

Department of Kinesiology San Jose State University

Kin 155 - Exercise Physiology Spring, 2021

Contact Information

Instructor:	Craig J. Cisar, Ph.D., FACSM, CSCS, NSCA-CPT, ACSM-ETT
Office Location:	SPX 117
Telephone:	408-649-4520
Email:	craig.cisar@sjsu.edu (Preferred Contact Method)
Office Hours:	Virtual MW 9:30 to 10:30 AM and by Appointment via Email or Telephone Conference
Class Days/Time:	Asynchronous Online Course – No Scheduled Days and Times
Classroom:	Asynchronous Online Course – No Scheduled Classroom
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. <u>Enrollment in this course indicates that you have completed the pre-requisite coursework. Misrepresentation of completion of the prerequisite coursework will be considered a direct violation of the University's Academic Integrity Policy.</u>

MYSJSU Messaging

You are responsible for regularly checking your email address used to register for the course to receive lecture and lab information and material as well as 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, cellular developmental traits, age, sex, body composition, and training will be presented and interrelated. Lectures will focus on applying the information from these topics into a framework for conditioning programs designed to improve performance and health.

Undergraduate Degree Program Learning Objectives (PLO)

At the end of a Bachelor of Science degree program in the Department of Kinesiology students should 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 4).
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 4).

Required Course Reader and Calculator

1. Cisar, C.J., Thorland, W.J., & Christensen, C.L. (2018). Physiology of exercise notebook. San Jose, CA: Maple Press (available at Maple Press, 330 South 10th Street, San Jose, CA). The course reader can be ordered for mail delivery at <https://maplepress.net/readers/> or via telephone at (408) 297-1000.
2. Computer with printer/scanner, calculator, and cell phone.

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. This course is an online asynchronous course, which will not meet during the semester. Students are responsible for information presented in lecture and lab sessions via email, which will be sent to the email address that was used to enroll in the course. Check your email regularly for incoming lecture and lab information and material as well as exams. Communication with the instructor can best be accomplished via email. Please email the instructor directly at craig.cisar@sjsu.edu with all questions, issues, and concerns rather than reply to mass emails sent to all students. Phone conferences with the instructor can also be arranged by appointment made through email as needed. Effective utilization of these course procedures should enhance the development of the knowledge and understanding of exercise physiology within the students during the semester.
3. Laboratory information and material are designed to supplement the lecture information and material.
4. Lecture exams will cover lecture information and materials. Lab exams will cover lab information and material. All exams will be conducted as individual effort open book exams, which will be sent to you via email with a blank answer sheet to use. You will have approximately 6 hours from 6:00 AM TO 12:00 PM (NOON) to complete each exam. See the lecture schedule (pages 5 and 6) and lab schedule (page 6) for the dates and times of the 2 lecture exams and 2 lab exams. Both the lecture and laboratory exams will be objective exams consisting of multiple choice, matching, and/or true-false questions; the lab exams will involve calculations. The second lecture and lab exams are not cumulative exams. **EXAMS WILL BE GIVEN AT THE SCHEDULED TIME ONLY AND NO MAKE-UP EXAMS WILL BE GIVEN**, except for dire and serious illnesses given in class and related readings to situations presented in the exam questions.

Grading Policy

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

	<u>Points</u>
Two Lecture Examinations - 30 Points Each (PLO 1 and 4)	60
Two Lab Examinations - 20 Points Each (PLO 1 and 4)	40
Total	100

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

A plus	98 to 100	B plus	88 to 89	C plus	78 to 79	D plus	68 to 69
A	92-97	B	82 to 87	C	72 to 77	D	62 to 67
A minus	90 to 91	B minus	80 to 81	C minus	70 to 71	D minus	60 to 61
F	equal to or less than 59						

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](#) 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 Public Sharing of Instructor Material

- “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 [University Academic Integrity Policy S07-2](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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 – Wednesday, March 17th, 6:00 AM to 12:00 PM (NOON)

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 (Final) Lecture Examination – Friday, May 21st, 6:00 AM to 12:00 PM (NOON)

Tentative Laboratory Topics and Examinations

<u>Week</u>	<u>Dates</u>	<u>Lab #</u>	<u>Topics/Examinations</u>
1	1-27 to 1-29		No Lab
2	2-1 to 2-5	1	Characteristics of Muscular Strength and Contractile Responses: Electromyography Responses
3	2-8 to 2-12	2	Characteristics of Muscular Strength and Contractile Responses: Isokinetic Responses
4	2-15 to 2-19	3	Anaerobic Work Indices
5	2-22 to 2-26	4	Determination of Resting Metabolic Rate and Energy Expenditure
		6	Cardiorespiratory and Metabolic Responses During Rest, Submaximal Exercise, and Recovery
6	3-1 to 3-5	5	Determination of Heart Rate and Blood Pressure Basic Interpretation of Electrocardiograms
7	3-10		First Lab Exam, 6:00 AM to 12:00 PM (Noon)
8	3-15 to 3-19	7	Determination of Maximal Oxygen Uptake Rate and Anaerobic Threshold
9	3-22 to 3-26	8	Astrand-Rhyming Bicycle Ergometer Test for Determination of Maximal Oxygen Uptake Rate
10	3-29 to 4-2		Spring Break
11	4-5 to 4-9	9	Pulmonary Function Testing
12	4-12 to 16	10	Body Composition - Underwater Weighing
13	4-19 to 4-23	11	Anthropometric Determination of Body Composition
14	4-26 to 4-30	12	Anthropometric Determination of Body Build Characteristics
15	5-5		Second Lab Exam, 6:00 AM to 12:00 PM (Noon)
16	5-10 to 5-14		No Lab
17	5-17		No Lab

