

**ENGT 305: Human Factors Engineering
Fall Semester, 2017**

Syllabus

Instructor: Lu Yuan, Sc.D., CSP
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Office Hrs: Monday and Wednesday, 3:30 pm to 5:00 pm. Other times by special appointment.

Course Description:

Credit 3 hours. *Prerequisites: Junior Standing.* This course provides the student with a basic knowledge of human factors design principles and the nature of human interaction with their physical work environment. The course introduces cognitive engineering, ergonomics, system design, and the nature of human performance in the workplace.

Course Objectives:

At the conclusion of this course, students will be able to:

1. Describe the meaning and importance of human factors engineering.
2. Relate human sensory, cognitive, and physical capabilities and limitations to the design of human-machine systems.
3. Select and correctly use appropriate human-machine system analysis and design tools.
4. Apply sound human-machine system design principles to develop written and graphical design specifications.
5. Recognize and construct proper recommendations to correct human factors deficiencies in human-machine systems in written and/or graphical form.
6. Design, conduct, and document a human factors experiment or study for a research project.

Course Textbook:

Wickens, C.D., Lee, J.D., Liu, Y., Gordon Becker, S.E. (2004). *An Introduction to Human Factors in Engineering* (2nd Ed.). Upper Saddle River, New Jersey: Pearson Prentice-Hall.

Other Readings:

Sanders, M.S. and McCormick E.J. (1997). *Human Factors in Engineering and Design* (7th Ed.). McGraw-Hill, Inc.

Kroemer, K.H.E., Kroemer, H.B., and Kroemer-Elbert, K.E. (2001). *Ergonomics: How to Design for Ease and Efficiency* (2nd Ed.). Upper Saddle River, New Jersey: Prentice Hall.

Exams:

There will be two mid-term exams plus a final exam given during the semester to measure your progress and to provide a basis for your grade. Each of the three exams will consist of multiple choice, matching, fill-in-the-blank and, where applicable, short math and essay problems. Each exam will cover the material studied during each of the three units of the class.

You will be permitted to make-up an exam ONLY if you have made arrangements PRIOR to the time the exam was originally administered. No make-up exam will be allowed if you merely have not shown up for the original exam and have not made arrangements to take a make-up. The make-up exam must be taken BEFORE the next scheduled class period.

NO EXCEPTIONS will be allowed.

Homework:

There are two sets of homework scheduled for this class, aimed at improving your quantitative skills. Homework will be collected at the beginning of the class in which they are due. They should be written clearly and logically. The calculation steps shall be included as appropriate.

Homework turned in after the due day will receive only partial credit.

Quizzes, Exercises, and Assignments (QEAs):

To make the class more fun and interactive, six QEAs will be “randomly” given during the semester. They may appear at the beginning of the class, or at the end of the class, or be due by the specified class. Each QEA is worth 10 points. The highest five scores will be counted toward the grade total and the lowest one will be counted as bonus points.

Project:

There will be a group research project which will require you to apply the principles learned in class to conduct a human factors analysis in a real-life situation. The project will be reported both in 1) a paper of 5 to 10 pages, and 2) an oral presentation in 10 to 15 minutes. The project will be graded upon: 1) accuracy of analysis of the problem, 2) appropriateness of the corrective measures that are recommended, and 3) dissemination of information through oral presentation. Good grammar and correct spelling will also be considered in grading the paper.

You should PROVIDE ME WITH A COPY OF YOUR PAPER AND PRESENTATION SLIDES (IF THERE IS ANY) THAT I CAN KEEP. I will provide you with a summary of how the grade for your project was determined. Projects are due by the oral presentation dates on **NOVEMBER 27TH** and **NOVEMBER 29TH**. **Projects turned in after the latter date will receive only partial credit.**

Course Grades:

1. Grades will be assigned in accordance with the Departmental Scale:

<u>Points</u>	<u>(Percent)</u>	=	<u>Grade</u>
461-500	(93 - 100)	=	A, Superior
421-460	(85 - 92)	=	B, Very Good
381-420	(77 - 84)	=	C, Average
341-380	(69 - 76)	=	D, Below Average
0-340	(0 - 68)	=	F, Fail

2.	Basis for assigning grades:			
	Three Exams @ 100 points	=	300 points	(60% of grade)
	Two Homework @ 25 points	=	50 points	(10% of grade)
	Five QEAs @ 10 points	=	50 points	(10% of grade)
	Research Project @ 100 points	=	100 points	(20% of grade)
	TOTAL	=	500 points	

Course Requirements:

1. Adherence to departmental policies and procedures.
2. Regular class attendance as prescribed in the departmental requirements.
3. Read the material to be discussed in class prior to coming to class.
4. Complete and turn in homework, QEAs, and research project by due deadline.

NOTE:

1. Students will NOT automatically be dropped from class. Students who choose to drop must do so by the semester deadline! The last day to withdraw or resign from the university is Friday, 3 November, 2017.
2. If you are a qualified student with a disability seeking accommodations under the Americans with Disabilities Act, you are required to self-identify with the Office of Disability Services, War Memorial Student Union 1304.
3. Students' behavior/classroom decorum: "Free discussion, inquiry, and expression are encouraged in this classroom. Classroom behavior that interferes with either (a) the instructor's ability to conduct the class, or (b) the ability of the students to benefit from the instruction is not acceptable. Examples may include routinely entering class late or departing early; use of beepers, cellular telephones, or other electronic devices; repeatedly talking in class without being recognized; talking while others are speaking; or arguing in a way that is perceived as 'crossing the civility line.' In the event of a situation where a student legitimately needs to carry a beeper/cellular telephone to class, prior notice and approval by the instructor is required."
4. Academic Integrity. The academic community relies upon a high standard of integrity in the relations among its members. To the extent that this standard is not maintained, the good of the community suffers, and injustice (sometimes serious injustice) may be done. One of the most important aspects of academic integrity concerns the just measure of each student's academic accomplishments. These are ordinarily evaluated through written examination or submitted work. For such modes of assessment to operate fairly, it is essential that the instructor be assured that the work used to evaluate the student's performance is genuinely the student's own. It is also the responsibility of the student to uphold the academic integrity of the University. The use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. Cheating on examinations, plagiarism, improper acknowledgment of sources in essays and the use of a single essay or paper in more than one course without permission are considered very serious offenses and shall be grounds for disciplinary action.

Course Outline & Reading Assignments (Revised 09/06/17)

Class meets on Mondays and Wednesdays from 11:00 am to 12:15 pm

Week	Date	Topic	Readings Due	Work Due
Unit 1: Human Factors Basics				
1	Aug. 16	Introduction to Human Factors	Chapter 1	
2	Aug. 21	Research Methods	Chapter 2	
	Aug. 23	Design and Evaluation Tools	Chapter 3	
3	Aug. 28	Design and Evaluation Tools (cont.)	Chapter 3	
	Aug. 30	CLASS CANCELLED		
4	Sep. 4	NO CLASS – Labor Day Holiday		
	Sep. 6	Visual Sensory System	Chapter 4	
5A	Sep. 11	Visual Sensory System (Homework #1)	Chapter 4	
5B	Sep. 13	Auditory, Tactile, and Vestibular Systems	Chapter 5	
6A	Sep. 18	Auditory, Tactile, and Vestibular Systems	Chapter 5	Homework #1
6B	Sep. 20	FIRST EXAM	Review Unit 1	
Unit 2: Human-Machine System				
7	Sep. 25 & 27	Cognition	Chapter 6	
8	Oct. 2 & 4	Decision Making	Chapter 7	
9	Oct. 9 & 11	Displays	Chapter 8	
10	Oct. 16 & 18	Control	Chapter 9	
11A	Oct. 23	SECOND EXAM	Review Unit 2	
Unit 3: Human Performance in the Workplace				
11B	Oct. 25	Anthropometry and Workplace Design	Chapter 10	
12	Oct. 30	Anthropometry and Workplace Design	Chapter 10	
	Nov. 1	Biomechanics of Work	Chapter 11	
13	Nov. 6 & 8	Biomechanics of Work (Homework #2)	Chapter 11	
14	Nov. 13	Work Physiology	Chapter 12	
	Nov. 15	Stress and Workload	Chapter 13	Homework #2
15	Nov. 20	Safety and Accident Prevention	Chapter 14	Last Lecture
	Nov. 22	NO CLASS – Thanksgiving Holiday		
16	Nov. 27 & 29	Research Project Presentation		Project
17	Dec. 5	FINAL EXAM	Review Unit 3	