San José State University
Department of Kinesiology
KIN 257 – Advanced Biomechanics, Fall 2015

Instructor:	Dr. James Kao
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	Office hours:
	• Thursday: 1:30 – 3:30 pm by appointment
	  ○ Send email to reserve an appointment time
	• Other times available
	  ○ Send email to request a non-office hour appointment time

Class Days, Times, and Rooms:	TH 4:00 – 6:50 pm; Spartan Complex 153
Prerequisites:	Undergraduate course in Biomechanics

Faculty Web Page 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 are responsible for regularly checking your email address listed on MYSJSU for updated course information.

Course Description

A seminar designed to (1) reinforce a student's understanding of the fundamental concepts and principles of biomechanics, (2) examine the methods used to collect and analyze 2D and 3D biomechanical data, and (3) interpret the biomechanical data to answer questions related to the study of human movement. Students will use critical thinking skills to read, interpret, and summarize recent biomechanical research and will conduct an individual systematic literature review of a biomechanical issue in the student's specific emphasis area.

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

1) To review the general concepts and principles of biomechanics.
2) To develop a deeper foundational knowledge of these concepts and principles
3) To develop knowledge of research methods typically used in biomechanical research.
4) To develop the skills required to interpret biomechanical research data and to discuss these research findings within the context of the research question being investigated.
5) To develop the ability to critically reading and interpret biomechanical research articles.
6) To develop the ability to identify current areas biomechanical research and to predict future areas requiring biomechanical research.
7) To prepare a systematic literature review.

Required Materials

Textbooks

Kao, J. C. (2015). *Real-World Biomechanics: How Human Motion is Created*, *3rd ed.* San Jose, CA: Silicon Valley Applied Biomechanics Publishing

Winter, D. A. (2009). *Biomechanics and Motor Control of Human Movement, 4th ed*. Hoboken, NJ: Wiley

Research Articles

You will be learning a method of identifying and gathering relevant research articles. You are expected to use this method to obtain copies of research articles will be discussing in class.

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, 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 is available at 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) Two Examinations (25% each)
2) Preparation for, Contribution to and Participation in Class Discussions/Activities (15%)
3) Written Systematic Review of the Literature (25%)
4) Oral Presentation of a Systematic Review of the Literature (10%)

Course Schedule

Dates	Topic
8/20 – 9/24	Designing an Experiment - Biomechanics of Walking • Biomechanical Model for Walking • Establishing a Logical Rationale and Purpose for the Experiment • Independent and Dependent Variables • Reviewing the Research o Ground Reaction Forces o Kinematics o Kinetics ▪ Injury Reduction ▪ Accelerometry o Electromyography (EMG) o Treadmill versus Overground o Gait Retraining
10/1	**Exam 1**
10/8 – 11/5	Data Collection and Analysis Methods • Kinematics o Videography o Accelerometry • Kinetics o Ground Reaction Forces • Muscle Utilization o Electromyography
11/12	**Exam 2; First Draft of Literature Review**
11/19	**Presentations – Group 1**
11/26	**THANKSGIVING**
12/3	**Presentations – Group 2**
12/10	**Final Draft of Literature Review**