SJSU SAN JOSÉ STATE UNIVERSITY

College of Health and Human Sciences · Kinesiology

Biomechanics

KIN 158

Fall 2025 Sections 01, 02, 03, 05 In Person 3 Unit(s) 08/20/2025 to 12/08/2025 Modified 08/15/2025

Contact Information

Instructor(s):	Lecture and Lab: Li (Jason) Jin, PhD Lab: Jules Damey-Fernandez
Email:	li.jin@sjsu.edu, jules.damey-fernandez@sjsu.edu
Telephone:	(408) 924-3046
Office Location:	Spartan Complex Central 111
Office Hours:	Tuesday and Thursday 8:30am – 9:30am Send email to reserve an appointment time
Class Days/Time:	Lecture twice a week: (synchronous in-person manner) Tuesday and Thursday 9:30am – 10:20am Lab once a week: (synchronous in-person manner) Tuesday 10:30am – 11:50am, or 1:30pm – 2:50pm, or 3:00pm – 4:20pm, or Thursday 10:30am – 11:50am, or 1:30pm – 2:50pm, or 3:00pm – 4:20pm.
Classroom:	Lecture: Yoshihiro Uchida Hall 124 Lab: Spartan Complex Central, Room 234, Biomechanics Lab.
Prerequisites:	KIN 070 (min C-); BIOL 065 (min C-); Math Area B4 (min C-)

Course Information

Biomechanics is the science concerned with the relationship of structural and mechanical principles of the musculoskeletal system to the analysis of human performance. Rigid-body mechanics will be used to explain gross movement of humans. Within rigid-body mechanics, dynamics, or the mechanics of objects in accelerated motion will be explored. Both kinematics and kinetics will be studied. This course will consist of lectures and activity labs designed to apply the knowledge of biomechanics to activities such as exercise, sports and locomotion.

Course Description and Requisites

Relationship of structural and mechanical principles of the musculoskeletal system to the analysis of human performance.

Prerequisite: KIN 070; BIOL 065 with a grade of 'C-' or better; approved GE Math Concept Course. Open only to declared KIN majors/minors, or instructor consent.

Misc/Lab: Lecture 2 hours/activity 2 hours.

Letter Graded

Classroom Protocols

1. All KIN 158 students should attend class regularly, and actively participate in each class and assigned lab session. Students are responsible for all missed course content and assignments.
2. Health Protocol: mask wearing is recommended for at-risk individuals in all indoor locations across campus. More details can be found in SJSU healthy advisories: https://www.sjsu.edu/healthadvisories/masks.php.
3. If you are experiencing COVID-19 symptoms, stay home, limit your exposure to others, and wear a mask. Report a Case if you have tested positive for COVID-19, with or without symptoms. Isolate as defined by the Santa Clara County Public Health Department. You may be contacted by the Case Management team from the SJSU Student Wellness Center for support, resources, and more information. More details can be found in SJSU COVID-19 Dashboard guidelines: https://www.sjsu.edu/healthadvisories/covid19-dashboard/index.php.
4. Classroom Etiquette: The aim for this course is to create an inclusive learning environment where all students feel welcome to participate and are free from judgment. To help create this learning environment, all students are asked to bring a positive attitude to class, be respectful and kind to classmates, and keep an open mind. Students can expect the instructor will do the same.
5. Use of Calculators: you may ONLY use a simple non-programmable calculator during lecture, homework, lab and exams.
6. Late assignments: Points will be deducted for every late assignment at the discretion of the course instructor. There will be a reduction of 10% in that assignment's grade for each day that it is late (Max 2 days, assignments will NOT be accepted after 2 days).

7. Make-up policy: Only under unique circumstances will a student be allowed to make up an exam. No make-up exams will be given without PRIOR (48 hours) approval of the instructor.
8. Requests for consideration of point corrections on examinations must be made within one week after the exam has been returned. These requests must be in writing and can be turned in at the Kinesiology office. Requests made after the one-week time limit will not be considered.
9. Missed Class: If a student miss class, the student is encouraged to chat with the instructor during scheduled office hours or by appointment to avoid falling behind.
10. Email: Please expect the instructor 24-36 hours response time during weekdays. If a student emails over the weekend, the instructor will likely not be able to respond until Monday.
11. Academic integrity: SJSU academic honesty info can be found at: https://www.sjsu.edu/studentconduct/conduct-processes/academic-integrity.php.
12. For more information on the Department of Kinesiology policies, please refer to the Department of Kinesiology undergraduate program website: https://www.sjsu.edu/kinesiology/Students/undergraduate.php.

Diversity Statement

The Department of Kinesiology is committed to developing and implementing equitable curricula and teaching practices that reflect the diversity of our student body and departmental core values. The faculty strives to foster an inclusive learning environment where all students feel valued, supported, welcomed, and empowered to succeed in ALL classes. All students, inclusive of all, but not limited to ethnicities, socioeconomic and cultural backgrounds, gender identities and expressions, castes, religions, ages, sexual orientations, abilities, bodies, political affiliations, statuses, and nationalities, are encouraged to share their rich array of perspectives and experiences. KIN department faculty, staff, and students all have something of value to contribute. Everyone is expected to respect differences and demonstrate diligence in understanding how others' perspectives, behaviors, and views may be different from theirs.

Program Information

Mission - In an atmosphere of social justice, equity, and respect for diversity, the mission of the Department of Kinesiology is to create and disseminate knowledge; engage in community service; prepare and graduate exemplary kinesiology professionals; as well as meet individual and societal needs for physical activity, sport, movement, and wellness.

PLOs - Upon completion of a Bachelor of Science degree program in the Department of Kinesiology students will be able to:

- 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.
- Effectively communicate in writing (clear, concise and coherent) on topics in kinesiology.
- Effectively communicate through an oral presentation (clear, concise and coherent) on topics in kinesiology.
- 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.
- Identify and analyze social justice and equity issues related to kinesiology for diverse populations.

Course Goals

The students will understand and will successfully apply basic biomechanical principles to the analysis of human movement.

Course Learning Outcomes (CLOs)

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

1. Use precise, well-defined professional biomechanical and anatomical terminology to describe motion (PLO #1 and #2).
2. Quantify linear and angular descriptors of human motion (PLO #1).
3. Quantify the forces, torques, mechanical work and power associated with human movement (PLO #1).
4. Use Newton's Laws to study forces and torques applied to the human body and identify movement mechanics (PLO #1).
5. Demonstrate the ability to accurately calculate and analyze kinematic and kinetic variables related to human movement in different sports and physical activities (PLO #1 and #4).
6. Explain human movement in various sports and physical activities through an understanding of biomechanical principles and identify the strategies to improve human movement performance (PLO #1 and #4).
7. Identify human movement injury mechanisms and explain age, gender, cultural and other individual differences may exist in biomechanical responses in various sports and physical activities (PLO #1 and #5).

Course Materials

Textbook

Biomechanics: A Case Based Approach, Flanagan S (2019), 2nd edition. Burlington MA, Jones and Bartlett Learning (ISBN: 9781284102338).

You can either access the textbook via Canvas > Left Side Menu > Library Course Materials. Or login your SJSU library account to access the link (https://ebookcentral.proquest.com/lib/sjsu/detail.action?docID=5372101&pq-origsite=primo).

Other Readings

Biomechanics of Sport and Exercise, Peter M. McGinnis (2013), 3rd edition. Champaign IL, Human Kinetics (ISBN: 9780736079662).

Other technology requirements / equipment / material

For successful completion of this course, an electronic device (laptop, desktop or tablet) and a simple non-programmable calculator are recommended. Additionally, the Online Office Hours will be conducted via Zoom. Students should install Zoom software in your computer and the detail information is here: https://www.sjsu.edu/ecampus/software-tools/teaching-tools/video-creative/zoom/index.php. This course will make extensive use of Canvas Learning Management System at http://sjsu.instructure.com. Course materials, homework and lab assignments will be posted in Canvas regularly. Please check often for class updates.

Students are responsible for ensuring that they have access to reliable Wi-Fi during the homework quizzes and exams. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible or at the latest one week before the test date to determine an alternative. See Learn Anywhere website for current Wi-Fi options on campus.

Library Liaison

Kinesiology

Adriana Poo

Phone: (408) 808-2019

Email: adriana.poo@sjsu.edu

Course Requirements and Assignments

1. Five homework assignments in Canvas
2. Eleven lab activity assignments
3. Three exams

Grading Information

The grading scale for KIN 158 will be in accordance with San José State University. The following list of assigned letter grades and their corresponding percentages accrued over the entire semester will be used to determine student performance on graded material. More guidelines on grading information and class attendance can be found from the following university policies:

- University Syllabus Policy S16-9 (http://www.sjsu.edu/senate/docs/S16-9.pdf)
- University Attendance and Participation Policy F15-12 (http://www.sjsu.edu/senate/docs/F15-12.pdf)
- University Grading System Policy F18-5 (http://www.sjsu.edu/senate/docs/F18-5.pdf)

Components of Final Grade

1. Homework Assignments (25% of final grade):

There will be 5 homework assignments in this course. They will be based on course content and will be available in Canvas as specified on the class schedule. Students should check the due time for each homework assignment in Canvas regularly. There will be a reduction of 10% in that assignment's grade for each day that it is late (Max 2 days, assignments will NOT be accepted after 2 days). The purpose of the homework assignments is to help students assess their progress in the class.

2. Lab Activity Assignments (40% of final grade):

There will be 11 lab activity assignments in this course. They will be based on each week's course content and will be available in Canvas before the lab session. Students will be assigned to groups in Canvas at the beginning of the semester and there will be 4 – 5 students in each group. Students should participate the in-person lab section and work together with their group members to finish the lab assignment throughout the semester. Each group just needs to submit ONE PDF document for each lab assignment to Canvas before the due time. Any group members who contribute little or no work to the lab activities will NOT get the credit for that lab assignment. While the grading for the other group members will not be affected. In each submitted lab assignment, each group should report whether this assignment is finished by the joint effort from each member, and mark the member's name who contributed little or no work (e.g. did not participate the in-person lab section). Each lab assignment will be due at 11:59 pm on Friday of the week. There will be a reduction of 10% in that assignment's grade for each day that it is late (Max 2 days, assignments will NOT be accepted after 2 days). Students are encouraged to bring the laptop or tablet to each lab section to finish the lab assignment.

3. Exams (35% of final grade):

There will be THREE exams (see schedule for dates). To get credit for the exams, you will have to take the exams in the in-person format. The third exam is the final examination: A Cumulative Exam covering all contents in the course.

Grades for students will be posted via Canvas after each exam. Students are encouraged to come to the instructor's office hours to review exams, and other assessments.

Internet connection issues:

Canvas autosaves responses a few times per minute as long as there is an internet connection. If your internet connection is lost, Canvas will warn you but allow you to continue working on your quiz. A brief loss of internet connection is unlikely to cause you to lose your work. However, a longer loss of connectivity or weak/unstable connection may jeopardize your exam.

Other technical difficulties:

Immediately email the instructor a current copy of the state of your quiz and explain the problem you are facing. Your instructor may not be able to respond immediately or provide technical support. However, the copy of your quiz and email will provide a record of the situation.

Contact the SJSU technical support for Canvas:

Technical Support for Canvas

Email: ecampus@sjsu.edu

Phone: (408) 924-2337

https://www.sjsu.edu/ecampus/how-we-can-help/contact-us.php

If possible, complete your quiz in the remaining allotted time, offline if necessary. Email your quiz to your instructor within the allotted time or soon after.

"Faculty members are required to have a culminating activity for their courses, which can include a final examination, a final research paper or project, a final creative work or performance, a final portfolio of work, or other appropriate assignment."

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

Course Grades:

5 Homework Assignments	250 points = 25%
11 Lab Activity Assignments	400 points = 40%
Exam 1	100 points = 10%
Exam 2	100 points = 10%
Final Exam (cumulative)	150 points = 15%
Total:	1000 points = 100%

Determination of Grades:

Grade	Points	Percentage
A plus	960 to 1000	96 to 100%
A	930 to 959	93 to 95.9%
A minus	900 to 929	90 to 92.9%
B plus	860 to 899	86 to 89.9%
B	830 to 859	83 to 85.9%
B minus	800 to 829	80 to 82.9%
C plus	760 to 799	76 to 79.9%
C	730 to 759	73 to 75.9%
C minus	700 to 729	70 to 72.9%
D plus	660 to 699	66 to 69.9%
D	630 to 659	63 to 65.9%
D minus	600 to 629	60 to 62.9%
F	599.9	59.9%

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Week	Date	Topic	Reading	HW	Lab	PLO #
1	8/19	N/A			No Lab this week	
	8/21	Introduction				
2	8/26	Anatomy Review			Icebreakers & Anatomy	#2
	8/28	Biomechanics Research Methods				
3	9/2	Linear Kinematics	Chapter 2, 3		Linear Kinematics	#1, 4
	9/4	Linear Kinematics (cont'd)	Chapter 2, 3	HW1		
4	9/9	Angular Kinematics	Chapter 5		Angular Kinematics	#1, 4
	9/11	2D Kinematics	Chapter 4	HW2		
5	9/16	Trigonometry Review			Trigonometry & Math	#1
	9/18	Force				
6	9/23	Torque and Lever Class			Torque	#1
	9/25	Static Equilibrium		HW3		
7	9/30	Exam #1 Review			No Lab This Week	#1
	10/2	**Exam #1: 9:20 – 10:20am**				

Week	Date	Topic	Reading	HW	Lab	PLO #
8	10/7	Linear Kinetics	Chapter 6, 7		Newton's Laws	#1, 2, 4
	10/9	Linear Kinetics (cont'd)	Chapter 6, 7			
9	10/14	Angular Kinetics	Chapter 8		Kinetics	#1, 2, 4
	10/16	Angular Kinetics (cont'd)	Chapter 8	HW4		
10	10/21	Work, Energy and Power	Chapter 9		Work, Energy and Power	#1, 4
	10/23	Center of Mass				
11	10/28	Tissue Mechanics	Chapter 11		Tissue Mechanics	#1, 4, 5
	10/30	Bone and Muscle	Chapter 11, 12	HW5		
12	11/4	Exam #2 Review			No Lab This Week	#1, 4
	11/6	Exam #2: 9:20 – 10:20am				
13	11/11	Veteran's Day – No Class			No Lab This Week	#1, 2, 4
	11/13	Gait (walking)	Chapter 2			
14	11/18	Gait (running)			Gait Analysis	#1, 4
	11/20	Lower Extremity	Chapter 14			
15	11/25	Upper Extremity	Chapter 16		No Lab This Week	
	11/27	Thanksgiving – No Class				

Week	Date	Topic	Reading	HW	Lab	PLO #
16	12/2	Amputee Gait & Prostheses			Stability & Equilibrium	
	12/4	Final Exam Review				
Final Exam	12/16	**Final Exam: 8:30am – 10:30am**				#1, 5

This schedule is tentative. The instructor reserves the right to make changes at any time. Students will be promptly notified if any changes do occur.