# IME 5420 – Human Factors Engineering

**Catalog Description 2003/2006:**

The process for designing for human use. The course covers the study of interactions between individual, equipment, products and the environment in any human-machine environment system. Topics include human capabilities and limitations; human input, output, and control; workspace design and the work environment (Cross listed with PSY 5420).

**Text:**

- Wickens, C. D., Hollands, J. G. (2000). Engineering Psychology and Human Performance, 3rd Ed. Prentice, Hall, Upper Saddle River, NJ.
- Casey, S. (1998). Set Phasers on Stun, 2nd Ed. Aegean Publishing, Santa Barbara, CA.

**Course Instructor:**

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**Performance Objectives:**

Students who successfully complete this course will:

1. Understand the functional processes of the human system that pertain to an understanding of the capabilities and limitations of humans in human-machine systems. The role of psychology, physiology, ergonomics, and safety will be discussed in the context of measuring and predicting human performance. (e,f,i).
2. Understand the principles and applications of human factors through design problems, case studies and a term project. (g, i).
3. Understand the ramifications (ethical and legal) of collecting data on humans and product liability (d,h).
4. Intensify the critical, analytical process of thinking (k).
5. Experience the planning, designing and testing of human performance aids(a,b,c,g).
6. Demonstrate collection of reliable and reproducible data, statistically analyze the data,discuss implications of the data, and draw reasonable conclusions. (b, h).
7. Demonstrate competence in oral and written communications (g).
8. Develop technical ability to design with multidisciplinary objectives (d, h).

**Grading Scale:**

Your grade is based upon the summed total of your performance criteria in meeting the course requirements:

| Grades | Points |
|---|---|
| **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 |

**Evaluation:**

| Evaluation | Points | Percentile |
|---|---|---|
| Mid-term Exam | 100 | 25% |
| Final Exam | 100 | 25% |
| Homework Assignments | 60 | 15% |
| Semester Project | 120 | 30% |
| 1.Paper (100) | | |
| 2.Presentations (20) | | |
| Paper Presentations | 20 | 5% |
| Total | 400 | 100% |

**Tentative Agenda:**

| Week | Date | Topics |
|---|---|---|
| **1** | **Aug 30** | Introduction and Human Factors Engineering History, Chapter 1 |
| **2** | **Sept 6** | Labor Day |
| **3** | **Sept 13** | Human Information Processing/Memory Systems, Handouts, Chapter 7 |
| **4** | **Sept 20** | Auditory and Visual Systems, Chapter 3 |
| **5** | **Sept 27** | Human-computer Interaction: Displays and Controls, Chapter 4,5 |
| **6** | **Oct 4** | Decision Making, Chapter 8 |
| **7** | **Oct 11** | Learning and Knowledge, Handouts |
| **8** | **Oct 18** | CSCW and Decision Support Systems, Handouts, Chapter 11 |
| **9** | **Oct 25** | **Midterm Exam (Chapters-1,3,4,7,8,11) & Midterm Presentations** |
| **10** | **Nov 1** | Artificial Intelligence and Expert Systems, Handouts |
| **11** | **Nov 8** | Artificial Intelligence and Artificial Neural Networks, Handouts |
| **12** | **Nov 15** | Safety, Product Liability and Human Error, Chapter 9, 12 |
| **13** | **Nov 22** | Biometric Sensors, Handouts, Chapter 5 |
| **14** | **Nov 29** | Robots, Handouts, Chapter 13 |
| **15** | **Dec 6** | **Final Exam (Chapters 5, 9, 12, 13) & Final Presentations** |

**Expectations:**

Students are expected to:

1. Attend and fully engage in each class.
2. Complete all labs and assignments by due date (no exceptions).
3. Perform statistical analyses.
4. Complete a semester project including collecting subject data.

**Performance Criteria:**

The student should be able to:

**Objective 1**

1. Demonstrate knowledge of human capabilities and limitations. (4, 5, 7)

**Objective 2**

1. Understand and develop appropriate human performance aids following industrial and managerial practices. (1, 2, 4, 3)

**Objective 3**

1. Complete written tasks in a clear, concise, efficient manner. (1, 2, 5, 7)

**Objective 4**

1. Incorporate statistical research into reports using electronic and print media and verify and document those resources appropriately. (3, 4, 5, 7)

**Objective 5**

1. Present ideas orally in an organized, concise, and effective manner. (3, 6)

**Computer Usage:**

Performance aids will be developed using Visual Basic programming or Excel software. All written assignments prepared outside the classroom are required to be computer word-processed. The use of Microsoft Word or WordPerfect is recommended. The use of graphing, spreadsheet, and presentation software (such as PowerPoint) is used in the preparation of reports and the Oral Presentations. Use of Netscape, Windows, and the University Libraries' computer network is also necessary for research purposes.

**Library Usage:**

Use of the Library is necessary for and recommended for the Weekly project assignments. Students should make use of the Library for all other assignments, as needed, to properly research and document their reports.

**Oral and Written Communications:**

This course provides an opportunity for Written and Oral Communication in the technical and business world. All assignments are devoted to the exploration of this topic.

**Assignments:**

Are due at the **beginning** of the class hour on the due date. If you know that you must miss a class, arrange for completion of assignments in advance of due dates.

**Attendance:**

Attendance is strongly encouraged. Since the class meets only once a week, each class period is equivalent to three weekly hours. If you must miss class, have a friend take notes and handouts and hand in your work for you.

**Cheating and Plagiarism:**

If you are caught cheating or plagiarizing, you will fail the course. You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate (pp. 274-276) [Graduate(pp. 26-28)] Catalog that pertain to Academic Integrity. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

**Revision Date: Fall 2004**