical fitness/cardiorespiratory testing and exercise prescription. As part of your culminating experience you will take part in two exams. One testing the skills needed for the ACSM Health Fitness Instructor Certification and the other an exam of GXT clinical skills. This latter exam *you will be* evaluating a client comprehensively in our human performance laboratory. The client must be under the age 45 for men and 55 for women, medically cleared for exercise testing, and sign an informed consent. There will be a \$25.00 client fee for the blood chemistry + lab supplies payable to CSUS SHAPE. The practicum will be divided into 2 parts, the laboratory exam and the client report. The practicum will be evaluated against ACSM recommendations for exercise testing and prescription.

A copy of your client report, *Health and Fitness Assessment with Exercise Prescription*, must be turned in one week after your client’s laboratory test. Again please take advantage of the **CSUS Writing Center** at 278-6356 Calveras Hall - Room 128 or <http://www.csus.edu/writingcenter> if you have difficulty writing at the college level.

Reference List of Selected Cardiovascular Testing and Exercise Prescription Material

- 1) Scheidt, S. and Netter, F.H. Interactive Electrocardiography (CD ROM). Novartis Medical Education, Summitt, New Jersey, 1997. (HPRL Computer Lab)
- 2) American College of Sports Medicine. ACSM's Guidelines for Exercise Testing and Prescription, 6th Edition. Williams and Wilkins, Baltimore, MD, 2000.
- 3) American College of Sports Medicine. ACSM's Resource Manual for Guidelines for Exercise Testing and Prescription, 4th Edition. Williams and Wilkins, Baltimore, MD, 2001.
- 4) American College of Sports Medicine. ACSM's Health and Fitness Certification Review. Williams and Wilkins, Baltimore, MD, 2002.
- 5) American College of Sports Medicine. ACSM's Clinical Certification Review. Williams and Wilkins, Baltimore, MD, 2002.
- 6) Powers, S.K., and Howley, E.T. Exercise Physiology Theory and Application to Fitness and Sport, 4th Edition. McGraw-Hill, Boston, MA, 2001.
- 7) Guyton, A.C. and Hall, J.E. Textbook of Medical Physiology, 10th Edition. W.B. Saunders, Philadelphia, PA, 2001.
- 8) Pollock, M.L. and Wilmore, J.H. Exercise in Health and Disease: Evaluation and Prescription for Prevention and Rehabilitation, 2nd Edition. WB Saunders, Philadelphia, PA, 1990.
- 9) Taber's Cyclopedic Medical Dictionary, 19th Edition. F.A. Davis Company, Philadelphia, PA, 2001.
- 10) Heyward, V. Advanced Fitness Assessment and Exercise Prescription, 3rd Edition. Human Kinetics, Champaign, IL, 1998
- 11) Wasserman, K. et al. Principles of Exercise Testing and Interpretation, 2nd Edition. Williams and Wilkins, Philadelphia, PA, 1994.
- 12) Dubin, D. Rapid Interpretation of EKG's, 4th Edition. Cover Publishing Company, Tampa, FL, 1994.
- 13) Berne, R.M. and Levy, M.N. Cardiovascular Physiology, 8th Edition. Mosby, St Louis, MO, 2001.
- 14) Golderger, A.L. Clinical Electrocardiography, A Simplified Approach, 6th Edition. Mosby, St Louis, MO, 1999.
- 15) Frolicher, V.F. Wolthuis, R. Fischer, J. and Uhl, G. Variations in Normal Electrocardiographic Response to Treadmill Testing, *The American Journal of Cardiology*, 47, 1161-1167, 1981.
- 16) Gibbons, R.J., Balady, G.J., Beasley, J.W. et al. Guidelines for Exercise Testing, *J Am Coll Card*, 30, 260-315, 1997.
- 17) Fletcher, G.F., Flipse, T.R., Kligfield, P. and Malouf, J.R. Current Status of ECG Stress Testing, *Current Problems in Cardiology*, July, 355-414, 1998.
- 18) Swain, D.P. and Leutholtz, B.C. Metabolic Calculations Simplified. Williams and Wilkins, Philadelphia, PA, 1997.
- 19) Froelicher, V.F. Manual of Exercise Testing, 2nd Edition. Mosby, St. Louis, MO, 1994.
- 20) Fletcher, G.F. et al. Exercise standards for testing and training: a statement for healthcare professionals from the American Heart Association, *Circulation*, 104, 1694-1740, 2001.