Course Syllabus

✎ Edit

SSW423 (Fall) & SSW424 (Spring)

Engineering Design VII & VIII

Course Title: Engineering Design VII & VIII

Course #: SSW423 (Fall) & SSW424 (Spring)

3 credits for each course

4 contact hours per week - two 100-minute sessions

Schedule: Mon and Tuesday: 2:30PM-4:20PM;

Location: Howe 404 Skyview 1 -- Moved to Altorfer 115, after 1st day.

Instructor: Darian Muresan, Ph.D. (https://www.linkedin.com/in/darian-muresan/)

eMail: dmuresan@stevens.edu (mailto:dmuresan@stevens.edu)

Office Location: Babbio 533, Altorfer 115, and Zoom (https://stevens.zoom.us/my/dmuresan)

Office Hours:

Monday 4:00pm-6:30PM,

Wednesday 12:00pm-2:00pm,

Thursday 12:30PM-2:30PM

Catalog Description:

This year-long, two-course sequence involves the students in a small-team Software Engineering project. The problem for the project is taken from industry, business, government, or a not-for-profit

organization. Each student team works with a client and is expected to collect data, analyze it and develop a design by the end of the first semester. In the second semester, the design solution of the problem is completed and a written report is submitted for binding. 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 SSW 322 Software Design VI, as well as skills learned in the other technical and non-technical courses of the Software Engineering curriculum.

Prerequisites: SSW215, SSW315, SSW345, SSW322
Corequisites: TG 403 (Fall), TG 404 (Spring)

Grade for SSW-423

Professionalism (weekly reports + attendance)	30%
Demos and Presentations	30%
Milestones (Proposal, Concept, Preliminary Design)	40%
TOTAL	100%

Grade for SSW-424

Professionalism	20%
Test Readiness Review and Demonstration	40%
Final Report and Presentation	40%
TOTAL	100%

Peer Evaluation for Grading: An online, anonymous team peer assessment will be done at regular intervals (approx. every two weeks). The outcome of this assessment can be used for individual adjustment of the grade for the associated milestone of up to +/- 20% based on contribution to the team.

Course's Objectives:

After successful completion of this course, students will be able to…
• 3.1 Conduct tests and experiments to assess the operational and economic effectiveness/potential

of the solution
• 4.1 Research and analyze a client’s or stakeholder’s problem/need, and develop an understanding of the context of that problem/need and relevant constraints to serve as a foundation to design an appropriate solution
• 5.1 Based on a thorough understanding of the problem, and relevant constraints (such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability), develop solution alternatives that address the problem, and select a preferred solution.
• 5.2 Implement/prototype the designed solution for the purpose of assessment of its appropriateness
• 6.1 Develop a budget for expected expenses necessary to complete the project. Actual expenses shall be accounted for according to good accounting practice.
• 6.2 Assess the task at hand and choose the appropriate Software Engineering tools and methods.
• 7.1 Assess the scope of their senior design project and prepare a project plan to achieve the desired outcome. The students shall continuously assess their progress according to the plan and manage their projects accordingly
• 7.2 Practice professional conduct and appearance throughout the course
• 7.3 Assess their projects' wider impact on society and compliance with relevant laws, regulations, and standards as well as potential IP issues or opportunities
• 8.1 Demonstrate the willingness and ability to lead a team.
• 9.1 Demonstrate the ability to work on a team.
• 10.1 Appropriately document the design, its rationale, and its impact in a comprehensive report. They shall also be able to present this to a diverse audience.
• 13.1 Actively research and learn new tools/methods and/or consult with faculty/subject matter experts when necessary to complete the design.

Course Format and Structure:

Senior Design is not a normal class in the traditional sense. It is a framework for teams of students to realize a design project from early opportunity/problem exploration to an implemented, tested, and analyzed prototype. Senior Design is also tightly integrated with the TG 403/403 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.

The design process is divided into 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 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.

Overall Schedule

While the overall course structure tends to follow a waterfall management style, I will try to spice the

course with a more agile approach, following the guidelines presented in the following book:

UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design. by Arlow, Jim., Neustadt, Ila. United Kingdom: Pearson Education, 2005.

- **SSW 423 – Fall:**
  - Week 1-3 (by 9/22/2024)
    - Team Formation,
    - Project Selection and
    - Definition of Project Mission

      This phase is about building a team, selecting a project, and interacting with clients and/or “ideal customers” to define/understand the objectives for your project, how they fit into their overall business objectives and why this project is important to them. This phase culminates in the Project Kick-Off Presentation that presents the team and the Project Mission.

  - Week 4–8 (by 10/27/2024)
    - Concept Development

      This phase is about developing several alternative concepts to achieve the project goals, and proposing a solution concept that has been developed and evaluated based on a thorough understanding of the needs and requirements of relevant stakeholders within realistic and relevant constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability. This phase culminates in the Concept Proposal Presentation

  - Week 9-14 (by 12/7/2024)
    - Preliminary Design

      This phase is about evolving the chosen concept into a well-specified preliminary design that identifies and specifies all internal subsystems/components with respect to what they do, how well they do it, and how they come together to fulfill key performance and quality requirements as well as use-cases at the system level. This phase culminates in a Preliminary Design Review during finals week.
- **SSW 424 – Spring 2024:**
  - Week 1-9 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

which includes a prototype demonstration.

- Week 10 - 16 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 TG 404 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, the TA, 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 TA will also have a more formal meeting with each team every two weeks to discuss progress and potential issues.

Expenses and prototyping

Software Engineering Senior Design projects normally do not incur any significant expenses. We will reimburse miscellaneous expenses related to the project up to $25 per team member. A receipt for the expenses must be presented.

In some cases, a project might need 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.

COURSE MATERIALS

1. UML 2 and the Unified Process: Practical Object-Oriented Analysis and Design. by Arlow, Jim., Neustadt, Ila. United Kingdom: Pearson Education, 2005.

2. Relevant resources will be distributed on the course page on Canvas

COURSE REQUIREMENTS

Professionalism

- **Class Meetings:**
  The class will meet every Monday and Wednesday from 8:00 am to 9:50 am in McLean 211. The classroom is your “office”, and these are your “office hours”. Attendance is mandatory for the first 10 minutes unless you are doing “field work” for your project. Please notify the instructor if you will be out, and why.

- **Weekly Report of Team Activities and findings/results/other outcomes:**
  Each team shall prepare a 1-page report that summarizes the week's activities, and results (findings, insights, experiments, designs, analysis.....) to be due on Wednesdays at 8:00 am before the weekly status meeting.

- **Status Meetings with Professor and TA:**
  Each team will have a 30-minute status meeting during class time with the Professor and/or Teaching Assistant on Tuesdays. During the Concept Development Phase, we will meet weekly, after that we will meet every two weeks. Each team member will rotate as Project Manager for each period. The Project Manager is responsible for leading the team to set goals for the upcoming week, and providing a brief written summary of the progress and issues encountered at the end of the week (made available in the continuously running PDF report). After the Project Manager has reported on last week’s progress, the Project Manager role is then handed over to the next team member, who will outline the goals for the next two weeks. All team members should bring their project/research journals to these meetings.

- **Client/sponsor/potential customers/advisor/... Relationship Management**:
  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 client/sponsor. Some components of a good relationship are: keeping appointments, commitments, and deadlines, staying in regular communication about your progress as well as any issues you might have (you might want to clarify expectations about what “regular” means – some might want frequent updates, whereas others would consider that “spam”). It is also important to manage expectations so that both you and the other party are on the same page regarding what is expected. Every meeting with a client/sponsor/advisor should be documented in the form of meeting minutes that are made available in the weekly submitted PDF report(s) and distributed to the client.

- **Presentation Skills:**
  In your formal miles-stone presentation you are expected to present in a professional fashion. That includes your appearance, your delivery, your mannerisms, and your respectful, but assertive 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 Milestone grade.

Project

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

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 ACCOMMODATIONS

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 (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.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/sit/counseling/disability-services.

contact:

INCLUSIVITY STATEMENT

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 or by phone (201) 216-8728.

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

The course syllabus is last updated on September 6th 2024 by Dr. Darian Muresan. Thanks to Dr. Lu Xiao and Dr. Gregg Vesonder for sharing the original version of the course syllabus.