

INDE 549A/ENVH 549A: Human Factors In Engineering Design

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Office Hours: Monday 2:30-3:30 pm (or by appt)

Course Material on Canvas

Class Hours: T/Th 2:30-3:50pm

Class Room: MEB 245

Course Description

The objective of this course is to provide students with knowledge on research methods that are used in the field of human factors. Students will be provided the fundamental guidelines for survey design, controlled experiments, quasi-experimental, and observational studies. The focus will be on safety, productivity, functionality, and usability. The class will review weekly journal articles on research methods and design issues related to operator performance given functional, psychological, physiological, and environmental constraints.

Required Materials

- Designing for People: An Introduction to Human Factors Engineering, 3rd edition.
Authors: Lee, Wickens, Liu, and Boyle
Can purchase on [Amazon.com](https://www.amazon.com)
There is a Facebook page with additional resources: <https://www.facebook.com/groups/134491173834029/>
- Journal article readings (on canvas)

Prerequisites/Corequisites

There are no prerequisites or corequisites for this class. However, an introductory class in Human Factors would be useful. I will go over many concepts from the introductory class (at a high level only) in class.

Weekly Quizzes

Students are expected to read the material before class. Weekly quizzes will be administered on canvas and students are expected to take the quiz before class each week. The quizzes will be based on the class readings.

Course Objectives

Successful students will:

1. Understand tools and research methods to understand human-machine interactions
2. Know how to perform a cognitive task analysis
3. Know how to examine user trust, acceptance, and satisfaction
4. Know the differences in controlled and uncontrolled experiments and the analysis challenges with each
5. Understand how to design studies to examine a product or service with the human operator in mind.

Midterm and Class Project

There is one midterm in this class and a final project. The midterm may be take home or in-class. In the past, it has been take-home, but I am open to having an in-class exam.

The final project includes multiple parts to be completed throughout the quarter. If done correctly, many parts of the final project will be completed before it is due. This is a group project with only one paper and one presentation per group. A peer evaluation (to be filled out by each person) is also due on the day of the Final Exam.

Grading

Graded Items	Percent
No quizzes	0
Write-ups of readings	10
Class discussions/participation	20
Take-home midterm	20
Final Project	
Part I	5
Part II	10
Part II	15
Presentation	5
Final Paper	15
Total	100

Course Policies

During Class

I understand that the electronic recording of notes will be important for class and so computers will be allowed in class. Please refrain from using computers for anything but activities related to the class. Phones are prohibited as they are rarely used for anything in the course. **You are expected to participate in class.**

All course material (included HW and project assignments) is on canvas. You have a responsibility to help create a classroom environment where all may learn. This means that you will treat other members of the class with courtesy. The points for participation will be allocated according to the following basis: attentiveness and contributions to class discussions, and student responses to periodic in-class requests to clarify and identify confusing topics, potential quizzes, and exam questions.

Attendance Policy

Attendance is expected in all lectures. Valid excuses for absence will be accepted BEFORE class. In extenuating circumstances, valid excuses with proof will be accepted after class. For every unexcused class missed, the participation grade will be dropped 1 point.

Academic Integrity and Honesty

Students will be held to the highest standards of academic honesty. There are specific actions that are considered academic dishonesty, cheating or fraud. I follow the list outlined on the following website: <https://faculty.washington.edu/mlg/students/cheating.htm> Students who conduct any of the behavior outlined in the above website will receive a failing grade in the course. If any of the items outlined on the website is unclear, it is up to the student to clarify any and all information outlined in this syllabus with me.

Collegiate Policies

For each quarter hour credit in the course, students are expected to spend 2-3 hours per week preparing for the class sessions. Given that this class is 3 credit hours, the standard out-of-class preparation is 6-9 hours.

Accommodations for Disabilities

Under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, instructors must make reasonable accommodations for students who have verifiable physical, mental, or learning disabilities. Therefore, if you require seating modifications or testing accommodations or accommodations of other class requirements, please let me know so that appropriate arrangements may be made.

Weekly Schedule

The schedule is tentative and subject to change. There is one midterm and one final project. ASSIGNED READINGS are due at 2 pm on the Tuesday listed before class.

Week 1. Intro to Human Factors Engineering

27 Mar: Fitting Research Design to Research Purpose, Basic vs Applied
29 Mar: User centered design, Design cycle

Week 2. Task Analysis

(Reading 1: Militello and Hutton, 1998)
3 Apr: Physical and cognitive task analysis
5 Apr: Ethical Issues: Internal Review Board

Week 3: Design Methods

(Reading 2: Jaspers IJMI 2009)
10 Apr: Iterative Design and Refinement
12 Apr: OUT OF TOWN

Week 4. Qualitative methods and assessments

(Reading 3: vanDongen et al, 2016)
17 Apr: Heuristic Evaluations, Usability Testing
19 Apr: Focus Groups, content analysis

Week 5. Controlled Studies

(Reading 4: Rodes and Gugerty HF, 2012)
24 Apr: Constructing laboratory studies, internal and external validity
26 Apr: MIDTERM

Week 6. Data Analysis of Controlled Studies

1 May: Study Designs
3 May: Correlation vs Causality, AB Testing

Week 7. Quasi Experiments, Survey Design

(Reading 5: Kyriakidis et al 2015)
8 May: Quasi Experiments and evaluation research
10 May: Developing survey instruments, survey sampling methods, Analysis of survey data

Week 8. Observational Methods and Naturalistic Research

(Reading 6: Aksan et al, Geriatrics, 2016)
15 May: Data recording instruments
17 May: Extraction of naturalistic data for analysis

Week 9. Objective vs Subjective Measures

(Reading 7: Looije et al, Int. J HCI, 2010)
22 May: Performance and physiological measures
24 May: Capturing attitudes, perceptions, stress, workload, performance

Week 10. Synthesizing Research Results

(Reading 8: Fox and Hendler, Science, 2011)
29 May: Data visualization, reporting results
31 May: How to prepare awesome presentations

June 5th, 4:30-6:30 pm: Final Presentations