EM Senior Design Sequence (Engineering Design VIII) – EM 424 A/X5

School of Systems and Enterprises
Spring 2024

Meeting Times:	Tuesdays and Thursdays 2:30pm – 4:20pm
Classroom Location:	McLean 209
Instructor:	Hao Chen
Contact Info:	Kenneth J. Altorfer Academic Complex 416, hao.chen@stevens.edu
Office Hours:	TBD or by appointment
Course Web Address:	Canvas
Prerequisite(s):	EM 423
Co-Requisite(s):	IDE 402 (Spring)
Cross-listed with:	ISE 424 A/X5, ME/CPE/CHE/EE/EN 423 X5

COURSE DESCRIPTION

This is the second class of the year-long, two-course sequence involving the students in a small-team Engineering Management design project. The problem for the project is taken from industry, business, government or a not-for-profit organization, or an approved student defined project. Each student team works with a client and is expected to collect data, analyze it and develop a preliminary design to be written up in a report due the end of the first semester.

In the second semester the design solution to address the problem/need is completed as well as a prototype to demonstrate the feasibility of the design, and a final written report that covers the project from beginning to end. During the year, oral and written progress reports are presented to peers, faculty and clients.

The total project involves the application of the subject areas covered in the EM 385 Innovative Systems Design course, as well as skills learned in the other technical and non-technical courses of the Engineering Management curriculum.

EM 424 Design 8: After successful completion of this course, students will be able to…

Course Outcome	NEW
The student proposed a final design that was developed by applying principles of engineering, science and mathematics, and considers public, health, safety and welfare.	**2A**
Implement/prototype the designed solution for the purpose of assessment of its appropriateness with consideration of global, cultural, social, environmental and economic factors.	**2B**
The student applied EM tools and methods to inform decision making to make better decisions.	**6**
Continuously assess the scope and progress of your senior design project and prepare/adjust/manage a project plan to achieve a desired outcome.	**4A**
Practice professional conduct and appearance throughout the course.	**4B**
The students demonstrate the willingness and ability to lead a team.	**5A**
The student actively worked on a team and functioned in a team based environment whose members may be different disciplines and may have different goals.	**5B**
Appropriately document the design, its rationale and impact in an understandable and comprehensive report	**3**
Assess their projects wider impact on society and compliance with ethical responsibilities and standards.	**4B**
Develop a budget for expected expenses necessary to complete the project taking into account environmental and social contexts. Actual expenses shall be accounted for according to good accounting practice.	**4C**
You are able to assess the impact of the design in a global, economic, environmental and societal context.	**4D**
The student is able to actively research and learn new tools/methods and/or consult with faculty/subject matter experts when necessary to complete the design.	**7**

FORMAT AND STRUCTURE

Senior Design is not a normal class in the traditional sense. It is a framework for teams of students to complete a design project. Senior Design is also tightly integrated with the IDE 400, 400 & 402 Innovation and Entrepreneurship sequence that further guides the teams in identifying, describing, analyzing and presenting the potential entrepreneurial and/or business value of their design. Periodic presentations and written submissions will be required by individual team members as well as each team. These will provide the detail findings, methods used, decisions made etc. The presentations and written reports will form the basis for the final design report that is due at the end of the semester.
Teams are required to meet during the scheduled meeting times and as needed with their project sponsors and faculty advisors.

The design process is divided up in 5 phases – 3 in the fall and 2 in the spring. Each phase is kicked off with a lecture that details the purpose and expectations of the phase as well as reviews some key concepts that are relevant for the phase. Each phase is concluded with a presentation (and in some cases demonstration) by each team, as well as a written report that details out important findings, methods used, decisions made etc. These written reports will also form the basis for the final project report that is due at the end of the project.

The project phases are as follow:

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Week 1-8 Prototype Detailed Design and Implementation

This phase is about finalizing the design and implementing a working prototype, as well as planning a test/piloting phase. This phase culminates in a Test/pilot-Phase Readiness Review before Spring Break which includes a prototype demonstration.

Week 9 - 15 Test/Pilot and Entrepreneurship Phase

This phase is about testing (and refine if necessary) your solution and collecting/analyzing data to assess your solution against the initial goals and requirements of the project. This phase will also include preparing the Innovation and Entrepreneurship materials from IDE 403 as it pertains to your project, and finalizing all design documentation. This phase culminates in the Senior Design Expo day, including participation in the Elevator Pitch Competition, and a Final Presentation and submission of the final documentation.

The teams are responsible for their own progress between the main milestones and to proactively seek the information, knowledge, and advice they need to complete their project successfully from previous course materials and notes, the literature, the client/sponsor, the Professor, other faculty members and other relevant sources. The Professor and/or TA will be available at the beginning of each class meeting, and stay for as long as there are questions and discussions. The Professor and/or TA will also have a more formal meeting with each team every week to discuss progress and potential issues.

Expenses and prototyping

EM Senior Design projects normally do not incur any significant expenses. We will reimburse expenses related to the project up to $500 per team.

In some cases a project might have a need for a bigger budget (e.g. for prototyping). This is something that should be identified during the concept and preliminary design phases. A preliminary budget with justification should be presented at the Concept Proposal presentation, and a final budget, no later than the Preliminary Design Review. This will be evaluated and considered for additional funding.

OTHER COURSE MATERIALS

Relevant resources will be distributed on the course page on Canvas

COURSE REQUIREMENTS

Class Meetings:

Teams will meet every Tuesday and Thursday. These meetings may include your sponsor and/or faculty advisor.

Professionalism:

The Professionalism part of the overall grade is constituted by the following components:

Weekly Status Meeting with the Professor (Dedicated time for teams to meet) (Team Assignments):
Each team must meet outside of class time before the meeting to *review the previous week's progress and plan next week's activities with clear responsibilities and expected outcomes.* Progress, issues and action items/assignments will be discussed with the Professor, and have to be captured in Meeting Minutes to be uploaded to the appropriate "Team Meeting Minutes" Assignment).

Individual Design "Notebook" submissions (Individual Assignments):
Each student should keep a dedicated, personal design notebook that you maintain on a regular basis where you record research findings, insights, ideas, and other thoughts briefly relevant to the project. The notebook should contain 5 sections:

- Exploring
- Planning
- Understanding
- Modeling
- Reflections

Submit your Notebook at each milestone, either as a pdf, a word document, or a Google Document link. If it is handwritten take picture(s) of or scan the pages.

Bi-Weekly Meetings with Advisors/Sponsor (Team Assignments):
Each team member will have an opportunity to serve as Project Manager for a period of time. The Project Manager is responsible for leading the team to set goals for the upcoming week and provide a brief written summary of the progress and issues encountered at the end of the week (made available on Canvas). Upload the meeting minutes to the corresponding Canvas Assignment

Sponsor/Client Relationship Management (Team Assignments):
Each team will schedule weekly or bi-weekly meetings with their external sponsor and/or advisor. You are expected to maintain a professional and courteous relationship with anyone that supports you throughout your project. Especially important is the relationship with a sponsor. Some components of a good relationship are; keeping appointments, commitments and deadlines, staying in regular communication about project progress as well as any issues which arise. The score here will be based on a survey to your client/sponsor.

Presentation Skills :
Presentations are expected to be given in a professional and concise manner. This includes your appearance, your delivery, mannerisms and interaction with the audience before, during and after the presentation. It also includes the general narrative/flow of your presentation and the design of the presentation material. The content itself will be graded as part of the Presentation grade. All

presentations must be uploaded to Canvas as noted in the assignments. Rubrics for the presentations will be available on Canvas.

Well Written Project Report (Team Assignments):
The project includes all associated deliverables at each milestone as outlined in document templates, syllabus as well as in the kick-off lecture for each phase. It also includes prototypes and associated documentation
The quality of the content will be assessed separately.

Clients/Sponsors/Advisors are encouraged to participate in all presentations. They MUST be present at the final presentation of each semester for you to receive the full grade for Client Relationship. Attendance on Zoom qualifies as being attending.

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.

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. Student Counseling and Disability Services works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, and psychiatric disorders 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 SCDS staff. The SCDS staff will facilitate the provision of accommodations on a case-by-case basis. These academic accommodations are provided at no cost to the student.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the

office of Student Counseling, Psychological & Disability Services. The Family Educational Rights Privacy Act 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.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/sit/counseling/disability-services. If you have any questions please contact:
Lauren Poleyeff, Psy.M., LCSW - Diability Services Coordinator and Staff Clinician in Student Counseling and Disability Services at Stevens Institute of Technology at lpoleyef@stevens.edu

INCLUSIVITY STATEMENT

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in education and innovation. Our community represents a rich variety of backgrounds, experiences, demographics and perspectives and Stevens is committed to fostering a learning environment where every individual is respected and engaged. To facilitate a dynamic and inclusive educational experience, we ask all members of the community to:

- be open to the perspectives of others
- appreciate the uniqueness their colleagues
- take advantage of the opportunity to learn from each other
- exchange experiences, values and beliefs
- communicate in a respectful manner
- be aware of individuals who are marginalized and involve them
- keep confidential discussions private

Semester Schedule Spring 2024:

Week	Tuesday 2:30pm-4:20pm	Thursday 2:30pm-4:20pm	Misc.
1 Jan. 15		Class Meeting: Semester Kick Off Lecture (Detailed Design/Implementation)	Jan 17th First day of classes
2 Jan. 22	Status Meeting with your team	Class Meeting: Instructor meeting with teams	
3 Jan. 29	Status Meeting with your team	Class Meeting: Instructor meeting with teams (Student *Presentation: Progress*)	
4 Feb. 5	Status Meeting with your team	Class Meeting: Instructor meeting with teams	
5 Feb. 12	Status Meeting with your team	Class Meeting: Instructor meeting with teams (Student *Presentation: Progress*)	**02/12 Internal deadline for Proposal and Video for RASC-AL only**
6 Feb. 19	Status Meeting with your team	Class Meeting: Instructor meeting with teams **(No class)**	Monday Feb 19th. – Presidents Day
7 Feb. 26	Status Meeting with your team	Class Meeting: Instructor meeting with teams (Student *Presentation: Progress*)	
8 March 4	Status Meeting with your team	Class Meeting: **Test Readiness Review (Incl. Demo of Functional Prototype)**	03/07 Deadline to Submit Proposals and Videos to RASC-AL
9 March 11	**SPRING BREAK** **(No class)**	**SPRING BREAK** **(No class)**	
10 March 18	Status Meeting with teams	Class Meeting: Lecture: Test and Design Analysis	
11 March 25	Status Meeting with your team	Class Meeting: Instructor meeting with teams (Poster board draft)	March 29 – Good Friday

12 Apr. 1	Status Meeting with your team	Class Meeting: Instructor meeting with teams	
13 Apr. 8	Status Meeting with your team (Poster board is due)	Class Meeting: Review EXPO Layout, Material and "Props"	**04/05 Fianlist Teams are Notified (RASC-AL)**
14 Apr. 15	Prepare for the Senior Design Expo and the final presentation	**Final Presentations (with Sponsor)**	
15 Apr. 22	**Final Presentations (with Sponsor)**	**Friday 4/26** **SENIOR DESIGN EXPO** **(No class)**	
16 Apr. 29	**Final week begins (No class)**		
17 May 6	**Final Report Due Monday 05/06 @ 9am**		