

San José State University
College of Health and Human Sciences
Kinesiology Department
KIN 158, Biomechanics, Section 1, Spring, 2021

Course and Contact Information

Instructor(s):	Li Jin, PhD
Email:	li.jin@sjsu.edu
Online Office Hours:	Wednesday 10:00am – 12:00pm (Online Office Hours Zoom link: https://sjsu.zoom.us/j/87145388428) Send email to reserve an appointment time
Class Days/Time:	<u>Lecture twice a week:</u> (synchronous + asynchronous manner) Tuesday and Thursday 8:00am – 8:50am <u>Lab once a week:</u> (asynchronous manner) TBA
Classroom:	Lecture Zoom link: https://sjsu.zoom.us/j/81941735294 . Lab: Each lab instruction video will be provided on Canvas.
Prerequisites:	KIN 070 (min C-); BIOL 065 (min C-); Math Area B4 (min C-)

Course Description

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 Format

Technology Intensive Online Course

This course will be facilitated in an online format. Lectures will be conducted in a synchronous and asynchronous combined manner: all lectures will be video streamed live via Zoom meeting at the regularly assigned time and they will be recorded simultaneously, and the lectures Zoom videos will be available on Canvas for students to review course materials. Lab sections will be conducted in an asynchronous manner: lab instruction videos will be available on Canvas and students should work remotely with their group members to finish each lab assignment. All correspondence with the lecture instructor will take place via email or Zoom. Students should install Zoom software in your computer and the detail information is here: <https://www.sjsu.edu/ecampus/teaching-tools/zoom/index.html>. It is important for students to have reliable internet access when attempting to interact with the instructor. See [University Policy F13-2](http://www.sjsu.edu/senate/docs/F13-2.pdf) at <http://www.sjsu.edu/senate/docs/F13-2.pdf> for more details.

Recording Zoom Classes

This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording).

Students are not allowed to record without instructor permission

Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy ([S12-7](#)) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on [Canvas Learning Management System course login website](#) at <http://sjsu.instructure.com>. You are responsible for regularly checking your SJSU email and Canvas through [MySJSU](#) on [Spartan App Portal](#) <http://one.sjsu.edu> to learn of any updates. For help with using Canvas see [Canvas Student Resources page](#) (http://www.sjsu.edu/ecampus/teaching-tools/canvas/student_resources)

Kinesiology Undergraduate Degree Program Learning Objectives (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. 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 (CLO)

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).

Required Texts/Readings

Textbook

Sean P. Flanagan (2019) Biomechanics A Case Based Approach, 2nd ed. Burlington MA, Jones and Bartlett Learning. ISBN 9781284102338

Other Readings

Peter M. McGinnis (2013) Biomechanics of Sport and Exercise, 3rd ed. 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, all the lectures will be live stream via Zoom. Students should install Zoom software in your computer and the detail information is here: <https://www.sjsu.edu/ecampus/teaching-tools/zoom/index.html>. This course will make extensive use of Canvas Learning Management System at <http://sjsu.instructure.com>. Course materials, homework and lab assignments, exams will be posted on Canvas regularly. Please check often for class updates.

Students are responsible for ensuring that they have access to reliable Wi-Fi during tests. 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. Attendance and participation in all lectures and labs
2. Five homework assignments on Canvas
3. Eleven lab activity assignments
4. Three exams

Homework Assignments:

There will be 5 homework assignments in this course. They will be based on course content and will be available on Canvas as specified on the class schedule. Students should check the due time for each homework assignment on 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.

Lab Activity Assignments:

There will be 11 lab activity assignments in this course. They will be based on each week's course content and will be available on Canvas before the lab session. Students will be assigned to groups on Canvas at the beginning of the semester and there will be 3 – 4 students in each group. Students should follow the lab instruction videos and work remotely 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. The individual member who did not contribute to the group assignment should finish the whole lab assignment on its own so as to receive a separate credit. 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).

“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.”

Final Examination or Evaluation

There will be THREE online exams (see schedule for dates). To get credit for the exams, you will have to take the exams on Canvas. 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 online office hours to review exams, and other assessments.

“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.”

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 exam. 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 exam 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 exam 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/support/>

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

Grading Information

The grading scale for KIN 158 will be in accordance with San Jose 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) (<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) (<http://www.sjsu.edu/senate/docs/F15-12.pdf>)
- [University Grading System Policy F18-5](http://www.sjsu.edu/senate/docs/F18-5.pdf) (<http://www.sjsu.edu/senate/docs/F18-5.pdf>)

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%
Exam 3 (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%

Classroom Protocol

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. Zoom Classroom Etiquette: 1) mute your microphone; 2) be mindful of background noise and distractions; 3) limit your distractions/avoid multitasking.
3. Use of Calculators: you may ONLY use a simple non-programmable calculator during lecture, homework, lab and exams.
4. 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).
5. 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.
6. 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.
7. Academic honesty: SJSU academic honesty info can be found at:
<http://info.sjsu.edu/static/schedules/integrity.html>
8. For more information on the Department of Kinesiology policies, please refer to the Department of Kinesiology undergraduate program website: <http://www.sjsu.edu/kinesiology/programs/undergradutes/>

University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/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 [Syllabus Information web page](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (<https://www.sjsu.edu/curriculum/courses/syllabus-info.php>). Make sure to visit this page to review and be aware of these university policies and resources.

KIN 158 / Biomechanics, Spring, Course Schedule

Course Schedule

Week	Date	Topic	Reading	HW	Lab	PLO #
1	1/26	N/A			No Lab this week	
	1/28	Introduction				
2	2/2	Anatomy Review			Icebreakers & Anatomy	#2
	2/4	Biomechanics Research Methods				
3	2/9	Linear Kinematics	Chapter 2, 3		Linear Kinematics	#1, 4
	2/11	Linear Kinematics (cont'd)	Chapter 2, 3	HW1		
4	2/16	2D Kinematics	Chapter 4		Angular Kinematics	#1, 4
	2/18	Angular Kinematics	Chapter 5	HW2		
5	2/23	Trigonometry Review			Trigonometry & Math	#1
	2/25	Force				
6	3/2	Torque and Lever Class			Torque	#1
	3/4	Static Equilibrium		HW3		
7	3/9	Exam #1 Review			No Lab This Week	#1
	3/11	Exam #1: 8:00 – 9:00 am				
8	3/16	Linear Kinetics	Chapter 6, 7		Newton's Laws	#1, 2, 4
	3/18	Linear Kinetics (cont'd)	Chapter 6, 7			
9	3/23	Angular Kinetics	Chapter 8		Kinetics	#1, 2, 4
	3/25	Angular Kinetics (cont'd)	Chapter 8	HW4		
10	3/30	Spring Recess (No Lecture)			No Lab this week	
	4/1	Spring Recess (No Lecture)				
11	4/6	Work, Energy and Power	Chapter 9		Work, Energy and Power	#1, 4
	4/8	Center of Mass				
12	4/13	Tissue Mechanics	Chapter 11		Tissue Mechanics	#1, 4, 5
	4/15	Bone and Muscle	Chapter 11, 12	HW5		
13	4/20	Exam #2 Review			No Lab This Week	#1, 4
	4/22	Exam #2: 8:00 – 9:00 am				

Week	Date	Topic	Reading	HW	Lab	PLO #
14	4/27	Gait (walking)	Chapter 2		Gait Analysis	#1, 2, 4
	4/29	Gait (running)				
15	5/4	Lower Extremity	Chapter 14		Stability & Equilibrium	#1, 4
	5/6	Upper Extremity	Chapter 16			
16	5/11	Amputee Gait & Prostheses			No Lab This Week	
	5/13	Final exam review				
Final Exam	5/25	Final Exam: 7:15 – 9:30 am				#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.