

HK 4240

Occupational Biomechanics and Ergonomics - Winter 2008

Instructor Information

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Office Hours: TBA

Teaching Assistants: Ms. Lauren Bailey (lbaile01@uoguelph.ca, Room 309, Thornbrough Building)
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Course and Schedule Information

Course Description: This course introduces the methods available for reducing musculoskeletal injuries in the workplace. Topics include: biomechanical, psychophysical, physiological, and integrated approaches to performing physical demands analyses, anatomy and etiology of low back injuries and upper limb disorders, principles of redesigning tasks to reduce the risk of injury, pre-employment screening and legislated guidelines. Students apply the course material to ergonomic assessments performed in industrial environments.

Prerequisites: 1 of [ENGG*1210](#), [HK*3270](#), ([HK*2270](#), [HK*3600](#))

Class Time: Lecture: Monday/Wednesday/Friday - 9:30-10:20 am, Room 105, ROZH

Laboratory: Tuesday 2:30-4:20PM, Wednesday 1:30-3:20PM, Friday 1:30-3:20PM, Room 215, JTP

Text: TBA

Learning Objectives

Upon successful completion of this course, students should be able to:

- Identify occupational tasks that may cause injuries and/or fatigue
- Identify the specific tissues that may be injured coupled with their injury mechanisms
- Redesign operations to reduce the demands on heavily and/or repetitively loaded tissues
- Have consideration for the unintended effects that ergonomic interventions may have
- Understand why and how to optimize ergonomic interventions

Major Topics Covered

- Biomechanics of Injury
- Occupational Injuries
 - Low Back
 - Upper Limb
- Quantifying risk in manual material handling
 - Guidelines
 - Quantification Tools
- Quantifying risk in repetitive and/or prolonged upper limb tasks
 - Guidelines
 - Quantification Tools
- Workplace design and redesign
- Optimization of ergonomic interventions
 - WSIB
 - Economics of Ergonomics
 - Ministry of Labour
 - Functional Abilities Evaluation
- Vibration

Marking

Activity	Percentage of Final Grade
Lab 1: Anthropometrics and Grip Strength	5% (Jan 21 - 25; Quiz done in lab)
Lab 2: Quantification of Manual Lifting (Individual Write-up)	10% (Feb 4-8; Due one week after the lab is performed)
Lab 3: Arm Tasks & Demands Description (Individual Write-up)	10% (Feb 25- 29; Due one week after the lab is performed)
Ergonomics Group Project	- Written Report 25% (due Monday March 24 th , in class) - Presentation 5% (presentations in last 5 classes, March 26 th on)
Midterm Exam Friday February 15 th , 2007, 9:30-10:20 am (In Class) (Room 105, ROZH)- Closed Book	15% or 0% (whichever provides the highest course grade)
Final Exam - Tuesday April 7, 2008, 8:30-10:30 AM (Location TBA) - Open Book	30% or 45% (whichever provides the highest course grade)

Ergonomics Group Project (due March 24th, in class)

Students are asked to get into groups of 4 or 5 (no groups will be allowed to be larger or smaller than this). Each group must have both engineering and HHNS students in it. By **Wednesday January 23th**, you must submit a sheet with the names and signatures of each group member. You must then go out into the Guelph area and find a business or company that is willing to let your group come into their environment and perform an ergonomics analysis. Try to find an occupational task that places both the low back and the upper limbs at some risk of injury (this task can be anything from an industrial job, some manual job on campus, a task you perform as a component of your part-time job, etc.). You must consult with the course instructor to verify that your selected task is appropriate for the project.

Your group will play the role of an ergonomics consulting company being hired by a company to improve the workplace (for free unfortunately). Each group will write one "Ergonomics Report" to summarize their findings, and submit that report for grading. This report is expected to be professional and it is mandatory that a second hard copy be submitted to the company you worked with. The students must also submit an electronic copy of their final report to the professor. Students are encouraged to use any of the assessment tools discussed in this course to strengthen their report. In addition, the group will present their project in class (last 5 classes).

Note: everyone in a group will normally receive the same mark for the project. However, the instructor reserves the right to assign a higher or lower mark to individuals who have done much more or much less than their share of the allotted work, by consensus of their group.

Report Format:

Font - 11 pt Times Roman or Arial, Margins - 1 inch on all sides; Page numbering - mandatory; Spacing - double; Tables & Figures - clearly labelled, should fully explain the figure or table. Reports should also include a table of contents. Further details will be provided later.

General Policies

- If a student does not write the midterm exam, the percentage weighting will be shifted to the final exam such that the final exam will be worth 45% of the student's final grade.
- Late materials (i.e., labs or group project) will be assessed a 10% deduction for every week the material is late. If the material has not been handed in within three weeks of the due date, a grade of 0 will be assigned for that particular material.
- In order to pass the course, students must pass both the laboratory/group project and exam course portions. Students must obtain a grade of 50% or higher on the exam portion of the course in order for the laboratory write-up/laboratory quiz/group project portions of the course to count towards the final grade. Similarly, students must also obtain a grade of 50% or higher on the laboratory write-up/laboratory quiz/group project portions of the course in order for the examination portion of the course to count towards the final grade. Students must attend and complete all laboratories in order to pass the course. If a laboratory is missed due to illness or other appropriately documented extenuating circumstance, arrangements must be made with the instructor and TA to complete a make-up lab. You will not pass the course without attending and completing the laboratories.

Grading Scale (as per the 2006-2007 University of Guelph Undergraduate Calendar)

Letter Grade	Percent Range
A+	90-100%
A	85-89%
A-	80-84%
B+	77-79%
B	73-76%
B-	70-72%
C+	67-69%
C	63-66%
C-	60-62%
D+	57-59%
D	53-56%
D-	50-52%
F	0-49%

Disclaimer

The instructor reserves the right to change any or all of the above in the event of appropriate circumstances, subject to the University of Guelph Academic Regulations.