KINE 3373 PHYSIOLOGY OF EXERCISE

Spring 2018

Department of Kinesiology

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Text/Readings: Exercise Physiology. Porcari, Bryant, and Comana. F.A. Davis publ. ISBN# 978-0-8036-2555-6
***TEXT IS NOT REQUIRED: THIS IS JUST A SUGGESTED BOOK.**

Course Description: This class is designed to provide the student with the knowledge necessary to understand the physiological basis upon which exercise is prescribed. Understanding these processes will allow kinesiologists to more effectively plan exercise programs and evaluate current practices used in the field.

Standards Matrix:

Objectives/Learning Outcomes	**Activities (* indicates field-based activity)**	**Performance Assessment**	**Standards:** _ **State Standards** _ ***Specialty Organization Standards*** _ *Conceptual Framework #*
Identify and select the appropriate training method for team and individual sport participants.	Lecture, class discussion	Written exam	*1, 2*
Demonstrate how to condition players in selected sports	Lecture, class discussion	Written exam, Written conditioning plan	*1, 2, 6*
Develop programs designed to increase cardiovascular endurance	Lecture, class discussion	Written exam, written exercise prescription	*1, 2, 6*
Develop programs designed to increase muscular strength and endurance	Lecture, class discussion	Written exam, written exercise prescription	*1, 2, 6*
Understand various techniques used to access body composition	Lecture, class discussion, lab experience	Observation of body composition measurements	*1, 2, 6, 7*

Understand physiological changes which occur as a result of exercise	Lecture, class discussion	Written exam	*1, 2*
Understand heat related illness, training in the heat and how to prevent heat related illness.	Lecture, class discussion	Written exam	*1, 2, 6*
Understand nutrition as it related to health and athletic performance	Lecture, class discussion	Written exam	*1, 2*
Understand the use of ergogenic aids to enhance performance	Lecture, class discussion, lab	Written exam	*1, 2*

Web address for **state standards**: N/A
Web address for ***specialty organization standards***: N/A
Web link for *Conceptual Framework*: N/A

Course Format:
This lecture course will present and highlight underlying concepts which are integral to understanding the physiological basis upon which exercise is founded.

Course Content:

I. Energy
- A. Introduction
- B. Definitions
- C. The Energy Systems
- D. 0_2 Consumption and Energy Production

II. Sports Activities and the Energy Continuum
- A. The Energy Continuum Concept
- B. The Energy Continuum and Running & Swimming
- C. The Energy Continuum and Other Sports
- D. Setting Up Continuum Guidelines

III. The Fuel for Exercise
- A. Carbohydrates
- B. Fats
- C. Proteins

IV. Recover from Exercise
- A. Restoration of Muscle, ATP and PC stores
- B. Replenishment of Myoglobin
- C. Restoration of Muscle Glycogen Stores
- D. Removal of Lactic Acid from Muscle and

Blood V. Measurement of Energy, Work, and Power

A. Definitions
   1. Energy
   2. Work
   3. Power
B. Measurement of Energy
   1. Direct
   2. Indirect
   3. R (carbo, fat, protein)
C. Measurement of Energy; Cost of Exercise
   1. Aerobic
   2. Anaerobic

VI. Physiological Changes Associated with Exercise
   A. Aerobic Programs and Anaerobic Programs
      1. Blood Pressure
         a. Systolic
         b. Diastolic
         c. Hypertension
         d. Measurement techniques
         e. Changes during exercise
         f. Long term effects

      2. Cardiac Output
         a. Stroke volume
         b. Heart rate
         c. Changes during exercise
         d. Long term effects

      3. Max VO2

VII. Exercise Testing and Prescription
   A. Cardiovascular disease
      1. History
      2. Risk Factors
      3. Treatment
   B. Medical Screening and Evaluation Procedures
      1. Preliminary Considerations
      2. Physical Fitness Evaluation
      3. Diagnostic Aspects of Graded Exercise Testing
   C. Prescribing Exercise for the Apparently Healthy

VIII. Neuromuscular Concepts Applied to Sports
   A. Structure of Nerves
   B. Function of Nerves
   C. Structure of Skeletal Muscle
   D. Function of Skeletal Muscle

IX. Weight Resistance Training: Methods & Effects
   A. Introduction
   B. Basic Principles Associated with Weight Training Programs
   C. Construction of Weight Resistance Programs for Various Sports
   D. Effects of Weight Resistance Training

X. Dehydration, Heat Problems, and Prevention of Heat Illness
   A. Introduction (Heat Loss and Gain)\
   B. Dehydration
   C. Environmental Heat Problems in Athletics

D. Prevention of Heat Disorders

XI. Body Composition, Nutrition, and Performance
- A. Introduction
- B. Body Composition
- C. Nutrition
- D. Diet and Performance
- E. Fad Diets and Weight Loss Products

XII. Flexibility
- A. Types
  1. Passive
  2. Dynamic
- B. Programs for Development
  1. Ballistic
  2. Stretch and Hold
  3. Comparison of Programs
     a. Results
     b. Myotactic (stretch) reflex

XIII. Ergogenic Acids
- A. Legal
  1. Physiological Effects
  2. Psychological Effects
- B. Illiegal
  1. Physiological Effects
  2. Psychological Effects

Course Requirements:

Evaluation (* indicates field-based activity):

1. Tests: 3 tests, 100 pts. Each (tests will be a combination of objective and subjective questions)
2. Final: 100 points (cumulative) 75-100 objective questions
3. Article Reviews: (50 points). There will be 10 articles for review during the semester each worth 5 points.
4. Online quizzes: (40 points) There will be 8 online quizzes each worth 5 points.

SUMMATIVE EVALUATION

351 – 390 points = A
312 – 350 points = B
273 – 311 points = C
234 – 272 points = D
234 points or below = F

ON ANY ONE EXAM

90 – 100 points = A
80 – 89 points = B
70 – 79 points = C
60 – 69 points = D
59 or fewer = F

NOTE: Regarding the Final – If you maintain a passing grade in this class, you will not be required to complete the final. If you do decide to take the final, it can't hurt your grade. If your grade on the final is higher than any one of your 3 test scores, I will substitute the grade on the final for your lowest test score.

NOTE: Regarding all tests – Students are expected to complete the test during the assigned time. Students will not be allow to complete a test after the assigned time has expired.

Expectations:

Upon completion of the course, students will be able to:

1. Understand the ATP-PC, lactic acid and O_2 energy systems of the body as they relate to ATP production, maintenance of ATP by fuel utilization and restoration.
2. Understand the sliding filament theory of muscle contraction
3. Understand the importance of cardiovascular adaptations which occur as a result of exercise
4. Evaluate and develop programs designed to increase cardiovascular endurance
5. Evaluate and plan programs designed to improve muscular strength and muscular endurance
6. Understand physiological changes which occur as a result of various training programs
7. Understand how the circulatory, respiratory, and digestive systems affect the human body during exercise
8. Understand the role and techniques of exercise testing and prescription
9. Understand and evaluate nutrition as it relates to health and athletic performance; and
10. Understand ergogenic acids and how they may enhance performance

Student absences on religious holy days policy (AP 861001):

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

Student Absence Notification Policy (Dean of Students)

Distinction between non-emergency and emergency absences; included in this link is the Absence Notification Request Form: http://www.shsu.edu/dept/dean-of-students/absence.html

http://www.shsu.edu/dotAsset/0953c7d0-7c04-4b29-a3fc-3bf0738e87d8.pdf

Procedures in Cases of Academic Dishonesty (AP 810213)

Students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any

form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials.

http://www.shsu.edu/dotAsset/728eec25-f780-4dcf-932c-03d68cade002.pdf

Allegations of student misconduct, as defined in paragraph 5.2, Chapter VI of the *Rules and Regulations*, Board of Regents, The Texas State University System, and Sam Houston State University *Student Guidelines*, published by the Dean of Students' Office, will be referred to the Dean of Students' Office for necessary action. Dean of

Academic Honesty:

Academic honesty is expected in all work. Ignorance is not an excuse. Penalties will include 0 points for the assignment or exam and loss of any extra credit opportunities. First instance will result in a 0 on the assignment and the incident being noted. Second instance will result in failing the class, and both incidents will be reported. Remember that self-plagiarism (using something you did) is also considered academic dishonesty.

The subject of academic honesty is addressed in paragraph 5.3, Chapter VI, of the *Rules and Regulations*, Board of Regents, The Texas State University system and Sam Houston State University Student guidelines published by the Dean of Students to wit: 5.3 Academic Honesty. The University expects all students to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. 5.31 The University and its official representatives, acting in accordance with Subsection 5.32, may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating, plagiarism, collusion, and the abuse of resource materials.

"Cheating" includes the following and similar actions:

(1) Copying from another student's test paper, laboratory report, other report, or computer files, data listings, and/or programs.

(2) Using, during a test, materials not authorized by the person giving the test.

(3) Collaborating, without authorization, with another student during an examination or in preparing academic work.

(4) Knowingly, and without authorization, using, buying, selling, stealing, transporting, soliciting, copying, or possessing, in whole or in part, the contents of an unadministered test.

(5) Substituting for another student, permitting any other person, or otherwise assisting any other person to substitute for oneself or for another student in the taking of an examination or test or the preparation of academic work to be submitted for academic credit.

(6) Bribing another person to obtain an unadministered test or information about an unadministered test.

(7) Purchasing, or otherwise acquiring and submitting as one's own work any research paper or other writing assignment prepared by an individual or firm. This section does not apply to the typing of the rough and/or final versions of an assignment by a professional typist.

5.32 "Plagiarism" means the appropriation and the unacknowledged incorporation of another's work or idea into one's own work offered for credit.

5.33 "Collusion" means the unauthorized collaboration with another person in preparing work offered for credit.

5.34 "Abuse of resource materials" means the mutilation, destruction, concealment, theft or alteration of materials provided to assist students in the mastery of course materials.

5.35"Academic work" means the preparation of an essay, dissertation, thesis, report, problem, assignment, or other project that the student submits as a course requirement or for a grade.

"Self-plagiarism represents a significant problem in academia as it serves to undermine the learning process and outcomes that are a key feature of each course that is offered as a part of a student's curriculum. As a result, the Department of Health and Kinesiology has a strict policy in place to prevent self-plagiarism in the classroom. Self-

plagiarism is defined as the submission of any type of assignment that contains content that is recycled from other assignments or a prior publication that one submits for course credit in another course."

Academic Grievance Procedures for Students (AP 900823)

Academic grievances include disputes over course grades, unauthorized class absences/tardiness, suspension for academic deficiency, instructor's alleged unprofessional conduct related to academic matters, graduate comprehensive and oral exams, theses and dissertations, and withdrawal or suspension of privileges related to degree-required clinical rotation, internships, or other clinical service delivery in professional degree programs.

If the dispute is determined to be based upon professional judgment, the aggrieved student is entitled to have, as appropriate and in turn, the department/school chair, College Academic Review Panel, academic dean, Dean of Graduate Studies (for graduate student issues), and Provost and Vice President for Academic Affairs form an opinion about the dispute and so advise the individual(s) involved.
http://www.shsu.edu/dotAsset/0bb1346f-b8d6-4486-9290-dba24123d0d8.pdf

Students with disabilities policy (AP 811006):

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Any student with a disability that affects his/her academic performance should contact the Office of Services for Students with Disabilities in the SHSU Lee Drain Annex (telephone 936-294-3512, TDD 936-294-3786) to request accommodations. They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.
SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. NOTE: No accommodation can be made until a student registers with the Services for Students with Disabilities http://www.shsu.edu/dotAsset/187f9029-a4c6-4fb4-aea9-2d501f2a60f3.pdf

Additional Resources:

All SHSU Policies: http://www.shsu.edu/intranet/policies/
Student Guidelines http://www.shsu.edu/students/guide/