

San José State University
Department of Kinesiology
Kin 155 - Exercise Physiology Fall, 2017

Course and Contact Information

Instructor:	Craig J. Cisar, Ph.D., FACSM, ACSM ETT, CSCS, NSCA-CPT
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Office Hours:	MW 1045-1215 and by appointment
Class Days/Time:	Lecture MW 0930-1020; Lab MW 0730-0920, TTh 1000-1150
Classroom:	Lecture – Sci 164; Lab - YuH 233
Prerequisites:	KIN 70 - Introduction to Kinesiology, BIOL 66 - Human Physiology, CHEM 30A - Introductory Chemistry or higher level chemistry course, and a general education mathematics course (Area B4), or equivalents

Course Format

Faculty Web Page and MYSJSU Messaging

You are responsible for regularly checking with the messaging system through your email address associated with your MySJSU to learn any updates.

Course Description

Exercise physiology examines the physiological responses and adaptations of the human organism to physical activity. Considerable emphasis is given toward understanding how the body functions during exercise and adapts to long-term training. Topics related to neuromuscular physiology, bioenergetics, cardiorespiratory physiology, circulation, neuroendocrinology, and cellular developmental traits will be presented and interrelated. In addition, the physiological effects of factors such as age, gender, body composition, and the environment on human performance will be discussed. Lectures and discussions will focus on applying the information from these topics into a framework for conditioning programs designed to improve performance and promote health enhancement.

Undergraduate Degree Program Learning Outcomes (PLO)

At the end of a Bachelor of Science degree program in the Department of Kinesiology students will be able to:

1. explain, identify, and/or demonstrate the theoretical and/or scientific principles that can be used to address issues or problems in the sub-disciplines in kinesiology.
2. effectively communicate in writing (clear, concise and coherent) on topics in kinesiology.
3. effectively communicate through an oral presentation (clear, concise and coherent) on topics in kinesiology.
4. utilize their experiences across a variety of health related and skill-based activities to inform their scholarship and practice in the sub disciplines in kinesiology.
5. Students will be able to identify and analyze social justice and equity issues related to kinesiology for diverse populations.

Course Learning Outcomes

Following successful completion of this course, students will be able to:

1. identify and explain the basic physiological responses and training adaptations to physical activity (PLO #1 and #4).
2. analyze and identify the physiological requirements of sports and physical activities (PLO #1 and #4).
3. identify and explain various physiological factors limiting performance of various sports and physical activities (PLO #1 and #4).
4. sensitively identify and explain age, gender, cultural, and other individual differences that may exist in physiological responses, training adaptations, and performance capabilities in various sports and physical activities (PLO #1 and #5).
5. identify and explain the basic components of conditioning programs designed to improve performance and promote health enhancement (PLO #1 and #4).
6. identify and describe equipment used to measure and evaluate various physiological aspects of human performance (PLO #1 and #4).
7. collect, analyze, and interpret physiological data collected from various laboratory tests and procedures (PLO #1 and #2).

Required Course Reader

Cisar, C.J., Thorland, W.J., & Christensen, C.L. (2016). Physiology of exercise notebook. San Jose, CA: Maple Press (available at Maple Press, 333 South 10th Street).

Other Requirements

Battery or solar operated hand calculator.

Course Requirements and Assignments

1. SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found at <http://www.sjsu.edu/senate/docs/S12-3pdf>.
2. Students are responsible for information presented in lectures and laboratory sessions, whether present or not. In addition, students are responsible for material presented in the assigned readings.
3. Active participation in the laboratory sessions is expected. Laboratory sessions are designed to supplement the lecture material. Laboratory sessions will consist of data collection, data analysis, and discussion of the results obtained during the laboratory sessions. Students are expected to study the data collected and answer questions during and at the end of each lab. This material will then be covered on lab exams.
4. Lecture examinations will cover lecture materials and related assigned readings (SLO #3). Laboratory examinations will cover the conceptual and technical aspects of the material presented in the laboratory sessions and related laboratory materials (SLO #6). All examinations will be conducted as closed textbook and notebook. Both the lecture and laboratory examinations will be objective examinations consisting of multiple choice, matching, and/or true-false questions; the examinations may involve calculations. Neither the second lecture or lab examination is a cumulative examination. **EXAMINATIONS WILL BE GIVEN AT THE SCHEDULED TIME ONLY AND NO MAKE-UP EXAMINATIONS WILL BE GIVEN**, except for dire and serious illnesses. If this should occur, the instructor must be notified personally PRIOR to the examination. Students should be aware that more than a superficial understanding of concepts will be necessary in order to apply the information given in class and related readings to situations presented in examination questions.
5. Students will have the opportunity to earn additional points through participation in laboratory activities and completion of laboratory assignments (SLO #1 and #6). The maximum additional points that can be earned are 5 points. Laboratory assignments will not be accepted late.
6. ACADEMIC INTEGRITY (from Office of Judicial Affairs). "Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty are required to report all infractions to the office of Judicial Affairs. The policy on academic integrity can be found at <http://www2.sjsu.edu/senate/S04-12.htm>.
7. AMERICANS WITH DISABILITIES ACT COMPLIANCE. If you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with the Accessible Education Center (924-6000, located in Adm 110) as soon as possible. Presidential Directive 97-03 requires that students with disabilities register with the Accessible Education Center to establish a record of their disability.

Final Examination

The final second lecture examination will occur on Wednesday, December 13th, from 0715-0930.

Grading Information

Grades will be based solely on accumulated points from the examinations and application paper with total points allocated in the following manner.

	<u>Points</u>
Two Lecture Examinations - 30 Points Each (PLO #1, #4, and #5)	60
Two Lab Examinations - 20 Points Each (PLO #1, #4, and #5)	<u>40</u>
Subtotal	100
Laboratory Participation and Assignments (PLO #1, #2, and #5)	<u>5</u>
Total	105

Final grades will be assigned according to the following allocation of total points.

A+	98-105	B+	88-89	C+	78-79	D+	68-69	F	≤ 59
A	92-97	B	82-87	C	72-77	D	62-67		
A-	90-91	B-	80-81	C-	70-71	D-	60-61		

Classroom Protocol

As previously stated students are expected to attend and participate the laboratory and lecture sections in which they are enrolled. The lecture and laboratory sessions will begin promptly at the scheduled time. Please limit cell phone use to class activities and emergency use only during class time. Cell phone use will not be allowed during exams and calculators cannot be shared during exams.

University Policies

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/) at <http://www.sjsu.edu/advising/>.

Consent for Recording of Class and Public Sharing of Instructor Material

[University Policy S12-7](http://www.sjsu.edu/senate/docs/S12-7.pdf), <http://www.sjsu.edu/senate/docs/S12-7.pdf>, requires students to obtain instructor's permission to record the course.

- “Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.”
 - Students have the permission of the instructor to make audio or video recordings of the lecture and laboratory presentations during the course.

- During active participation in the laboratory sessions, permission from those students participating in the activity should be obtained from the participating students before they are video recorded.
- “Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.”

Academic integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The **Error! Hyperlink reference not valid.** at <http://www.sjsu.edu/senate/docs/S07-2.pdf> requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The [Student Conduct and Ethical Development website](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Integrity Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. [Presidential Directive 97-03](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

In 2013, the Disability Resource Center changed its name to be known as the Accessible Education Center, to incorporate a philosophy of accessible education for students with disabilities. The new name change reflects the broad scope of attention and support to SJSU students with disabilities and the University's continued advocacy and commitment to increasing accessibility and inclusivity on campus.

Tentative Schedule of Lecture Topics and Examinations

Introduction

Central and Peripheral Nervous System Control of Movement

Contractile Model

Muscle Fiber Type Variations and Properties

Three Basic Principles of Exercise Physiology

Motor Unit Response Characteristics

Determinants of Force Production

Influences on Speed of Movement

Effects of Muscular Fatigue on Force Production and Training Influences on Contractile-Related Factors

Phosphagen Metabolism and Glycolytic Metabolism

Oxidative Metabolism - Krebs Cycle and Electron Transport System

Energy System Characteristics and Energy Yield from Carbohydrate and Fat Metabolism

Beta Oxidation of Fatty Acids

Metabolic Response to Exercise

Free Fatty Acid Mobilization

Carbohydrate Loading and Replenishment Fluids and Other Ergogenic Aids

Muscle Histological and Biochemical Adaptations from Training

First Lecture Examination – Monday, October 16th

Pulmonary, Metabolic, Cardiac, and Motor Unit Recruitment Responses to Exercise

Effects of Respiratory Rate and Depth on Alveolar Ventilation Rate

Gas Exchange and Pulmonary Diffusion

Plasma and Hemoglobin Transport of Oxygen

Hemoglobin-Oxygen Dissociation Curve

Circulatory and Cardiac Responses to Exercise

Submaximal and Maximal Oxygen Uptake Rate

Influences on Cardiorespiratory Responses to Exercise

Carbon Dioxide Transport

Lactic Production and Buffering During Exercise

Anaerobic Threshold

Cardiorespiratory and Metabolic Training Adaptations

Review of Oxygen Uptake Rate Responses to Exercise

Influence of Exercise on Growth, Aging, Coronary Heart Disease, and Other Causes of Death

Fundamental Concepts Underlying Training Programs

Metabolic Contributions to Energy Requirements

Review of Oxygen Deficit and Debt Concepts

Effects of Different Pacing Strategies on Oxygen Uptake Rate and Oxygen Deficit

Factors Affecting Oxygen Debt and Rate of Recovery from Exercise

Performance and Training Implications

Interval Training Guidelines and Endurance Training Guidelines

Concepts Related to Strength Training, Strength Training Guidelines, and Muscle Soreness

Muscle Mass and Strength Development Trends

Review of Gender Differences in Age Trends of Body Composition
 Review of Training Adaptations

Second Lecture Examination – Wednesday, December 13th, 0715-0930

Tentative Laboratory Topics and Examinations

Week	Dates	Lab #	Topics/Examinations
1	8-24/25		No Labs
2	8-29/30/31 & 9-1	1	Characteristics of Muscular Strength and Contractile Responses: Electromyography Responses
3	9-5		No Lab
3	9-6/7/8/9/12	2	Characteristics of Muscular Strength and Contractile Responses: Isokinetic Responses
4	9-13/14/15/19	3	Anaerobic Work Indices
5	9-20/21/22/26	4	Determination of Resting Metabolic Rate by Open Circuit Calorimetry and Energy Expenditure
		6	Cardiorespiratory and Metabolic Responses During Submaximal Exercise and Recovery
6	9-27/28/29 & 10-3	5	Determination of Heart Rate and Blood Pressure Basic Interpretation of Electrocardiograms
7	10-4/5/6/10		First Lab Examination
8	10-11/12/13/17	7	Determination of Maximal Oxygen Uptake Rate and Anaerobic Threshold
9	10-18/19/20/24	8	Astrand-Rhyming Bicycle Ergometer Test and Other Field Tests for Determination of Maximal Oxygen Uptake Rate
10	10-25/26/27/31	9	Pulmonary Function Testing
11	11-1/2/3/7	10	Body Composition - Underwater Weighing
12	11-8/9/10/14	11	Anthropometric Determination of Body Composition
13	11-15/16/17/21	12	Anthropometric Determination of Body Build Characteristics
14	11-22/23/24		No Labs
15	12-28/29/30 & 12-1		Second Lab Examination
16	12-5/6/7/8		No Labs

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12-12

No Lab