Industrial Engineering 340 / Psychology 358: Human Factors

2025 Spring

Department of Industrial and Enterprise Systems Engineering

University of Illinois at Urbana-Champaign

# Course Description

Introduction to human factors and ergonomics, covering topics of human information-processing, neurophysiological and biomechanical functioning, and implications for (re)design of technology and workplace settings. The field of Human Factors and Ergonomics (HFE) is interdisciplinary with applications in which humans interact with technology in systems context. Examples will be drawn from manufacturing, medicine, aerospace, transportation, computing and Artificial Intelligence. Students will learn an overview of HFE principles and understand how they fit into analysis, engineering design, and systems integration. Typical design and operational problems in work domains, as well as their HFE solutions, will be highlighted. Students will be strongly encouraged to apply HFE principles to specific real-world problems. Also, the course will seek to improve the teamwork, written and oral presentation skills of each student.

**Credits**: 4

# Schedule:

Lectures: Tuesdays and Thursdays, 10:00-11:20 a.m.

In-person at 2310 Everitt Laboratory

Laboratories: Monday, either 11-11:50 a.m. or 12:00-12:50 p.m. at 137 Loomis Laboratory, or,

Wednesday, either 9-09:50 a.m. or 10-10:50 a.m. at 1057 Lincoln Hall

**Instructor:**

Professor Kim, Inki PhD (inkikim@illinois.edu)

**Teaching Assistants:**

 Eraslan, Emre (emree2@illinois.edu), Jiang, Yilan (yilanj2@illinois.edu)

# Course Goals:

1. Increase your interest and awareness of HFE issues in society and industry.
2. Illustrate how to recognize and identify HFE problems.
3. Provide with basic concepts, methods, and tools to tackle these problems.
4. Inspire students with human-centered perspective for the future of AI-embedded systems.

# Course Outcomes:

1. **[Problem definition]** Identify real-world Human Factors and Ergonomics problems in the context of technology-human(s) interaction.
2. **[Problem analysis]** Use relevant concepts, methods, and tools covered in class to better understand the problem, thereby advance the HFE methodology.
3. **[Solution development]** Propose, implement, and validate a solution to tackle the problem analyzed. The solution may differ by the track you choose:
* ***Track 1*** *– Quantitative analysis, modeling, or simulation*
* ***Track 2*** *– Qualitative analysis and human-subject study*
* ***Track 3*** *– Human-centered design*
* ***Track 4*** *– Human-systems integration*
1. **[Project dissemination]** Draft an academic report and present the outcomes in poster. \*Submitting to a peer-reviewed article, workshop / conference, or design competition hosted by HFE society or other professional community will be highly evaluated. This plan for professional dissemination must be discussed in advance with the instructor.

# Course Prerequisites:

PSYC 100, PSYC 103 (not necessary, updating system), or consent of instructor.

# Textbook:

“Designing for People: An Introduction to Human Factors Engineering" (3rd edition, August 31, 2017)

Editors: J. D. Lee, C. D. Wickens, Y. Liu, and L. N. Boyle. Publisher: CreateSpace Independent Publishing Platform ISBN-10: 1539808009; ISBN-13: 978-1539808008

**Canvas:** [**https://canvas.illinois.edu**](https://canvas.illinois.edu/)

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas Learning management system course website at [**https://canvas.illinois.edu**](https://canvas.illinois.edu/)**.** You are responsible for regularly checking the course site as well as your email and Canvas messages to learn of any updates.

***Note: Class material is copyright to the University of Illinois at Urbana-Champaign and should not be distributed or disseminated.***

# Grading Scale: Straight (i.e., no +/-)

90% and up: A 80% - 89%: B 70% - 79%: C 60% - 69%: D below 59%: F

# Grade Determination

* **25%** Quizzes (in class): One quiz/week, except the week of the midterm and the last week, for 13 in the semester. Your grade is based on the top 10 (lowest 3 are dropped) - each one kept is 2.5% of your final grade.
* **28%** Labs: Lab meetings are each week – you are expected to attend!
	+ 6%Individual labs: The lab in weeks 1, 2, and 15 are completed individually. Each is worth 2% of your final grade.
	+ 20% Team labs: There are five labs that will be completed in teams assigned by the instructor. For each of these labs, you will have one week to get and review the assignment and begin working on it, followed by a second week dedicated for your team to work on writing up your findings in a full laboratory report (template and rubric will be provided). Lab reports are due via Canvas on the weekly due date in the second week (i.e., Friday at 11:59 p.m.). Each lab report is 4% of your final grade.
	+ 2% Lab Attendance
* **10%** Exam 1
* **10%** Exam 2
* **27%** Project – 5-page minimum written report (22%) and poster presentation (5%). Additional details below with more to be provided.

# Project:

Projects are to be done in teams, assigned by instructor. The project will be your team’s own choice from one of the tracks specified in Course Outcomes. Note that the project topic and solution must be discussed and approved by the instructor. Deadline for topic approval and more details will be announced at a later date. Expectations are that the project is representative of the knowledge, tools, and techniques obtained in this course. The project has two components:

1. **Written report:** Reports will be written as a technical document using proper spelling and grammar (i.e., technical writing). The structure will be done in ***HFES Annual Meeting paper*** format. Reports should be typed and formatted in style of conference of submission.
2. **Poster presentations:** The last two days of class will be presentations (half of the class will go on the Tuesday, half on Thursday – each half should bring their posters to their respective day). Poster presenters will field questions from faculty, staff, and students.

# Electronic copies of both the written report and the poster are due by 11:59 p.m. the day of the final exam period.

# Summary of Grade Determination

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| **Item** | **Points out of Maximum Points** |
| Quizzes | Sum of top 10 scores out of 25 points |
| Individual Labs | Sum of scores out of 6 points |
| Team Labs | Sum of scores out of 20 points |
| Lab Attendance | 2 points out of 2 points |
| Exam 1 | Score out of 10 points |
| Exam 2 | Score out of 10 points |
| Project | Score out of 27 points |

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| Final Grade | Summation of all of the above, out of 100 points (i.e., it works just like apercentage – look at the scale above for letter grades) |