IE 1061: HUMAN FACTORS ENGINEERING

Spring 2025 Course Syllabus

Credit: 3

Lecture Hours

Monday 1:50-4:25 pm, S202

Instructor

Xiaomei Tan, xiaomei.tan@scupi.cn
Office: N417, SCUPI Building
Office hours: M/T/W 12:50-1:50 pm
Contact instructor:

- Attend office hours or via email
- Extra office hours will be offered by appointment.

Teaching Assistant

Qihang He, 2021141520149@stu.scu.edu.cn

TA Responsibilities: TAs primarily support the instructor across a range of tasks, including grading homework, lab reports, and exams, addressing student inquires, and contributing to the smooth functioning of educational environments.
Contact TAs: QQ Group or via email

Please Note: While emailing the instructor or TA, please kindly include "IE 1061" in the subject line for efficient communication. Please use your university email account (student_ID@stu.scu.edu.cn), as emails from other sources could be caught by the SCU spam filter.

Textbook or Reference Book

- **Designing For People: An Introduction to Human Factors Engineering** (3rd ed.) by John D. Lee, Christopher D. Wickens, Yili Liu, & Linda NG Boyle. CreateSpace.
- **Human Factors in Engineering and Design** (7^{th} ed.) by Mark S. Sanders and Ernest J. McCormick. McGraw Hill.

Course Description

Human Factors Engineering is an interdisciplinary course that explores the interaction between humans and systems, emphasizing the design and evaluation of user-centered systems. This course covers key topics of cognitive characteristics of people and their implications for design, including design methods, sensory systems (visual, auditory, tactile, and vestibular), cognitive processes, decision-making, and human-computer interaction. Students will gain a comprehensive understanding of how human capabilities and limitations influence system performance, as well as practical skills in applying human factors principles to system design and evaluation.

Course Objectives

This course aims to provide students with a deep understanding of human sensory systems and cognitive processes, and how they affect system interaction and design. Students will learn fundamental human factors design methods and evaluation techniques, develop a solid grasp of human-automation and human-computer interaction, and understand the role of cognition and decision-making in system performance. The course also aims to provide students with the tools and knowledge to apply human factors principles to improve system usability, safety, and performance across various contexts.

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Analyze human sensory and cognitive processes and their impact on system interaction.
- Apply human factors design methods to develop user-centered systems.
- Utilize appropriate evaluation techniques to assess system performance and usability.
- Design and evaluate human-computer and human-automation interfaces, ensuring alignment with human capabilities.
- Understand and apply decision-making models to optimize system performance and safety in real-world applications.

Applicable ABET Outcomes

This course addresses several applicable ABET, including

- an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Grading

- In-class exercises and attendance: 10%
- Homework: 10%
- Lab participation and report: 20%
- Midterm exam: 30%
- Final exam: 30%

Attendance

Attendance at lectures and labs is mandatory. Missing Three or more sessions will result in a loss of all the attendance points. Absences of five or more will lead to failure (F grade) in the course. To monitor attendance at lectures, in-class exercises will be conducted randomly. **NO makeup in-class exercises will be permitted.**

Homework and Lab Reports

[Due] Homework and lab assignments will be distributed periodically throughout the semester. Due dates and times will be posted to Blackboard. **Late work will receive a penalty of up to 20% per day**, unless certified medical proof is given. It is advised that assignments be submitted in advance of the designated deadline to avoid any potential lateness. It is the students' responsibility to ensure accurate and timely submission.

[Submission] Homework and lab reports must be typed and presented in a professional manner and be submitted in **one PDF format file through the Blackboard**.

[Grading Criteria] The full score of each assignment and lab is 100 points. **Directly copying and pasting AI-generated content without analysis will be considered academic misconduct and will result in a complete loss of points.**

Exams

[Format] Exams are scheduled following the course timetable. **Closed book, closed notes. A single A4-sized cheat sheet is allowed** with content handwritten on both sides.

[Attendance] Attendance for exams is mandatory. In case of foreseeable absences, it is the students' responsibility to inform the instructor one week prior to the event and provide written verification of the reason for missing the exam. For unforeseen emergencies, it is the students' responsibility to provide written verification within one week after the event. Makeup exams will be arranged as needed. Failure to give prior notice for an absence will result in a "**ZERO**" score, except in exceptional cases.

Course Policy

1. Class and lab participation

Regular class attendance as well as active participation in course activities is expected. It is the students' responsibility to complete all assigned in-class tasks. Any required student absences should be reported to the instructor in advance via email or if not possible in advance, shortly thereafter.

2. Academic integrity

Students are expected to uphold academic integrity by completing all assignments and exams independently. **Any violations, including cheating, plagiarism, unauthorized collaboration, and uncredited use of generative AI tools for assignments, will result in severe consequences, including possible failure of the course.** Specific violations include:

- **Cheating**: Copying from others, using unauthorized materials, receiving or providing unauthorized help during exams, such as trading examinations, whispering answers, passing notes, or using electronic devices to transmit or receive information.
- **Plagiarism:** Presenting someone else's work, ideas, or data as your own without giving credit. Sources include published works such as book, movies, websites, and unpublished works such as other students' papers or material from a research service. The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that you did not arrive at on your own. Sources must be given regardless of whether the material is quoted directly or paraphrased.

- **Unauthorized Collaboration:** Working with others on assignments without instructor approval. If in doubt, seek permission from the instructor before working with others. Students are encouraged to learn from one another: form study groups, discuss assignments, BUT each assignment must be the student's individual work unless specified as a group task.
- **Multiple Submissions:** Submitting the same work for credit in multiple courses without prior approval.
- **AI-Generated Content:** Students are permitted to use AI tools to assist with their coursework, provided the content is not directly copied and pasted without critical engagement. When using AI-generated material, students must thoroughly review, modify, and integrate the content into their own work, ensuring it aligns with course objectives and demonstrates their understanding of the subject matter. **All sources, including AI-generated content, must be properly cited to avoid plagiarism.** The purpose of AI tools is to assist in the learning process, not to replace individual thought and effort. **Directly copying and pasting AI-generated content without analysis will be considered academic misconduct and will result in a complete loss of points.**

3. Accommodation

Students requiring accommodations should schedule a meeting within the first week of classes.

Tentative Course Schedule (February 24, 2025)

Week	Date	Topic	Chapter
1	2/24	Introduction to HFE	1
2	3/3	Design Methods; Evaluation Methods	2, 3
3	3/10	Visual Sensory System	4
4	3/17	Auditory, Tactile, and Vestibular Systems	5
5	3/24	Lab#1: Illumination & Noise	/
6	3/31	Cognition	6
7	4/7	Decision-Making and Macrocognition	7
8	TBD	Midterm Exam	
9	4/21	Displays	8
10	4/28	Lab#2: Human Perception and Cognition	/
11	5/5	*May Day Holiday (No class)*	/
12	5/12	Controls	9
13	5/19	Human-Computer Interaction	10
14	5/26	Human-Automation Interaction	11
15	6/2	*Dragon Boat Festival (No class)*	/
16	6/9	Lab#3: Human-Computer Interaction	/
17	TBD	Final Exam	

Please Note: The schedule is subject to change based on the classroom driven and the interactive nature of this course. All topics will be covered, but order may vary. Changes to the schedule (exams, additional information provided, etc.) will be announced during the lecture period and updated in syllabus. Students are responsible for noting these changes.