

IE 1061 Human Factors Engineering
Spring 2020 (SCUPI)
(TBA)

Time/Place: Tuesday 8:15 – 11:00, Teaching Building 1A408.

Instructor: Dr. Steve Hsueh-Ming Wang
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Office Hours: Tuesday, Wednesday, 13:00 – 16:00; Thursday 8:30 – 11:30 or by appointments.

TA: Remon Ding (丁鑫涛)
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Textbooks: *An Introduction to Human Factors Engineering, 3rd Edition* by Lee, Wickens, Liu, Boyle

Course This course provides an introduction to human factors engineering.

Description: The science of Human Factors seeks to gather information on human physical and mental capabilities and apply this information to the design / redesign of things people use. The purpose of Human Factors intervention is to enhance work performance, safety and user satisfaction.

- Course Overview - Introduction
- Research Methods
- System Design
- Task Analysis
- Cognitive Aspects of Human Factors
- Information Processing
- Visual Displays: Static and Dynamic
- Motor Skills
- Human Errors
- Automation
- Decision making
- Selection and training
- Ergonomic Aspects of Human Factors
- Material Handling
- Controls – Compatibility and Lag
- Controls – Hand Tools
- Anthropometry and Design
- Arrangement of Controls and Displays
- Work Environment
- Illumination
- Noise
- Organizational Failure
- Work Physiology
- Psycho-social factors

Course Objectives:

- To provide the student with a basic understanding of human factors engineering theory and practice over a diverse range of potential applications
- Apply various human factors industry-based software.
- Familiarize the student with information resources and techniques used by human factors professionals to design and evaluate consumer products, machines, workplaces, work organizations
- To apply these concepts and principles in a team-based design project.

- Engineering Criteria Outcomes:**
- An ability to apply knowledge of mathematics, science, and engineering
 - An ability to design a system, component, or process to meet desired needs
 - An ability to function on multi-disciplinary teams
 - An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice issues

Exams: There will be **two** exams. Please see schedule attached. **If you have to miss an exam**, please see me prior to the scheduled date to make the proper arrangements. If it is an emergency, please see me as soon after the emergency as is possible. To be fair to everyone, I will have to see some sort of proof that it was a true emergency.

Project: There will be a project that will be completed in small groups and will involve the human factors design/redesign of some type of tool, device, or product that we will discuss in the beginning of the class. It will be a group assignment and you will be assigned to a group. The project will be monitored throughout the three weeks with memos required at certain times (see schedule). More information will be given at a later time, but the format will be different than in prior years... First, there will be no final report... rather; you will be making a YouTube Video instead...

Note: Group members who do not participate adequately in their groups in the project could receive a **much lower** grade for the project. You will rate yourself and your teammates on each project. If you do not carry your own weight, I will grade some individuals separately where necessary!

Case Study: There will be **twelve** cases for each week. We will have one group to present their solutions at the beginning of the class and have a quiz for each of you after the presentation and discussion. The assigned group needs to upload your slides before the class starts.

Labs: There will be 12 laboratories concerning concepts in this class. The group lab report needs to be uploaded on the Blackboard before the next weekly class starts.

Note some of the initial work will start in the labs – so attendance will be required

If you cannot make a lab, please see the TA prior to the scheduled date to make the proper arrangements. If you do not see us prior to the schedule date, you will not be able to make up the lab/exam unless you have an approved doctor's note explaining your absence.

- Student Conduct:**
1. Engineers are educated professionals, and every engineer is expected to subscribe to a professional canon of ethics.
 2. Please upload the assignments, quizzes, and exam papers in a timely manner.
 3. Academic integrity is taken very seriously. I have no objections if you wish to study with friends or work together on homework – in fact, you should feel free to do so! However, all work that you turn in must represent your own effort (i.e. you do the first problem, your friend does the second problem is not considered working together!). Cheating of any form on labs or exams and plagiarism on projects or reports will result in a grade of 0!

Course Grade:

	Normal
Mid-term Exam 1	20
Final Exam 2	30
Projects (Group Presentations)	20
Laboratories (Reports)	15
Case studies (Presentations, Quizzes)	15
Total	100

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Wk	Date	Topic	Tool	Lab/Case	
1	2/25	Course Overview			1
2	3/3	Research Methods	Excel	Brightness/Medical Devices	2
3	3/10	Design and Task Analysis	Statgraphics	Audio/Turing Operations	3
4	3/17	Visual Sensory Systems	Gephi	Network Analysis/Smart City	4
5	3/24	Auditory, Tactile and Vestibular System		Song/Apple 3D Touch	5
6	3/31	Cognition		/Pattern Recognition	6
7	4/7	Cognition		/Evolutionary	6
8	4/14	Group Presentation (Critical Thinking)			
9	4/21	Mid-term Exam			
10	4/28	Decision-making	(AnyLogic)	System Dynamics/	7
11	5/5	Control	Matlab	Kalman Filter I/	8
12	5/12	Displays	Matlab	Kalman Filter II/	9
13	5/19	Applied Anthropometry & Workplace Design		Work Breakdown Analysis/	10,11
14	5/26	Manual Material Handling & Biomechanics		Conveyor Design/	9
15	6/2	Work Physiology & Stress and Workload		Service Design/	12
16	6/9	Human Computer Interaction		APP Design/	13
17	6/16	Group Presentation (Redesign)			
18	6/23	Final Exam Week			
19	6/30	Final Exam Week			