

IE/PSY 57700
Human Factors in Engineering
CRN: multiple
Credits: 3
MWF 2:30-3:20p @ STEW302, Spring 2021

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MW 12:30-1:30 p.m.
by appointment (email)

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Course Description and Objective (adapted from Fall 2020's instructor, Dr. Proctor):

The course provides a survey of Human Factors and Ergonomics with particular reference to human functions in human-machine systems, including interactions with computers, robots, automated vehicles, and so on. We consider basic human capabilities and the ways that these capabilities are taken into account in the design of human-machine systems and work environments.

The goal of the course is for you to acquire the fundamental knowledge and skills of Human Factors and Ergonomics to be able to identify design issues, potential solutions, and how to evaluate those solutions. Specific topics include:

- how the field of Human Factors developed;
- the principles, assumptions, and methods on which the field of Human Factors is based;
- scientific and probabilistic thinking and their roles in Human Factors;
- the systems engineering approach and its implications for Human Factors;
- types of human error and the factors that influence their likelihood;
- facts and theories regarding human perception, cognition, and action and their implications for design;
- physical and environmental factors that need to be taken into account when designing for human use;
- specific methods such as those for assessing mental workload and situation awareness for alternative designs;
- steps for implementing human factors and ergonomics programs within organizations;
- why Human Factors is more important than ever in today's technologically driven society.

You should be able to answer questions about why human factors analyses are needed and what types of factors must be considered for specific design problems. You also should be able to solve problems with, and demonstrate knowledge of, some of the techniques that are available to make informed choices among alternative designs.

Recommended Procedure:

- (1) Read the suggested material from the course outline before the class for which it is assigned.
- (2) Be engaged: Think about how the concepts and principles we cover relate to stories in the news and your everyday life.
- (2) If you have questions pertaining to homework, you should consult with a teaching assistant first.

Text:

The text for the course is the 2nd edition of R. W. Proctor & T. Van Zandt (2008), *Human Factors in Simple and Complex Systems*. Boca Raton, FL: CRC Press.

Course Web Site: <https://purdue.brightspace.com/d2l/home>

The syllabus, office hours, course slides, homework assignments, and additional course information will be posted at the course Web site on Brightspace. To access these materials, you must:

Log on to Brightspace by entering your CAREER account username and password.
Select the course Spring 2021 IE 57700 - Merge.

Lectures will be given in-person from MWF afternoons. All lecture meetings can be accessed through Brightspace typically several hours after the lecture is uploaded.

Your learning will be assessed through a combination of assignments and two exams spread throughout the academic period. Details on these assignments and exams, including a schedule of due dates will be posted on the course website.

Category	Due	Points
Assignments	Monthly (tentatively)	200
Participation	Randomly throughout semester	100
Exam 1	March 5	100
Final Exam	Scheduled date (4-hr window)	100
		Total: 500

Assignments:

Assignments will be assigned approximately monthly throughout the semester. Most will be due a week later unless otherwise specified. The cumulative grade for the assignments will be the equivalent of two exam grades (200 points). The assignments should be prepared by each student team, unless otherwise indicated. Any indication of copied material from someone else, asking help from online sources (e.g., Chegg), or using online resources as “reference” for homework and exams will result in immediate failure in the course and reported to the Office of Dean of Students. Although these assignments are modified and updated each semester; copied projects or ones using numbers from a prior semester will be subject to penalty as determined by the Office of the Dean of Students (see Academic Honesty, below). No exceptions will be made; all cases will be forward to the office of the Dean of Students.

Participation

No make-up for participation assessments. Instead, two lowest participation assessments will be dropped.

Exams and Course Grade:

Two exams will be held, each covering approximately 1/2 of the course. The last of these exams will be the final examination, which will be comprehensive. The exams will be multiple-choice, short answer, calculations, etc., with limited time for taking them. The exam grades will not be curved. The course grade will be determined from the two exam grades and the assignment grades, each of which will be worth as detailed in above table. Assume that the cutoffs will be at 90% for A-, 80% for B-, 70% for C-, and 60% for D-. Scores above thresholds are guaranteed that grade; instructor reserves the ability for slight lowering of threshold for the class.

Academic Guidance in the Event a Student is Quarantined/Isolated:

If you become quarantined or isolated at any point in time during the semester, in addition to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you academic support during this time. Your Academic Case Manager can be reached at acmq@purdue.edu and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email or

Brightspace. We will make arrangements based on your particular situation. The Office of the Dean of Students (odos@purdue.edu) is also available to support you should this situation occur.

Academic Integrity:

Academic integrity is one of the highest values that Purdue University holds. Consistent with the provision of the Purdue University Bill of Student Rights (as proposed by the Board of Trustees, July 13, 1978) and the University Regulations Governing Student Conduct, Disciplinary Proceedings and Appeals (as passed by the Board of Trustees, July 24, 1978), the following policy regarding academic integrity will apply to the course. All exams and homework assignments are designated as individual or group effort only (unless specified otherwise). Dishonesty in these areas will result in failure for the course and will most likely subject other penalties as the Office of the Dean of Students deem appropriate. A student who assists in any form of dishonesty is equally as guilty as the student who accepts such assistance.

Notes are “considered to be ‘derivative works’ of the instructor’s presentations and materials, and they are thus subject to the instructor’s copyright in such presentations and materials.” As such, notes or any other materials from this course cannot be sold or bartered without the instructor’s express written permission. Any notes or course material found online and their uploaders will be identified and reported to the University Copyright Office

Nondiscrimination Statement:

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. More details are available on our course Brightspace table of contents, under University Policies.

Accessibility:

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247. More details are available on our course Brightspace under Accessibility Information.

Mental Health Statement:

If you find yourself feeling some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack, <https://purdue.welltrack.com/>. Sign in and find information and tools at your fingertips, available to you at any time.

If you’re struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and <http://www.purdue.edu/caps/> during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center during business hours.

Emergency Preparation:

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor’s control. Information about changes in this course will be posted on the course web site.

TENTATIVE Topics (Only a selection of topics below will be covered based on class interests)

Topics	Description	Suggested Reading
Topic 1	Intro Human Factors in Engineering	Chapter 1
Topic 2	Research Methods	Chapter 2
Topic 3	System Concept and Human Error	Chapter 3
Topic 4	Human Information Processing/Psychophysical Methods	Chapter 4
Topic 5	Perceptual Factors & Their Application: Vision	Chapter 5-6
Topic 6	Audition and the Other Senses	Chapter 7
Topic 7	Displays	Chapter 8
Topic 8	Attention	Chapter 9
Topic 9	Memory Stores and Working Memory	Chapter 10
Topic 10	Situation Awareness	Chapter 10
Topic 11	Decision Making and Decision Aids	Chapter 11
Topic 12	Skill Acquisition and Expertise	Chapter 12
Topic 13	Response Selection and Principles of Compatibility	Chapter 13
Topic 14	Motor Skill	Chapter 14
Topic 15	Types of Controls and Their Features	Chapter 15
Topic 16	Physical Ergonomics	Chapter 16-17
Topic 17	Macroergonomics & Teaming with Humans & Automation	Chapter 18

Important Dates

Reading Day	2/17
EXAM 1	3/5
Reading Day	3/19
FINAL EXAM	To be announced
