

**San José State University**  
**Department of Kinesiology**  
**KIN 158 - Biomechanics, Spring 2015**

<b>Instructor:</b>	Dr. James Kao Office: SSC 513 Phone: 408-924-3026 email: <a href="mailto:james.kao@sjsu.edu">james.kao@sjsu.edu</a> Office hours: <ul style="list-style-type: none"> <li>• Thursday: 1:30 – 3:30 pm by appointment             <ul style="list-style-type: none"> <li>○ Send email to reserve an appointment time</li> </ul> </li> <li>• Other times available             <ul style="list-style-type: none"> <li>○ Send email to request a non-office hour appointment time</li> </ul> </li> </ul>
<b>Class Days, Times, and Rooms:</b>	Lecture: TuTh 08:00 – 08:50; Yoshihiro Uchida Hall 124 Lab: Tu 0930 – 1120; Boccardo Business Center 126 Lab: Tu 1130 – 1320; Boccardo Business Center 126 Lab: Th 0930 – 1120; Boccardo Business Center 126 Lab: Th 1130 – 1320; Boccardo Business Center 126
<b>Prerequisites:</b>	KIN 70 (Introduction to Kinesiology) Core GE Mathematical Concepts Course BIO 65 (Human Anatomy)

**Faculty Web Page, Real World Biomechanics Blog, and MYSJSU Messaging**

Copies of the course materials such as the syllabus, major assignment handouts, etc. may be found on Dr. Kao's faculty web page at <http://www.kin.sjsu.edu/faculty/jkao/>.

You should also follow my blog posts related to Real-World Biomechanics at <http://realworldbiomechanics.blogspot.com/>

You are responsible for regularly checking your email address listed on MYSJSU for updated course information.

**Course Description**

Biomechanics is the study of Biomechanical principles and the use of these principles in performing and/or teaching effective and efficient human movement.

## Program Learning Objectives

1. To obtain a critical understanding and the ability to apply theoretical and scientific knowledge from the subdisciplines in kinesiology for personal fitness, healthy lifestyles, sport, and/or therapeutic rehabilitation.
2. To effectively communicate the essential theories, scientific applications, and ethical considerations related to kinesiology.
3. To apply scholarship and practice of different movement forms to enhance movement competence in kinesiology.

## Course Objectives

Describe human movement using qualitative kinematic terminology

Explain human movement through an understanding of biomechanical principles

Understand the anatomy of the human body associated with creating human movement

Learn the muscles/muscle groups responsible for creating specific human movements

Understand human movement injury mechanisms

## Required Materials

### Textbooks

Kao, J. C. (2013). *Real-World Biomechanics*, 3<sup>rd</sup> ed. Electronic Book purchased from Dr. Kao

Muscolino, J. E. (2010). *The Muscular System Manual: The Skeletal Muscles of the Human Body*, 3<sup>rd</sup> ed. St. Louis, MO: Elsevier-Mosby

### Course Handouts

Chapter Handouts: Available on my website

Laboratory Handouts: Available on my website

## Course Policies

1. The University policy on adding and dropping courses will be strictly followed.
  - a. Students are responsible for understanding the policies and procedures about add/drop. Refer to the current semester's [Catalog Policies](#) and the [Late Drop Policy](#). Add/drop deadlines can be found on the [current academic calendar](#). Students are responsible for knowing the current semester deadlines and penalties for dropping classes.
2. The University policy on incompletes and late withdrawals will be strictly followed.
3. If you need course adaptations or accommodations because of a disability, or if you have emergency medical information to share with me, or if you need to make special arrangements in case the building must be evacuated, let me know as soon as possible.
4. If you are experiencing difficulty with the course material or are unsure of the requirements for this course, it is **YOUR** responsibility to see me as soon as possible.

## **University Policies**

### **Academic integrity**

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The [University's Academic Integrity policy](http://www.sjsu.edu/senate/S07-2.htm), located at <http://www.sjsu.edu/senate/S07-2.htm>, 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.sa.sjsu.edu/judicial_affairs/index.html) is available at [http://www.sa.sjsu.edu/judicial\\_affairs/index.html](http://www.sa.sjsu.edu/judicial_affairs/index.html).

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 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 requires that students with disabilities requesting accommodations must register with the [Accessible Education Center](#) (AEC) to establish a record of their disability.

## Course Evaluation

1. Three Exams (75% total)
  - a. Exam 1 (20%)
  - b. Exam 2 (20%)
  - c. Exam 3 (35%)
2. Quizzes (15% total)
3. Laboratory Grade (10% total)

### Examinations

- 1) Lecture Portion (50%)
- 2) Biomechanical Modeling Portion (50%)
- 3) No Scantrons or Blue Books are required
- 4) Make-up exams are permitted ONLY for serious and compelling reasons.

### Quizzes

- 1) Given at beginning of every lecture and lab section.
- 2) **CLOSED** book, notes, and neighbor.
- 3) eInstruction Response Pads will be used to take the lecture quizzes.
- 4) Make-up quizzes **WILL NOT** be given under any circumstances.

### Laboratory Work

- 1) You are expected to attend the lab section that you are enrolled in.
- 2) Laboratory lab policies and procedures will be discussed at the first meeting of your lab section.

## Grading Rubric

### Examination Grading

For each exam, you will receive a letter grade based on percentages of the **highest score on the exam**

<b>Percentage of the Highest Score on each Exam</b>	<b>Grade</b>
93 – 100%	A
90 – 92.99%	A-
87 – 89.99%	B+
83 – 86.99%	B
80 – 82.99%	B-
77 – 79.99%	C+
73 – 76.99%	C
70 – 72.99%	C-
67 – 69.99%	D+
63 – 66.99%	D
60 – 62.99%	D-
less than 59.99%	F

### Quiz Grading

You will receive a letter grade based on percentages of the **highest cumulative quiz points achieved by a student.**

<b>Percentage of the Highest Cumulative Quiz Points</b>	<b>Grade</b>
93 – 100%	A
90 – 92.99%	A-
87 – 89.99%	B+
83 – 86.99%	B
80 – 82.99%	B-
77 – 79.99%	C+
73 – 76.99%	C
70 – 72.99%	C-
67 – 69.99%	D+
63 – 66.99%	D
60 – 62.99%	D-
less than 59.99%	F

### Lab Grading

You will receive a letter grade based on percentages of the **highest cumulative lab points achieved by a student**.

<b>Percentage of the Highest Cumulative Lab Points</b>	<b>Grade</b>
93 – 100%	A
90 – 92.99%	A-
87 – 89.99%	B+
83 – 86.99%	B
80 – 82.99%	B-
77 – 79.99%	C+
73 – 76.99%	C
70 – 72.99%	C-
67 – 69.99%	D+
63 – 66.99%	D
60 – 62.99%	D-
less than 59.99%	F

### Letter Grade Values

A	11
A-	10
B+	9
B	8
B-	7
C+	6
C	5
C-	4
D+	3
D	2
D-	1
F	0

### Course Grading Example

Exam 1 Grade: B (8 points)

Exam 2 Grade: B (8 points)

Exam 3 Grade: C+ (6 points)

Quiz Grade: C (5 points)

Lab Grade: A- (10 points)

Exam 1 is worth 20% of your final grade:  $(8 \text{ points}) \times (0.20) = 1.60 \text{ points}$

Exam 2 is worth 20% of your final grade:  $(8 \text{ points}) \times (0.20) = 1.60 \text{ points}$

Exam 3 is worth 35% of your final grade:  $(6 \text{ points}) \times (0.35) = 2.15 \text{ points}$

Quizzes are worth 10% of your final grade:  $(5 \text{ points}) \times (0.10) = 0.50 \text{ points}$

Labs are worth 15% of your final grade:  $(10 \text{ points}) \times (0.15) = 1.50 \text{ points}$

Your final point total for the class =  $1.60 + 1.60 + 2.15 + 0.50 + 1.50 = 7.35 \text{ points}$

Round your final point total to the nearest integer: 7 points

Your final letter grade: B-

## Course Schedule

Dates	Topic	Reading Assignments		Lab
		Muscolino	Kao	
1/22 & 1/27	<b>Introduction</b> <ul style="list-style-type: none"> <li>Course Syllabus (i.e., Greensheet)</li> <li>What is Biomechanics?</li> </ul> <b>Human Motion</b> <ul style="list-style-type: none"> <li>Linear and Angular Motion</li> <li>Discrete and Continuous Motion</li> <li>Planes of Motion</li> <li>Axes of Rotation</li> <li>Body Segment Anatomical Terminology</li> <li>Body Segment Motion Terminology</li> </ul>	Chapters 1, 3, 14-16, and 19	Chapter 1	Lab 1
1/29 & 2/3	<b>Biomechanical Model for Linear Motion of the Torso to Achieve Maximum Vertical Jump Height or Maximum Horizontal Jump Distance</b> <ul style="list-style-type: none"> <li>Biomechanical Model</li> <li>Real-World Applications                             <ul style="list-style-type: none"> <li>Vertical Jump</li> <li>Horizontal Jump</li> </ul> </li> </ul>		Chapter 2	Lab 2 & Lab 3
2/5 & 2/10				Lab 4
2/12 & 2/17	<b>Biomechanical Model for Linear Motion of the Torso to Achieve Lowest Sum of Joint Forces When Landing After a Jump</b> <ul style="list-style-type: none"> <li>Biomechanical Model</li> <li>Real-World Applications                             <ul style="list-style-type: none"> <li>Vertical Jump</li> <li>Horizontal Jump</li> </ul> </li> </ul>		Chapters 3	Lab 6
2/19 & 2/24				Lab 7
2/26 & 3/3	<b>Exam 1</b>			<b>No Labs</b>
3/5 & 3/10	<b>Biomechanical Model for Linear Motion of the Torso to Achieve Minimum Movement Time</b> <ul style="list-style-type: none"> <li>Biomechanical Model</li> <li>Real-World Applications                             <ul style="list-style-type: none"> <li>Running and Walking</li> </ul> </li> </ul>	Chapters 3, 14-16, and 19	Chapter 4	Lab 8
3/12 & 3/17				Lab 9
3/19				<b>No Lab</b>
3/24 & 3/26	<b>Spring Break (no class)</b>			
3/31	<b>Cesar Chavez Day (no class)</b>			
4/2 & 4/7	<b>Biomechanical Model for Linear Motion of the Torso to Achieve Minimum Movement Time</b> <ul style="list-style-type: none"> <li>Real-World Applications                             <ul style="list-style-type: none"> <li>Road Cycling</li> </ul> </li> </ul>		Chapter 4	Lab 10
4/9 & 4/14				Lab 11
4/16 & 4/21	<b>Exam 2</b>			<b>No Labs</b>



4/23 & 4/28	<b>Biomechanical Model for Linear Motion of the Torso to Achieve Minimum Movement Time</b> <ul style="list-style-type: none"> <li>• Real-World Applications</li> <li>• Front Crawl Swimming</li> </ul>		Chapter 4	Lab 12
4/30 & 5/5	<b>Biomechanical Model for Projectile Motion to Achieve Maximum Horizontal Distance</b> <ul style="list-style-type: none"> <li>• Biomechanical Model</li> <li>• Real-World Applications</li> </ul>		Chapter 5	Lab 13
5/7 – 5/12	<b>Biomechanical Model for Angular Motion</b> <ul style="list-style-type: none"> <li>• Biomechanical Model</li> <li>• Real-World Applications <ul style="list-style-type: none"> <li>• Throwing – Baseball Pitch</li> <li>• Striking – Hitting a Golf Ball</li> <li>• Kicking – Soccer Goal Kick</li> </ul> </li> </ul>		Chapter 6	Lab 14
5/19	<b>Exam 3 (7:15 – 9:30)</b>			