ENS 610: Biomechanical Measurement Techniques I -
Kinematics

School of Exercise and Nutritional Sciences
San Diego State University
Spring 2016

Course Particulars

Instructor: Pinata H. Sessoms, PhD

Meeting time and place: Wed 5:00-7:40pm; ENS 106/Biomechanics Lab

Office Hours: By appointment (pinata.h.sessoms.civ@mail.mil)

E-mail: psessoms@mail.sdsu.edu

Prerequisites: ENS 306 or equivalent

Course Description

This course is part of a three-part series involving the use of biomechanical techniques to gather scientific information for the purposes of quantifying and evaluating human movement ability. The present course focuses on the collection, analysis and interpretation of kinematic data of human motion.

ENS Learning Goals

Learning Goal 1 Demonstrate core critical thinking skills and dispositions to ask and answer questions relevant to exercise, nutrition, and rehabilitation sciences.

Objective 1.1 Critically evaluate published research in the discipline.

Objective 1.3 Present opposing viewpoints and alternative hypotheses on issues in exercise, nutrition, and rehabilitation sciences.

Objective 1.4 Critically evaluate current trends and practices using disciplinary knowledge.

Objective 1.5 Actively seek out discipline-based questions as opportunities to apply core critical thinking skills.
Learning Goal 2  Demonstrate effective oral, written, and other interpersonal skills to help communicate knowledge and promote health, wellbeing, and rehabilitation in diverse communities.

Objective 2.1 Use effective technical writing skills to communicate information about exercise, nutrition, and rehabilitation sciences.

Objective 2.2 Use effective oral presentation skills to present information to peers and other professionals.

Learning Goal 3  Demonstrate understanding of scientific concepts, principles, and methods used in the study of exercise, nutrition, and rehabilitation sciences.

Objective 3.5: Design a research study and collect, analyze, and evaluate findings in relation to a proposed hypothesis.

Learning Goal 4  Use an array of technologies to support inquiry and professional practice.

Objective 4.2 Use various technology instrumentations to measure phenomena of interest.

Objective 4.3 Use software programs appropriate to discipline to organize, analyze and interpret findings.

Objective 4.4 Use presentation software to report project findings.

Learning Goal 8  Demonstrate an ability to integrate and apply knowledge and skills through experiential learning opportunities.

Objective 8.2 Administer assessments in a variety of healthy and chronic disease populations across the lifespan.

Objective 8.3 Organize and structure learning and research environments to maximize their quality and safety.
Learning Outcomes

1. Appreciate the role of movement in all aspects of daily living and the necessity to quantify movement for the purposes of improving performance in both healthy and disabled individuals.

2. Present and critically evaluate a research article related to the kinematic assessment of movement.

3. Develop a kinematic based research project that replicates an aspect of the existing human movement literature and extends this work in some meaningful way. The project must be undertaken using available equipment in the biomechanics laboratory and should have some relevance to either a sport or clinical setting.

4. Demonstrate research findings in a clear and convincing manner via multiple written and oral presentation techniques.

Tentative Class Schedule

Week 1
January 20  Introduction (ENS 106)
Biological Signals, kinematics as an Example (ENS 106)

Week 2
January 27  History of kinematics (ENS 106)
Overview of measurement systems

Week 3
February 3  Kinematic analysis (ENS 106)
Create groups for journal article review

Week 4
February 10  Upload journal article to Blackboard under your group
Using kinematic analyses
Journal article needs to be approved by instructor
Work on journal article review, begin project selection

Week 5
February 17  Journal Article Review Presentations (ENS 106)

Week 6
February 24  Marker Placement for Optical Motion Capture (Biomechanics Lab)
Project Design/Literature Search (On your own)
Week 7
March 2  Data Processing of Kinematic Data
Project Topic Selection Meetings with Instructor (Biomechanics Lab)

Week 8
March 9  Pilot Data Collection/Project Design (Biomechanics Lab)

Week 9
March 16  Project Proposal Pitches to the class for feedback (ENS 106)
Finalization of project design with instructor
Data Collection/Analysis (Biomechanics Lab)

Week 10
March 23  Proposal with literature search due
Data Collection/Analysis (Biomechanics Lab)

Week 11
March 30  NO CLASS: Spring Break

Week 12
April 6  Data Collection/Analysis (Biomechanics Lab) (Biomechanics Lab)
Group/Instructor Discussion of Findings/Data Analysis (ENS 106)

Week 13
April 13  Finalization of presentations (ENS 106)

Week 14
April 20  Data Collection/Analysis (Biomechanics Lab)
Open class for working on manuscript/poster

Week 15
April 27  Project presentations (ENS 106)

Week 16
May 4  TBD TENTATIVE: Tour of Naval Health Research Center – how we apply this in the field/Open class for working on Poster (NHRC)

Exam Week
May 11  FINAL DAY: Project presentations at either 4-6 PM or 7-9PM TBD

Course Evaluation (200 points)
1. Article review (20 points) 10%
2. Lit review/ Project Proposal (30 points) 15%
3. Project – written report (50 points) 25%
4. Project – oral presentation (40 points) 20%
5. Assignments (30 points) 15%
6. Class participation (online, in class) (30 points) 15%

Grading Scale

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Statement on Cheating and Plagiarism

Cheating is the actual or attempted practice of fraudulent or deceptive acts for the purpose of improving one’s grade or obtaining course credit; such acts also include assisting another student to do so. Typically, such acts occur in relation to examinations. However, it is the intent of this definition that the term ‘cheating’ not be limited to examination situations only, but that it include any and all actions by a student that are intended to gain an unearned academic advantage by fraudulent or deceptive means. Plagiarism is a specific form of cheating which consists of the misuse of the published and/or unpublished works of others by misrepresenting the material (i.e., their intellectual property) so used as one’s own work. Penalties for cheating and plagiarism range from a 0 or F on a particular assignment, through an F for the course, to expulsion from the University. For more information on the University’s policy regarding cheating and plagiarism, refer to the Schedule of Courses (‘Legal Notices on Cheating and Plagiarism’) or the University Catalog (‘Policies and Regulations’).
If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.