



## Engineering Design VI – EM/ISE 322

*School of Systems and Enterprises*  
Spring 2024

Instructor:	Hao Chen
Course Website:	Canvas
Units:	2 Units
Meeting Times:	Mondays 12-1:50pm and Wednesdays 2-2:50pm
Classroom Location:	Burchard 102
Contact Info:	hao.chen@stevens.edu
Office Hours:	By appointment on Zoom

### COURSE DESCRIPTION

This course provides students with **experiences and tools** for new product and process development. Students will become familiar with systematic approaches to design, and they will explore the design process from problem identification through detailed design, validation, and economic analysis. Tools introduced in earlier courses may be brought together as part of this pre-senior design experience. Discussions of contemporary design issues and class projects will provide experiences and insights to improve the senior project experience.

### STUDENT LEARNING OUTCOMES

After successful completion of this course:

- Students will apply their knowledge of relevant engineering principles and analysis tools to solve complex design problems. (1)
- Students will be familiar with different methods and tools in technical design and appropriately apply them to develop, analyze, and select design solutions. (2A)
- Students will be able to assess the expected performance of designs within the appropriate context and criteria. (2B)
- Students will explore different presentation styles and practice communicating ideas and project progress through written assignments and oral presentations. (3)
- Students will discuss and evaluate design- and systems-related issues that impact today's society and the engineering, design, and management needs within it. (4A)
- Students will become familiar with sustainability and environmental impacts related to ethics and society in regard to the design of products and services. (4B)
- Students will facilitate team projects by managing team members, scheduling, and deliverables throughout the semester. (5A)

- Students will gain experience working within teams and honoring individual commitments to the team. (5B)
- Students will be able to acquire and apply new information and knowledge to address the needs of a design problem (7)

## COURSE FORMAT AND STRUCTURE

This course meets twice per week in interactive, in-person lecture sessions.

## TENTATIVE COURSE SCHEDULE

#	Week Starting	Topic(s)	Notes & major assignments (tentative)
1	Jan 17	What is design?	No Monday
2	Jan 22	Engineering/systems design challenges	
3	Jan 29	Leadership, teamwork, and personal styles	Teams form
4	Feb 5	Problem definition and system boundaries	
5	Feb 12	Market research and voice of the customer	
6	Feb 21	Concept generation and creativity	Mon class held Wed;
7	Feb 26	Selecting the best concept & Communication	
8	Mar 4	Midterm presentations	Presentations & PR1 due
Spring Break			
9	Mar 18	Getting survey results	
10	Mar 25	Detailed design	
11	Apr 1	Prototyping, testing, and validation	
12	Apr 8	Production and economics	
13	Apr 15	Business planning	
14	Apr 22	Design reviews	
15	Apr 29	Final presentations & course reflections	Final presentations & Final report due

## COURSE MATERIALS

**Textbook:** *Optional (not required, any edition is fine):* Ulrich, Karl T., Eppinger, Steven D., and Yang, Maria C. (2020). *Product Design and Development*, 7th edition, McGraw Hill. ISBN: 978-1260043655.

**Materials:** Software such as Excel will be needed for some of the in-class activities. The instructor will let students know in advance when these are needed.

## COURSE REQUIREMENTS

- Participation** Students are expected to show up on time to class sessions and participate in all class discussions and polls. Group discussions and team project work will take place during class, so missing class will be detrimental to your learning and your team's progress. Therefore, attendance will be monitored. Students who are clearly not actively present during class (nonresponsive to questions and/or not participating during group discussions) will be counted as absent. **[10%]**
- Discussions** One time during the semester, each student will (as part of a group of students) lead a 7- to 10-minute class discussion on a contemporary topic and how it relates to design or systems thinking; discussion leaders will choose a topic from the news or from an everyday issue that they experience; leaders are expected to prepare a 2- to 4-minute introduction to the topic (using multimedia if possible) and a number of discussion prompts to tie in design topics and keep the conversation going. **[10%]**
- Reports** Each team will submit 2 written reports (1 progress reports and 1 final report) on the progress of the project, addressing specific parts of the design process detailed in the assignment prompts. [20% for progress reports and 25% for final report; total **45%**]
- Presentations** Each team will deliver an in-class presentation on their progress in the middle of the semester as well as their final projects at the end, evaluated based on the quality of their work to date as presented; evaluation rubrics will be disseminated with assignment prompt on Canvas. [15% for mid-term and 20% for final; total **35%**]

## GRADING PROCEDURES

Grades will be based on:

Class attendance & participation	(10 %)
Discussion leads	(10 %)
Midterm presentation (team)	(15 %)
Progress report (team)	(20 %)
Final presentation (team)	(20 %)
Final report (team)	(25 %)

Late Policy:

- Unless otherwise stated, reflections and reports will be accepted up to 3 days late, with a 20% penalty per 24-hour period beyond the due date.
- Failure to show up prepared and on-time for the session in which you are leading a discussion will result in a 20% penalty on that assignment and rescheduling.

## GRADING SCALE

The default Stevens undergraduate grading scheme (below) will be used. No curve should be expected.

Letter:	Range:
A	100 % to 93.0%

Letter:	Range:
A-	< 93.0 % to 90.0%
B+	< 90.0 % to 87.0%
B	< 87.0 % to 83.0%
B-	< 83.0 % to 80.0%
C+	< 80.0 % to 77.0%
C	< 77.0 % to 73.0%
C-	< 73.0 % to 70.0%
D+	< 70.0 % to 67.0%
D	< 67.0 % to 60.0%
F	< 60.0 % to 0.0%

## ACADEMIC INTEGRITY

### Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at <http://web.stevens.edu/honor/>

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

***“I pledge my honor that I have abided by the Stevens Honor System.”***

### Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at [www.stevens.edu/honor](http://www.stevens.edu/honor).

## LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

For more information about Disability Services and the process to receive accommodations, visit <https://www.stevens.edu/office-disability-services> (Links to an external site.). If you have any questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at [pgehman@stevens.edu](mailto:pgehman@stevens.edu) or by phone 201-216-3748.

### *Disability Services Confidentiality Policy*

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

## INCLUSIVITY

### *Name and Pronoun Usage*

As this course includes group work and class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

### *Inclusion Statement*

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.

## MENTAL HEALTH RESOURCES

Part of being successful in the classroom involves a focus on your whole self, including your mental health. While you are at Stevens, there are many resources to promote and support mental health. The Office of Counseling and Psychological Services (CAPS) offers free and confidential services to all enrolled students who are struggling to cope with personal issues (e.g., difficulty adjusting to college or trouble managing stress) or psychological difficulties (e.g., anxiety and depression). CAPS is open daily from 9:00 am – 5:00 pm M-F. Evening hours are available by appointment in the Fall / Spring semesters and up-to-date information regarding the availability of evening appointments can be found by visiting [www.stevens.edu/CAPS](http://www.stevens.edu/CAPS) (Links to an external site.). To schedule an appointment, call 201-216-5177.

Due to the pandemic, in-person appointments may be limited until further notice. Up-to-date information about the availability of in-person services can be found at [www.stevens.edu/CAPS](http://www.stevens.edu/CAPS) (Links to an external site.). Teletherapy (therapy via secure video platform) is available to

registered students physically located in the states of New York or New Jersey. Students located outside of NY / NJ are encouraged to pursue local treatment through their personal health insurance. To learn more about the process of finding a therapist please visit the CAPS webpage on Seeking Help Off-Campus

## EMERGENCY INFORMATION

In the event of an urgent or emergent concern about the safety of yourself or someone else in the Stevens community, please immediately call the Stevens Campus Police at 201-216-5105 or on their emergency line at 201-216-3911. These phone lines are staffed 24/7, year round. For students who do not reside near the campus and require emergency support, please contact your local emergency response providers at 911 or via your local police precinct. Other 24/7 national resources for students dealing with mental health crises include the National Suicide Prevention Lifeline (1-800-273-8255) and the Crisis Text Line (text “Home” to 741-741). If you are concerned about the wellbeing of another Stevens student, and the matter is *not* urgent or time sensitive, please email the CARE Team at [care@stevens.edu](mailto:care@stevens.edu). A member of the CARE Team will respond to your concern as soon as possible.