

## IEE 6420: Ergonomics and Occupational Biomechanics

**Catalog Data:** Topics related to work physiology and biomechanics. Topics include anthropometry, skeletal system and muscle, neuromuscular control system, biomechanics, respiratory system, circulatory system, and metabolic system.

### Textbooks:

Tayyari, Fariborz, and Smith, James, (2003). Occupational Ergonomics: Principles and Applications. Kluwer Academic Publishers.

Pheasant, Stephen, and Haslegrave, Christine. Bodyspace. Third Edition, Taylor & Francis.

### References

Chaffin, D.B., Andersson, G.B.J., and Martin, B.J., (1999). Occupational Biomechanics. Fourth Edition, John Wiley & Sons.

Journals: Human Factors, Ergonomics, International Journal of Industrial Ergonomics, etc.

### Coordinator

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### Prerequisites by topic:

Basic knowledge of statistics: Means, standard deviations, t-tests, ANOVA, regression, design of experiments, SAS or Minitab. (IEE 2610, IEE 2620, or IEE 5160 or equivalent)

### Objectives

At the end of the semester the student should have the ability to:

1. Accurately recognize hazards (ergonomic in nature), based upon the relationship between an individual and their work, which are likely to cause occupational illnesses or injuries.
2. Collect reliable and reproducible data, statistically analyze the data, discuss implications of the data, and draw reasonable conclusions.
3. Understand the ramifications (ethical and legal) of collecting data on human.
4. Have the ability to use specialized ergonomic equipment to determine components of work, which pose and increase an increased risk of injury.
5. Apply government guidelines to the workplace to ensure worker safety.
6. Document a final report in a scholarly manner.

### Class Policies:

1. All tests will be closed book, closed note type.
2. No make up tests will be given.
3. Late assignments and lab reports will not be accepted.

### Individual Work

All students are expected to do their own work on each exam, homework assignments, and lab project unless specifically instructed to work in groups. Anyone that does not follow this policy will be given a zero for the assignment and will be recommended for dismissal from the course.

**Topics by week: (Tentative)**

Wk 1	Introduction, Chapter 1, 2 (Tayyari and Smith), Chapter 1 (Pheasant and Haslegrave)
Wk 2	<b>Article 1 (Project Related) Due, Web Site Resource List Due, Hw1 Due</b> , Chapter 4, 10 (Tayyari and Smith), Chapter 2, 3, 6 (Pheasant and Haslegrave), Chapter 4 (Chaffin et al.)
Wk 3	<b>Article 2 (Anthropometry) Due</b> , Lab 1 – Anthropometry
Wk 4	<b>Article 3 (Physiology) Due</b> , Chapter 6 (Tayyari and Smith), <b>Outline Project Topics Due</b>
Wk 5	<b>Lab 1 Due, Article 4 (Project Related) Due</b> , Chapter 6 (Tayyari and Smith)
Wk 6	Lab 2 – Physiology
Wk 7	<b>Lab 2 Due</b> , Chapter 8 (Tayyari and Smith), Chapter 10 (Chaffin et al.), Chapter 9, (Pheasant and Heslegrave)
Wk 8	<b>Article 5 (Biomechanics) Due</b> , Chapter 5 (Tayyari and Smith), Chapters 1, 2, 3 (Chaffin et al.)
Wk 6	<b>Exam 1</b> - Chapters 1, 2, 4, 6, 8,10 (Tayyari and Smith), Chapters 1, 2, 3, 6 (Pheasant and Haslegrave)
Wk 9	Chapter 9 (Tayyari and Smith), Chapter 8 (Chaffin et al.)
Wk 10	Lab 3 – MMH
Wk 11	<b>Lab 3 Due</b> , Chapter 7 (Tayyari and Smith), Chapter 10 (Chaffin et al.)
Wk 12	Special Topics, <b>Semester Project + Presentation Due</b>
Wk 13	<b>Final Exam</b> – December 14, 2008 (7:15 – 9:15 pm)

**Evaluation:**

Mid-term	20%
Final	20%
Labs + Homework	35%
Semester Project	25%

**Grading Scale:**

A	= 90-100
BA	= 88-89.9
B	= 80-87.9
CB	= 78-79.9
C	= 70-77.9
DC	= 68-69.9
D	= 60-67.9
E	= Below 60

**Article Reviews**

Throughout the semester you will be responsible for evaluating an article in a referred journal. A one page typed review of the strengths, weaknesses, and application is due according to the schedule above. Please attach a copy of the paper, with your submission. **DO NOT SUMMARIZE THE ARTICLE.**

**Labs**

Lab reports should consist of the following sections:

- Introduction
- Objective
- Method and Procedures
- Results and Discussion

Conclusions  
References  
Appendix with supporting data

All reports should be typed and are limited to 5 pages text (unless specifically instructed by the instructor).

**Semester Project**

For the semester project you will be expected to conduct an original experiment. You will work in teams of 3 or 4. The format of the write up should be similar to the lab report. Prior to initiating your experiment, it must be approved. Please present logical arguments (literature) for the need for the work to be done. A Power Point presentation must accompany the written report.