ERGONOMICS

**Psych 535**

**FALL 2003**

TUES. 5:50-7:05 (30 Meetings + Final)*
St. Joseph's Hall: Rms. 325, 321 & 10
Several meetings (Date & Time TBD) with engineering students in Design Clinic, First Floor of KL.
*During the semester we will visit at least one assembly line, other than the project site

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Web Site: http://academic.udayton.edu/WilliamMoroney
Office Hours: Mon & Wed: 1:15-2:00; Prefer meetings arranged by appointment.

Graduate Assistant: Chris Voorheis, voorhecm@notes.udayton.edu, St. Joe's, Rm. 313, 229-2175,

**Description:**
The purpose of this course is to introduce you to ergonomics, with an emphasis on engineering physiology, anthropometry, biomechanics and environmental effects. We will examine the human as a machine or engine, which works in an environment.

**Textbook**

**Assigned Readings:**
Assigned Readings are available in the Reserve Section of the Library under Moroney (PSYCH 535) or in journals and proceedings. The CD-ROMs and other software are available in SJ 321. Do not remove them from the room. Catalogs needed for our class project are available in SJ 10, and in the Design Clinic in KL.

**Objectives:**
1. To familiarize you with the areas of anthropometry and biomechanics.
2. You will have the opportunity to serve as subject, measurer, and data collector during our anthropometry laboratory. You will also utilize a computerized anthropometric database.
3. During the biomechanics portion of the course you will to learn to:
   a) use a basic CAD (Computer Aided Design) system to evaluate physical tasks.
   b) address manual materials handling issues: including redesigning two work stations, Based on video case studies
4. We will have the opportunity to redesign a work area in a local factory. This is a unique hands-on learning opportunity, which will allow you to participate as a team member in a system/workstation redesign. You will deliver a product which the corporation can use. This project will be coordinated with MEE/MET senior level courses from the School of Engineering.
5. Introduce you to course related material available on the WWW. This will be useful, indeed essential, in your professional life. You can also be a member of a biomechanical “listserv” and other “listserves” if you wish.
6) Tour an industrial site and observe applied ergonomics. Dates and site to be announced
WWW SITES: These WWW sites will be of interest to you and lead you to other sites and sources of information.

Professional Organizations
* International Ergonomics Association
  http://www.louisville.edu/speed/ergonomics/international_ergonomics_association.html
* Human Factors and Ergonomics Society:  http://www.hfes.org
* International Society of Biomechanics:  http://www.isbweb.org
  See the ISB Biomechanical Listserv:  You may wish to subscribe to it for this semester
  http://isb.ri.ccf.org/biomch-l/
  • Biomechanics Worldwide:  http://www.per.ualberta.ca/biomechanics/bwwframe.htm

Govt Sources
* Agency locator:  www.firstgov.gov
* National Institute of Occupational Safety and Health:  http://www.niosh.gov
* Department of Labor:  www.dol.gov
* Center for disease Control (Injury data bases)  http://www.cdc.gov/
* Crew Systems Ergonomics Information Analysis Center:  http://iac.dtic.mil/hsiac
* BLS Safety & Health Statistics  http://stats.bls.gov/oshhome.htm

Commercial sites:
* Transom:  http://www.eds.com/
* CTDNews Online: http://ctdnews.com/
* ERGOWORLD: http://www.interface-analysis.com/ergoworld/
* NextGen:  http://www.nexgenergo.com/

Organizations:
Insurance Institute for Highway Safety  http://www.hwysafety.org/
Highway Loss Data Institute  http://www.carsafety.org/
Physical Performance Site:  http://sportsci.org/
Job Accommodation Network  http://janweb.icdi.wvu.edu/

POLICY:
1. Honor Code applies. Submission of copied work is a violation and will result in a grade of zero for that exercise. Examining the files created by your classmates, without their permission is an invasion of their privacy. However, please help each other, but do your own work.
2. Knowledge of the assigned readings by the assigned times is presumed.
3. Assignments are due on the date assigned, assignments received late lose 20% for each class that they are late. Assignments are not accepted if they are more than one class late.
4. If you don’t understand anything presented in class, please send an E-Mail to me or stop by my office. We will revisit the unclear areas at the beginning of the next class. If you had a question some of the other students probably had the same question. If appropriate, I will send a clarifying E-Mail to all members of the class.

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5. I will loan material to you, failure to return the material to me prior to the last class (Dec. 9) will result in an incomplete until the material is returned. If the material is not returned before the beginning of the next semester your grade will be reduced by one letter grade. The material in the files in SJ ?, SJ 10 and LK 433 are for your use on the project. Please copy what you need and return the original material to the files, the material will be used again by the next class.

6. Advise me of conflicts, problems, etc. as soon as they arise. The sooner they are resolved, the smoother our class will be.

7. This is an interactive class. Your active participation and cooperation is expected. We need to have a “team” attitude if we are to get the best return on our time together. Team Participation will be rated. We bring both different and overlapping skills/talents to this class - plan on sharing them.

**Mannequin (MQ) Issues:**
1. You will note that the syllabus contains MQ Exercises and MQ Assignments. The exercises correspond with the exercises in the manual available in the MQ Laboratory (RM. 333B). The exercises are not graded, but will be collected; the assignments are collected and graded. There is also an examination and data evaluation exercise based on MQ.

2. Use of the laboratory (SJ 321) is encouraged. My GA maintains the laboratory schedule and will assist you as required. If you have it reserved and must cancel, please call 229-2175 and cancel your reservation. As a back-up call my office. Provide as much lead time as possible, other individuals may wish to use the laboratory.

3. Please do not eat or drink in the laboratory. Also remember that smoking is not permitted in campus buildings.

4. You will need to bring a **two new**, blank 3.5" HD disks (IBM Format) to the second class. We will copy some material onto one disk for your use during the course and hopefully in your professional life. The other disk will be used to collect your Mannequin exercises and assignments. Put your name on each disk. Label one Ergo and the other MQ.

**ANTHROPOMETRIC DATA COLLECTION AND EVALUATION:**
DATA COLLECTION: This course will allow you to become familiar with tools and techniques used by ergonomists to measure people. Selected gender-neutral measurements will be collected under laboratory conditions. You will serve as both measurer and subject. The following rules apply:

* Wear appropriate attire (to be described in class) for our measuring sessions. If you can't get the required clothing, please, see me.
* Bring a clipboard to our lab sessions.
* Inappropriate comments about other individuals during the measuring sessions is not professional behavior.
* Violation of the rules listed above carries a 50 point penalty per violation.

One-third of your grade in this portion of the course will be based on how well you place the landmarks. The remainder will be based on your measuring technique and teamwork.

**SELECTED READINGS:**
During the semester you will be assigned selected readings. Depending on the nature of the readings, you may be asked to prepare an "Executive Summary" or a "response/reaction" paper, not to exceed one typed page. On some occasions you will be asked to share copies of your response with your classmates; on other occasions the response may be presented in class.

**READING ASSIGNMENTS:** The day reading assignments are due you should provide a review page with the four sections completed. If time permits we will discuss selected portions in class. I will review them before the next class to address questions.

**EXAMINATION QUESTIONS:** By Noon of the class day, you should email 3 quality questions and the correct answers to my Graduate Assistant. These should come from the assigned readings. Some of these questions may appear on your examinations. My GA will provide copies of everyone’s submissions before the examinations.

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## PSYCH 535: ERGONOMICS

**Course Schedule** (Subject to change)

**Indicates as Team with MEE/MET 423L students**

<table>
<thead>
<tr>
<th>Week</th>
<th>TOPIC</th>
<th>Assignment</th>
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<tbody>
<tr>
<td>/Dates</td>
<td></td>
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<tr>
<td>1</td>
<td>Goals &amp; Objectives</td>
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<tr>
<td>8/26</td>
<td>Course Overview</td>
<td>1-9</td>
</tr>
<tr>
<td>8/28</td>
<td>Class Project Presentation &amp; Discussion</td>
<td>51-89</td>
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<tr>
<td>8/28</td>
<td>History/Impact of Anthropometrics/ergonomics</td>
<td>Skip</td>
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<tr>
<td>8/28</td>
<td>Introduction to Bodyworks</td>
<td>*77-</td>
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<tr>
<td>8/28</td>
<td>Introduction to terms/distribution of manuals</td>
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<tr>
<td>8/28</td>
<td>Mannequin (MQ) introduction</td>
<td>Table 1-10</td>
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<tr>
<td>8/28</td>
<td>Distribute MQ exercises 1,2,3.</td>
<td>Describing</td>
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<tr>
<td>8/28</td>
<td>Describing Body motion</td>
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<tr>
<td>2</td>
<td>Introduction to Ergonomics</td>
<td>602-611</td>
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<td>8/28</td>
<td>Biomechanics</td>
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<tr>
<td>8/28</td>
<td>Workstation redesign #1 (assignment)</td>
<td></td>
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<tr>
<td>8/28</td>
<td>BRING DISKS</td>
<td></td>
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<td>3</td>
<td>Biomechanics (continued)</td>
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<tr>
<td>9/9 &amp; 9/11</td>
<td>Review Workstation Redesign # 1</td>
<td>501-561</td>
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<tr>
<td>9/11</td>
<td>Distribute Workstation Design # 2</td>
<td></td>
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<tr>
<td>9/11</td>
<td>EXAM #1: Terms and Definitions</td>
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<tr>
<td>9/11</td>
<td>Manual Materials Handling (MMH)/NIOSH</td>
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<tr>
<td>9/11</td>
<td>MQ Exercises 1,2,&amp; 3 due NLT Noon.</td>
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<tr>
<td>9/11</td>
<td>Distribute MQ assignment #1</td>
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<tr>
<td><strong>9/XX</strong></td>
<td>Project Definition</td>
<td></td>
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<tr>
<td>4</td>
<td>Manual Materials Handling/NIOSH (cont)</td>
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<tr>
<td>9/16</td>
<td>Repetitive motion disorders</td>
<td>337-403</td>
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<tr>
<td>9/18</td>
<td>Tool design/ Bring TWO tools (Problematic or quality), discuss pros and cons as an ergonomist. Do not bring weapons!</td>
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<tr>
<td><strong>9/XX</strong></td>
<td>Conceptual Design, visit to manufacturing facility</td>
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<tr>
<td>5</td>
<td>Close out Biomechanical and MMH material</td>
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<tr>
<td>9/23</td>
<td>MQ Assignment # 1 due NLT Noon</td>
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<tr>
<td>9/25</td>
<td>Distribute MQ Assignment 2 &amp;3</td>
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<tr>
<td>Workstation redesign # 2 assignment due &amp; discussion. Measuring Devices/Techniques</td>
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<tr>
<td><strong>10/XX</strong></td>
<td>Oral Presentation #1</td>
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</tbody>
</table>
6. Measurement Lab (landmarks)
   9/30 Measurement Lab (Data collection) 13-89
   10/2 **MQ Assignment 2&3 due NLT Noon**  Glossary
   2.5 hr class Measurement Lab (Data collection, finish) p 652-675

7. Analyze Measurement data, Complete measurement assignments
   10/7
   10/9 Project time

8. No Classes 10/14 or 10/16 HFES meeting

9. Design of workplaces
   10/21 Accommodation in workplace
   10/23 Models 325-336
   **Hand Calculator required**
   Statistical Issues
   Human Diversity 562-574

10. 10/27 Human Diversity continued
     10/30 **MQ Examination & Midterm due NLT noon.**
     VDT/Office issues 404-440

** 10/XX Preliminary Design
** 10/XX Oral Presentation # 2

11/??XX Field Trips

11. 11/4 Use of Human Subjects (Ethics) Readings
     11/6

12. Fitness for Duty Testing Readings
    11/11 Finish Ethics
    11/13 Thanksgiving Break begins

13. Project Time
    11/18 Aging/Handicapped 575-601
    11/20

14. 11/25 Aging close out
     **Americans With Disabilities Act** Readings
     OSHA/NIOSH roles & responsibilities
    11/27 No Class: Thanksgiving

15 & 16
12/2 Project time/lessons learned
12/4 Wrap-up, Final exam due
12/9 Course Evaluation

** 12/XX Oral Presentation #3
** 12/XX Final Design

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Note
You will also be invited to attend presentations on: designing for the environment, economic optimization, technology & culture, and liability when they are offered as part of MEE/MET Design Clinic courses. I will let you know the dates when they are provided to me.

Grading:

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
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<tbody>
<tr>
<td>Anthro Data Collection/Evaluation</td>
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<tr>
<td>MQ Assignment</td>
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<tr>
<td>#1</td>
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<td>#2</td>
<td>33</td>
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<tr>
<td>#3</td>
<td>34</td>
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<tr>
<td>EXAMINATIONS</td>
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<tr>
<td>Terms &amp; Definitions</td>
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<tr>
<td>Midterm</td>
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<td>MQ Examination</td>
<td>75</td>
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<td>MQ Data evaluation</td>
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<td>Final</td>
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<td>Selected readings</td>
<td>50</td>
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<tr>
<td>Project</td>
<td>250</td>
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<tr>
<td>Project Participation (peer eval)</td>
<td>50+</td>
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<tr>
<td>Workspace redesign</td>
<td>50</td>
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<tr>
<td>Total</td>
<td>1000</td>
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Conversion
Grading: This scale reflects the new grading system.

A: > 966
A-: 933-965
B+: 901-932
B: 866-900
B-: 833-865
C+: 801-832
C: 766-800
C-: 733-765
D: 700-733
F: < 700
Supplemental Ergonomics Readings

Texts are available at Roesch Library or from Moroney

General Texts

Industrial Engineering

Global References

Manual Material Handling:

Biomechanics:

Cumulative Trauma Disorder:

Shiftwork