IE/PSY 57700
Human Factors in Engineering
Fall, 2019

Dr. R. W. Proctor
Department of Psychological Sciences
Purdue University
703 Third Street
West Lafayette, IN 47907-2081

Office: PSYC 3150
Phone: (765) 494-0784
Course E-Mail Address: ta577@purdue.edu
Instructor E-Mail: rproctor@purdue.edu
Office Hours: On campus: TBA
Off campus: TBA

Course Description and Objective:

The course provides a survey of Human Factors and Ergonomics with particular reference to human functions in human-machine systems. 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 objective of the course is for you to learn:

-- 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 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 mental workload analysis for evaluating alternative designs;
-- the steps for implementing human factors and ergonomics programs within organizations;
-- appreciation of why Human Factors is more important than ever in today's technologically driven society.

At the end of the course you should know why human factors analyses are needed, what types of factors must be considered for specific design problems, and the techniques that are available to make informed choices among alternative designs.

Recommended Procedure:

(1) Read the assigned 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.

Required Text:

The text for the course is the 3rd edition of R. W. Proctor & T. Van Zandt (2018), *Human Factors in Simple and Complex Systems*. Boca Raton, FL: CRC Press.

Course Web Site: https://mycourses.purdue.edu

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

Log on to Blackboard Learn by entering your CAREER account username and password.
Select the course IE or PSY 577.

Homework Projects:

Homework projects will be assigned weekly, usually in the class session that is held on Friday. Most will be due a week later. The projects should be prepared individually by each student, unless otherwise indicated, and not copied from someone else. The projects are modified and updated each semester; copied projects or ones using numbers from a prior semester will not receive credit and may be subject to stronger penalty (see Academic Honesty, below). The cumulative grade for the projects will be the equivalent of an exam grade (25%).

Course Grade:

Three exams will be held, each covering approximately 1/3 of the course. The last of these exams will be the final examination, which will not be comprehensive. The course grade will be determined from the three exam grades and the homework projects grade, each of which will be worth 25%.

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 effort only (unless specified otherwise). Dishonesty in these areas will result in failure for the quiz or exam and will most likely subject the student to failure in the course. 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.

Major Campus Emergency:

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.

Mental Health Syllabus 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.

TENTATIVE SCHEDULE

Session	Topic	Reading Assignment
Session 1 (Aug. 19)	Human Factors in Engineering	
Session 2 (Aug. 21)	Historical Foundations	Chapter 1
Session 3 (Aug. 23)	Research Methods 1: Scientific Method	Chapter 2
Session 4 (Aug. 26)	Research Methods 2: Research Design	Chapter 2
Session 5 (Aug. 28)	Research Methods 3: Statistics	Chapter 2
Session 6 (Aug. 30)	System Concept and Human Error	Chapter 3

Session	Topic	Reading Assignment
	LABOR DAY (09/02)	
Session 7 (Sept. 4)	Human Reliability Analysis	Chapter 3
Session 8 (Sept. 6)	Human Information Processing/Psychophysical Methods	Chapter 4
Session 9 (Sept. 9)	Signal Detection Theory	Chapter 4
Session 10 (Sept. 11)	Chronometric and Physiological Methods	Chapter 4
Session 11 (Sept. 13)	Perceptual Factors & Their Application: Vision	Chapter 5
Session 12 (Sept. 16)	Visual Perception	Chapter 5
Session 13 (Sept. 18)	Visual Acuity and Color Vision	Chapter 6
Session 14 (Sept. 20)	Perceptual Organization	Chapter 6
Session 15 (Sept. 23)	Depth & Motion Perception, and Pattern Recognition	Chapter 6
Session 16 (Sept. 25)	**EXAM 1 (tentative date)**	
Session 17 (Sept. 27)	Audition, Proprioception, and the Chemical Senses	Chapter 7
Session 18 (Sept. 30)	Static Visual Displays	Chapter 8
Session 19 (Oct. 2)	Warning Lights and Dynamic Visual Displays	Chapter 8
Session 20 (Oct. 4)	Auditory and Tactual Displays	Chapter 8
	OCTOBER BREAK (10/7-10/8)	
Session 21 (Oct. 9)	Attention	Chapter 9
Session 22 (Oct. 11)	Attention and Mental Workload	Chapter 9
Session 23 (Oct. 14)	Memory Stores and Working Memory	Chapter 10
Session 24 (Oct. 16)	Long-Term Memory and Comprehension	Chapter 10
Session 25 (Oct. 18)	Situation Awareness	Chapter 10
Session 26 (Oct. 21)	Problem Solving and Reasoning	Chapter 11
Session 27 (Oct. 23)	Decision Making and Decision Aids	Chapter 11
Session 28 (Oct. 25)	Skill Acquisition and Expertise	Chapter 12
Session 29 (Oct. 28)	Naturalistic Decision Making & Expert Systems	Chapter 12
Session 30 (Oct. 30)	Response Selection and Principles of Compatibility	Chapter 13
Session 31 (Nov. 1)	Population Stereotypes and Dual-Task Performance	Chapter 13
Session 32 (Nov. 4)	**Exam 2 (tentative date)**	
Session 33 (Nov. 6)	Control of Movement	Chapter 14
Session 34 (Nov. 8)	Acquisition and Retention of Motor Skill	Chapter 14
Session 35 (Nov. 11)	Types of Controls and Their Features	Chapter 15
Session 36 (Nov. 13)	Control Panels	Chapter 15
Session 37 (Nov. 15)	Engineering Anthropometry	Chapter 16
Session 38 (Nov. 18)	Manual Materials Handling & Cum. Trauma Disorders	Chapter 16
Session 38 (Nov. 20)	Design of Workspaces and Environments	Chapter 16
Session 39 (Nov. 22)	Environmental Ergonomics: Lighting and Noise	Chapter 16
Session 40 (Nov. 25)	Temperature and Air Quality; Stress	Chapter 17
	THANKSGIVING BREAK (11/27-11/30)	
Session 42 (Dec. 2)	Macroergonomics and Team Performance	Chapter 18
Session 43 (Dec. 4)	The Practice of Human Factors	Chapter 19
Session 44 (Dec. 6)	Course Highlights and Summary	
	FINAL EXAM - To be announced	