University of Southern California
ISE 570 – Human Factors in Engineering

Time: Tuesdays 4:00-7:50 pm
Location: GFS 108

Instructor: Yalda Khashe
Office: https://usc.zoom.us/my/yaldakhashe
Office Hours: By appointment on Wednesdays 2-3 pm
Contact Info: khashe@usc.edu

Catalog Course Description:
Psychological systems and physiological characteristics of humans; how they impact engineering design of technological systems and human-computer interactions.

Text:
Designing for People: An introduction to Human Factors Engineering, by J. Lee, C. Wickens, Y. Liu and L. Boyle, published by CreateSpace, 3rd edition (2017), ISBN: 9781539808008

A Guide to Human Factors and Ergonomics by M. Helander, published by CRC Press, 2nd edition (2005), ISBN: 9780429212376

Supporting texts:
Introduction to Work Study, by George Kanawaty, published by International Labour Office (ILO), 4th edition (1992), ISBN: 9221071081.

Managing the Unexpected, by Karl E. Weick, Kathleen M. Sutcliffe, Published by John Wiley & Sons, Inc., 3rd edition (2015), ISBN: 9781118862414.

Interaction Design: Beyond Human-Computer Interaction, by J. Preece, H. Sharp, Y. Rogers, Wiley & Sons Publishers, 5th edition (2019), ISBN: 978-1-119-54725-9

The Encyclopedia of Human Computer Interaction, by Mads Soegaard and Rikke Friis Dam, 2nd Edition (2012), available at https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed

Please note that handouts and case studies will be posted on Brightspace.

Learning Objectives:
- ✓ Evaluate the role of human in technological systems and its impact on society, environment and current affairs
- ✓ Analyze the impact of introducing new technologies in technological operations
- ✓ Evaluate the ergonomics considerations and risk factors associated with the design of tools, interfaces, workstations and systems
- ✓ To identify human error potentials, safety risks and accidents analysis
- ✓ To evaluate, analyze and design human-computer interaction
- ✓ Develop, articulate, and defend a specific viewpoint in a case study in cooperation with peers
- ✓ Conduct and report original research in the area of human factors and ergonomics

<u>**Course Expectations and Policies**</u>:

***Course Expectations and Netiquette*:** To ensure a cooperative learning environment, each student is expected to read the text before each class meeting time, and prepare to actively participate during class discussions, team-related activities, presentations, and writings. Netiquette is network etiquette; a set of rules that encourages appropriate and courteous online behavior. The list of "Netiquette Rules for Class" is included on page 7 of this syllabus. Students are expected to engage in behaviors that enhance the learning environment. Our goal is to optimize the learning experience for all the students; therefore, disruptive behaviors are prohibited and will not be tolerated.

Participation and Attendance Policy: It is expected that students will attend class regularly and participate in the class discussion throughout the semester. Participation involves actively listening and volunteering answers to questions and moving the discussion along toward a shared understanding. The participation grade will be assigned at the end of the semester based on objective (contribution to class discussions, interaction with TA/Instructor inside and outside the classroom) and subjective (contributing meaningful questions/answers, illustrating comprehension of course material) assessment by the instructor. The participation rubric is included at the end of this syllabus.

***Academic Integrity*:** The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the [USC Student Handbook](). All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the [student handbook]() or the [Office of Academic Integrity's website](), and university policies on [Research and Scholarship Misconduct]().

Course Content Distribution and Synchronous Session Recordings Policies: USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Assignment Submission*:* Homework descriptions will be posted on Brightspace and assignments are due at the beginning of the class and should be submitted online through Brightspace. Electronic submission must be in MS Office formats. Take-home exams have problems, essay questions, and case studies.

Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually or in groups. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, using AI-generated tools is prohibited in this course, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

In-class Work, Class Discussions, and Final Participation Grade: We encourage students' participation in class discussion. The participation grade will be assigned at the end of the semester, and 50% of the final participation grade is based on the in-class exercises and case studies. There is no make-up or late submission for in-class assignments. Three lowest grades will be dropped at the end of the semester.

Students will complete work assigned during class time, such as small group assignments, open-notes quizzes, and polls that count towards their in-class work grade. Case studies will be presented at the end of each topic (given the time availability) as an in-class group exercise. Each team will read a case and present it briefly. The questions associated with each case will be discussed in the class by all the students. There is no late submission for in-class exercises. Most activities are designed as group exercises; however, no credit will be given to team members who miss the exercises. Credit will be given for thoughtful completion.

Due Dates/Make-Up Work: Exams must be taken as scheduled. Assignments are due as scheduled. Make-ups will be allowed only if the student has contacted the professor before the due date, detailing a serious problem. There is no late submission for in-class assignments. Make-up midterm should be scheduled before the next instruction session and cannot be taken before the scheduled exam. Travel plans do not count as documented emergencies. Please consult the course outline before making any plans. The final exam date/time cannot be rescheduled.

***Online Communication Policy*:** Students are encouraged to contact the instructor by USC email and schedule a meeting during office hours. In the subject line, indicate the course number and a very brief summary of the email. Simple questions will be answered by email, but for more complex discussions, students may be instructed to schedule a zoom meeting.

Grading:

Letter Grades Table:

96–100	A	75–79	C+
91–95	A-	70–74	C
87–90	B+	65–69	C-
84–86	B	60–65	D+
80–83	B-	56–60*	D

* Grades less than 56: F

The final grade will be based on the above table combined with the cluster analysis of all the students' grades. Which will be explained in detail in the first class session.

The final course grade will be determined based on the following weights:

Exam 1 .... 24 %
Exam 2 .... 26 %
Case Studies .... 10 %
Research Project .... 30 %
Participation/in-class exercises .... 10 %
Peer Evaluation .... *

According to USC policy: *"No student is allowed to retake a final examination or do extra work in a course after the semester has ended for purposes of improving his/her grade."* https://arr.usc.edu/forms/ARR_Grade_%20Handbook.pdf

*Peer Evaluation will be indirectly reflected in the final Term Project grade and the participation grade

Tentative Course Outline[1]:

Date		Topics	Reading	Deliverables
01	Aug 27	Introduction and Logistics of the course Introduction to Human Factors and Ergonomics	*LE[2]-Ch1* *HM-Ch1*	
02	Sep 3	Human System & Human-centered Design	*LE-Ch 2&12* *MH- Ch 8&9*	Teams: students will form teams of two and finalize their team with the instructor.
03	Sep 10	Human System & Ergonomic Design Engineering Anthropometry and Workspace Design	*LE-Ch11* *MH- Ch 8&9*	
04	Sep 17	Design of work areas, tools, equipment & physical work environment	*LE-Ch 3&4* *ILO Handouts*	
05	Sep 24	Human Information Processing, and sensory systems, Cognition and Decision making ***Research Proposal Presentation***	*LE-Ch 4-7*	Proposals: Each team will give a 10-minute presentation on their chosen research topic, background, motivation and next steps.
06	Sep 31	Human-Computer Interaction and Interaction Design Design of displays and controls & prototyping	*LE-Ch 8-10* *PR-Ch 10* *SD-Ch 38*	
07	Oct 8	***Exam I – October 7-8 (Take-home)*** ***October 10 – Fall Recess – University Holiday***		Take-home exam: No lecture and the class time is dedicated to your exam.
08	Oct 15	User experience & usability heuristics	*SD-Ch 4* *Handout[3]*	
09	Oct 22	Human-Automation Interaction HCI design in emergency control applications in driverless vehicles	*LE-Ch 11* *Handout*	
10	Oct 29	New technology integration and Human and organizational factors of complex technological systems ***Research Progress Report Presentation***	*Handout*	Proposals: Each team will give a 10-minute presentation on their research progress discussing findings (lit review), methodology and next steps.
11	Nov 5	Socio-technical system design, macro-ergonomics & process mapping Human error, safety and accident prevention	*SD-Ch 24* *LE-Ch 16*	
12	Nov 12	Safety Culture, High Reliability Organization Case Study: Aviation-Boeing 737 Max accidents	*HRO* *Handout*	
13	Nov 19	***Exam II – November 18-19 (Take-home)***	*Handout*	Take-home exam: No lecture and the class time is dedicated to your exam.
14	Nov 26	Case Study: Railroad-WMATA & Chatsworth accidents *(Asynchronous session)*		
15	Dec 3	***Final Project Presentations***	-	***Assignment Due: HW8*** ***Due: Presentation slides (12/2-11:59pm)*** ***Due: Project Paper (12/2-11:59pm)*** ***Due: Peer evaluations (12/2)*** ***Due: Course evaluation (12/2)***

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[1] Schedule may be revised to accommodate the content and pace of the class learning process. Due dates and case studies are subject to change.

[2] Textbooks: LE: Lee et. al, MH: Helander, HRO: Weick & Sutcliffe, SD: Soegaard and Dam, PR: Preece et. al

[3] Handouts will be posted on Blackboard prior to each session.

In-class Work and Class Discussions

Students will complete work assigned during class time, such as small group assignments, open-notes quizzes, and polls that count towards their in-class work grade. Case studies will be presented at the end of each topic (given the time availability) as an in-class group exercise. Each team will read a case and present it briefly. The questions associated with each case will be discussed in the class by all the students. There is no late submission for in-class exercises. Most activities are designed as group exercises; however, no credit will be given to team members who miss the exercises. Credit will be given for thoughtful completion. The lowest two scores on in-class work will be dropped.

Research Term Paper

Student will form a team of two and write a research paper related to the topics covered in the class. Alternative and/or sample topics will be discussed during the class sessions. In this paper, the students will investigate and research a topic of their interest based on the materials covered in the class.

Term Paper Proposal: The teams will give a 10-minute presentation that includes the potential topics of the research, the problems statement, motivation and the research question. Teams will receive feedback from the instructors and their peers. This presentation is P/NP.

Research Progress Report Presentation: The students will give a 10-minute presentation discussing their findings on the chosen topic, literature review, methodology and next steps.

Final Term Paper: The term paper should include all the steps that the students have taken to define the problem, literature review, analysis and discussion of the results and suggest recommendation (if applicable). For each term paper the following standard for contents are expected.

Section	Grade
Abstract	5
Introduction	10
Literature review	25
Analysis / discussion	35
Conclusion	15
References	10

Final Presentation: Students will present their findings in class at the end of the semester.

Criteria	%	Excellent
Content of the presentation	85	● Covering the main topics assigned to each presentation. ● Relating the topics to course material discussed in lectures ● Supplemental external research included in the presentation ● Providing relevant and informative examples
Presentation style and professionalism	15	● Professional slides (Fonts, format, etc.) ● Presentation style ● Multimedia and other creative approaches to presentation

Peer Evaluation and Final Grade: All team members will receive equal grades, contingent to team members' confirmation of their participation, however each member has a chance to evaluate the other members at the end of the semester. Peer Evaluation will be reflected in the final Term Project grade and the participation grade. Please note that if you fail to submit your peer evaluation on time, you will not receive any points towards your own evaluation.

Criterion	Name	
(Assign **0 to 5** for each criterion)	Team Member 1	Team Member 2
1 Ability to communicate effectively: listening and talking with respect		
2 Willingness to help others		
3 Creativity in performing the tasks assigned		
4 Ability to offer solutions and accept constructive criticism		
5 Spend time and work hard to finish the project		
6 Availability and flexibility		
Total Points/6		

NOTE:

Course materials and grades will be posted on the Brightspace page. Please make sure that you have access to Brightspace oard and your **USC account** is up and running.

Participation Rubric

Excellent Performance	Fair / Average Performance	Unacceptable Performance
• Initiates information relative to topics discussed • Accurately exhibits knowledge of assignment content • Clarifies points that others may not understand • Shares personal experiences or opinions related to the topic • Offers relevant/succinct input to class • Actively participates in labs and class exercises • Demonstrates ability to apply, analyze, evaluate & synthesize course material. • Demonstrates willingness to attempt to answer unpopular questions • Builds on other students' contributions	• Participates in group discussions when asked • Demonstrates knowledge of course material • Offers clear, concise, "good" information on class assignments • Offers input, but tends to reiterate the intuitive • Attends class regularly	• Fails to participate even when specifically asked • Gives no input to discussions • Does not demonstrate knowledge of the readings • Shows up to class: does nothing • Distracts group/class • Irrelevant discussion

Statement on Academic Conduct and Support Systems

Academic Integrity:
The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, comprises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).

Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university. All incidences of academic misconduct will be reported to the Office of Academic Integrity and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - *(213) 740-5086 or (213) 821-8298*

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - *UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call*
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - *UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

Office of the Ombuds - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.