

INDE / ENVH 569 – Occupational Biomechanics Spring 2013

Credits: 4

Class Times: Tuesday and Thursday 8:30 – 10:20am

Room: Sieg Hall 229

Instructor: Dr. Peter W. Johnson

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Co-Instructor: Dr. Jeong Ho (Jay) Kim

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Office Hours: Walk-in or by appointment

Required Text:

Occupational Biomechanics, 4th Edition; Don B. Chaffin, Gunnar B Andersson, Bernard J. Martin; John Wiley & Sons, Inc.; 2006; ISBN 0-471-72343-6

Course Description: This graduate level course will meet twice a week. During selected weeks there will be labs where students will learn how to use various types of bioinstrumentation (e.g. Labview Data Acquisition Software, Electromyography, goniometry, 3D Static Strength Prediction Program, Heart Rate Monitors, inclinometers, accelerometers). Homework assignments will primarily consist of conducting simple lab experiments using the various types of bioinstrumentation presented in the class. There will be one take home mid-term and a take home final. To understand the application of occupational biomechanics, students are encouraged to participate in any ongoing data collection project being conducted in any UW Biomechanics labs.

Grading: Class Participation 25%, Homework 25%, Mid-Term 25%, Final 25%

Learning Objectives: By the end of this course you will be able to:

- Understand the structure and function of the musculoskeletal system
- Apply anthropometric methods to biomechanical analyses.
- Understand how a mechanical work capacity evaluation is performed.
- Be familiar with the various types of bioinstrumentation used in occupational biomechanics.
- Be familiar with methods to classify manual work, how to evaluate manual material handling processes and understand biomechanical considerations in machine control and workplace design.
- Be familiar with the various types of biomechanical models used in occupational biomechanics.
- Understand the important biomechanical concepts which drive hand tool design.
- Be familiar with the biomechanical considerations associated with segmental and whole body vibration.

Course Schedule

Date	Topic	Readings	In-Class Activities and Homework
Tuesday April 2	Introduction to Biomechanics	Chapter 1	
Thursday April 4	The Musculoskeletal System – Connective Tissue, Bones and Muscle	Chapter 2	Introduction to Labview - Complete all the Labview Tutorials (Must be complete by 4/18)
Tuesday Apr 9	Anthropometry in Occupational Biomechanics	Chapter 3	
Thursday Apr 11	Mechanical Work Capacity Evaluation	Chapter 4	
Tuesday Apr 16	Bioinstrumentation for Occupational Biomechanics	Chapter 5	Dynamometers
Thursday Apr 18	Bioinstrumentation for Occupational Biomechanics	Chapter 5	Inclinometry and Goniometry
Tuesday Apr 23	Bioinstrumentation for Occupational Biomechanics	Chapter 5	EMG
Thursday Apr 25	Bioinstrumentation for Occupational Biomechanics	Chapter 5	Force Platform Accelerometers
Tuesday Apr 30	Occupational Biomechanical Models	Chapters 6	Finger Model in Labview
Thursday May 2	Methods of Classifying and Evaluating Manual Work	Chapter 7	Polar Heart Rate Monitor
Tuesday May 7	Take Home Midterm No Class		
Thursday May 9	Methods of Classifying and Evaluating Manual Work	Chapter 7	3DSSPP
Tuesday May 14	Hand Tool Design	Chapter 11	Dynamometers, Goniometers, EMG
Thursday May 16	Manual Material Handling Limits	Chapter 8	
Tuesday May 21	Guidelines for Work in Sitting Postures	Chapter 9	
Thursday May 23	Biomechanical Considerations in Machine Control and Workplace Design	Chapter 10	
Tuesday May 28	Whole Body and Segmental Vibration	Chapter 12	WBV Measurement
Thursday May 30	No Class – Student Research Day		
Tuesday June 4	Hand-Arm Vibration	Chapter 12	HAV Measurement
Thursday June 7	Take Home Final No Class		

Changes: The instructor reserves the right to make changes to the syllabus during the course. Any necessary changes will be announced in class and posted on the class website.