

**San José State University**  
**College of Health and Human Sciences**  
**Department of Kinesiology**  
**KIN 158, Biomechanics, Section 8 (& Lab 9, 10, 11, 12), Spring 2022**

**Course and Contact Information**

Instructor:	KyungMo Han, PhD, ATC, CSCS
Office Location:	SPX 173A
Telephone	408-924-3041
Email:	<a href="mailto:kyungmo.han@sjsu.edu">kyungmo.han@sjsu.edu</a>
Office Hours:	Tuesday 5:30 - 7:30 PM (Via Zoom by appointment)
Class Days/Times:	Lecture (T/Th): 11:00 - 11:50 AM Lab 9/Lab 12: T (9:00 - 10:50 AM) / (1:30-3:20 PM) Lab 10/ Lab 11: Th (9:00 - 10:50 AM) / (1:30-3:20 PM)
Classroom:	Lecture: Zoom/Canvas Labs: YUH 128 (Online until Feb. 10 and In-Person from Feb. 15)
Prerequisites:	KIN 070 (min C-); BIOL 065 (min C-); & Math Area B4 (min C-)

**Course Description**

Biomechanics is the science concerned with the effect of forces acting on living objects, and in this course, the effect of forces acting on the human body. 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.

**MYSJSU Messaging**

Course materials such as syllabus, power points, handouts, assignments, etc. can be found in 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.

**Course Goals**

The students will understand and 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 terminology to describe motion
2. Quantify linear and angular descriptors of human motion (kinematics)

3. Quantify the forces associated with human movement (kinetics)
4. Use Newton's Laws to study forces and torques applied to the human body
5. Explain human movement through an understanding of biomechanical principles
6. Understand human movement injury mechanisms

## Required Texts/Readings

### Textbook

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

### Library Liaison

Kinesiology

Adriana Poo

Phone: (408) 808-2019

Email: [adriana.poo@sjsu.edu](mailto:adriana.poo@sjsu.edu)

## Course Requirements and Assignments

1. Five (5) homework assignments
2. Eleven (11) lab assignments
3. Three (3) exams

### Homework Assignments:

There will be five (5) online homework assignments in Canvas. Each homework assignment is worth 30 points (10 questions, 3 points each) and duration of each homework assignment is 50 minutes. The format of homework assignments will be multiple choice questions. Calculators and course materials are permitted for homework assignments. Students should check the due time for each homework assignment in Canvas regularly. There will be a reduction of 15 points for each day it is late.

### Lab Assignments:

There will be eleven (11) lab assignments. Each lab assignment is worth 40 points (Lab 1 and 11 are worth 20 points each). 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 small groups (3-4 students in each group) at the beginning of the semester. Students should work with their group members to complete each lab assignment throughout the semester.

**Each group needs submit ONE PDF document for each lab assignment to Canvas by the due time. Prior to upload the finalized PDF document, it should be confirmed by the group members and also check the uploaded document after uploading it into Canvas.**

Among group members who did not contribute or only minimally contributed to the lab assignment will NOT get a credit for the lab assignment. Each group should report whether the submitted assignment is completed by a joint effort or not. The individual member(s) who did not contribute or only minimally contributed to the assignment, should finish the lab assignment by themselves (and **send it to my email**) to receive a separate grade for the lab assignment.

Each lab assignment is due by the following Monday (for Tuesday lab-) and Wednesday (for Thursday lab) at 11:59PM. There will be a reduction of 20 points of the lab assignment for each day it is late.

“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.”

### Exams

There will be three (3) exams. The first two exams are worth 100 points each, and the third exam is the cumulative (final) exam and worth 150 points.

“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.”

### **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) (<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	150 points
11 Lab Activity Assignments	400 points
Exam 1	100 points
Exam 2	100 points
<u>Exam 3 (Cumulative)</u>	<u>150 points</u>
<b>Total:</b>	<b>900 points</b>

### **Determination of Grades:**

Grade	Points	Percentage
A plus	864 to 900	96 to 100%
A	837 to 863	93 to 95.9%
A minus	810 to 836	90 to 92.9%
B plus	774 to 809	86 to 89.9%
B	747 to 773	83 to 85.9%
B minus	720 to 746	80 to 82.9%
C plus	684 to 719	76 to 79.9%
C	657 to 683	73 to 75.9%
C minus	630 to 656	70 to 72.9%
D plus	594 to 629	66 to 69.9%
D	567 to 593	63 to 65.9%
D minus	540 to 566	60 to 62.9%
F	≤ 539	≤ 59.9%

## Classroom Protocol

1. Use of calculators: you may ONLY use a simple non-programmable calculator during lecture, homework, lab and exams.
2. 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.
3. Academic honesty: SJSU academic honesty info can be found at: <http://info.sjsu.edu/static/schedules/integrity.html>
4. 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/undergraduates/>

## 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](http://www.sjsu.edu/gup/syllabusinfo) (<http://www.sjsu.edu/gup/syllabusinfo>), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.

# KIN 158, Biomechanics, Spring 2022, Course Schedule

## Course Schedule

Week	Date	Topic	Reading	HW	Lab	PLO#
1		N/A				
	1/27	1. Introduction				
2	2/01	2. Researches in Biomechanics			Lab Grouping	#1, 2, 3
	2/03	3. Osteokinematics				#1, 2
3	2/08	4. Linear Kinematics	Ch. 2, 3		L1. Osteokinematics	#2
	2/10	5. Linear Kinematics cont.	Ch. 2, 3	HW1		
4	2/15	6. 2D Kinematics	Ch. 4		L2: Linear Kinematics	#1, 4
	2/17	7. Angular Kinematics	Ch. 5	HW2		
5	2/22	8. Trigonometry Review			L3: Angular Kinematics	#1, 4
	2/24	9. Force	Ch. 7			
6	3/01	10. Torque and Lever Class	Ch. 8		L4: Trigonometry & Math	#1
	3/03	11. Static Equilibrium	Ch. 8	HW3		
7	3/08	12. Linear Kinetics	Ch. 6, 7, 10		L5: Torque	#1
	3/10	13. Linear Kinetics cont.	Ch. 6, 7			
8	3/15	14. Angular Kinetics	Ch. 8		L6: Newton's Laws	#1, 2, 4
	3/17	15. Angular Kinetics cont.	Ch. 8	HW4		

Week	Date	Topic	Reading	HW	Lab	PLO#
9	3/22	Exam #1 Review (Lecture 3-11 & Lab 1-5)			No Lab This Week	
	3/24	<b>Exam #1, 11:00AM-12:00Noon</b>				
10	3/29	<b>Spring Break</b>			No Lab This Week	
	3/31	<b>Spring Break</b>				
11	4/05	16. Work, Power and Energy	Ch. 9		L7: Kinetics	#1, 2, 4
	4/07	17. Center of Mass				
12	4/12	18. Tissue Mechanics	Ch. 11		L8: Work, Power and Energy	#1, 4
	4/14	19. Bone and Muscle	Ch. 11, 12	HW5		
13	4/19	20. Gait (Walking)	Ch. 2		L9: Tissue Mechanics	#1, 4, 5
	4/21	21. Gait (Running)	Ch. 2			
14	4/26	Exam #2 Review (Lecture 12-19 & Lab 6-9)			No Lab This Week	
	4/28	<b>Exam #2, 11:00AM-12:00Noon</b>				
15	5/03	22. Lower Extremity Biomechanics	Ch. 14		L10: Gait Analysis	#1, 4
	5/05	23. Upper Extremity Biomechanics	Ch. 16			
16	5/10	24. Kinetic Chains: Biomechanical Analysis of Rehabilitative Exercises	Ch. 17		L11: Biomechanical Analysis of Four- Directional Elastic Tubing Exercises	#1, 4, 5
	5/12	Exam #3 Review (Lecture 22-24) (Lecture 3-24 & Lab 1-11)				
<b>Final Exam</b>	<b>5/20 (F)</b>	<b>Exam #3 (9:45-11:45 AM)</b>				