ENS 611: Biomechanical Measurement Techniques II - Kinetics

School of Exercise and Nutritional Sciences
San Diego State University
Fall 2013

Course Particulars

Instructor: Daniel J. Goble, PhD

Meeting time/place: TU & TH 2:00-3:15pm; ENS 106 or Annex 001 (Biomechanics Lab)

Office Hours: By appointment (ENS 313)

E-mail: dgoble@mail.sdsu.edu

Prerequisite Course: ENS 306 or equivalent

Course Description

This course is one of a three-part series involving the use of biomechanical techniques to gather scientific information for the purposes of quantifying and evaluating healthy and unhealthy human movement ability. In particular, this course focuses on the collection, analysis and interpretation of movement kinetics, which are the forces underlying biological motion.

ENS Masters Program Learning Goals

1. Students will demonstrate the ability to design, conduct, and interpret the findings from a research study in the area of rehabilitation.

2. Students will demonstrate the ability to critique and interpret germane literature (scientific, clinical, etc.) in the area of rehabilitation.

3. Students will demonstrate the ability to perform laboratory techniques appropriate for data capture.

4. Students will demonstrate an understanding of the principles underlying the processing and interpretation of biomechanical information.

5. Students will demonstrate the ability to successfully examine and interpret the appropriate measurement characteristics of specific instruments and measures used in these contexts.
6. Students will demonstrate an understanding of the principles underpinning clinical rehabilitation.

7. Students will demonstrate an understanding of the unique features of selected pathologies as they relate to therapeutic interventions.

Learning Objectives for this Course

1. Critically evaluate research journal articles in the areas of sport and rehabilitation, including methods, results, and discussion (G1, 2).

2. Accurately communicate findings of germane literature, both orally and in writing (G1, 2, 3, 4, 5, 6, 7).

3. Demonstrate knowledge of current measurement topics germane to the area of rehabilitation (G2, 4, 5, 7).

4. Demonstrate the correct use of laboratory equipment for the capture of motion data (G1, 3).

5. Demonstrate the ability to analyze and interpret kinetic data for the purposes of planning rehabilitative programs (G4, 5, 7).

Learning Outcomes

1. Appreciate the role of movement as a fundamental aspect of life 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 kinetic assessment of movement.

3. Develop a research question, via a thorough literature search, that is testable using available equipment in the biomechanics laboratory. Research question should have some application in either a sport or clinical setting.

4. Collect and analyze data to help answer a research question by testing both a control population and at least one individual from a “special” population (e.g. elite athlete, individual with a disability).

5. Demonstrate research findings in a clear and convincing manner through written and oral presentation techniques.
Class Schedule

Week 1

Aug 27 Course Overview and Expectations (ENS 106)
Aug 29 Biological Signals and Kinetics, Article Discussion info (ENS 106)

Week 2

Sep 3 Ground reaction forces (ENS106; Biomechanics Lab)
Sep 5 Center of pressure (ENS 106; Biomechanics Lab)

Week 3

Sep 10 Hand/finger forces, Kinetics Project info (ENS 106; Biomechanics Lab)
Sep 12 GRF Article Discussion (ENS 106)

Week 4

Sep 17 COP Article Discussion (ENS 106)
Sep 19 HFF Article Discussion (ENS 106)

Week 5

Sep 24 Group meetings to select project topic, Proposal Pitch info (ENS 106)
Sep 26 Project topic selection meetings with Instructor (Biomechanics Lab)

Week 6

Oct 1 Project topic selection meetings with Instructor (Biomechanics Lab)
Oct 3 Open class for developing project pitch (ENS 106)

Week 7

Oct 8 Project Proposal Pitches to the class (ENS 106)
Oct 10 Open class for working on proposal (ENS 106 or Biomechanics Lab)

Week 8

Oct 15 Finalization of project design with instructor (ENS 106)
Oct 17 Data Collection/Analysis (Biomechanics Lab)

Week 9

Oct 22 Data Collection/Analysis (Biomechanics Lab)
Oct 24 Data Collection/Analysis (Biomechanics Lab)
Week 10

Oct 29 Data Collection/Analysis (Biomechanics Lab)
Oct 31 Data Collection/Analysis (Biomechanics Lab)

Week 11

Nov 5 Data Collection/Analysis (Biomechanics Lab)
Nov 7 Data Collection/Analysis (Biomechanics Lab)

Week 12

Nov 12 Data Collection/Analysis (Biomechanics Lab)
Nov 14 Group/Instructor Discussion of Findings (Biomechanics Lab)

Week 13

Nov 19 Group/Instructor Discussion of Findings (Biomechanics Lab)
Nov 21 Open class for working on manuscript (Biomechanics Lab or ENS 106)

Week 14

Nov 26 Open class for working on manuscript (Biomechanics Lab or ENS 106)
Nov 28 No Class - THANKSGIVING

Week 15

Dec 3 Check in with instructor for Video/Poster (Biomechanics Lab)
Dec 5 Open class for working on Video/Poster (Biomechanics Lab or ENS 106)

Week 16

Dec 10 Video Presentation Day

Week 17

Dec 17 Poster Presentation Day – Exam Period (1-3pm)
Course Evaluation

Percent of Grade

1. Article Discussion .................................................. 15%
2. Project Proposal with Wiki Edits ................................. 20%
3. Project – written presentation (manuscript) ............... 25%
4. Project – oral presentations (video and poster) ......... 30%
5. Class participation ................................................. 10%

Grading Scale

A  >92%
A- 90-92%
B+ 88-89.9%
B  82-88.9%
B- 80-81.9%
C+ 78-79.9%
C  72-77.9%
C- 70-71.9%
D+ 68-69.9%
D  62-67.9%
D- 60-61.9%
F  <60%

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’).