Course Syllabus

SSW345 Fall 2023

Model-based Software Engineering

Schedule: Tu: 11:00-12:15PM; Th: 11:00-12:15PM

Location: McLean 211

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

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

Office Location: Altorfer-404 and Zoom (https://stevens.zoom.us/my/dmuresan)

Office Hours: Mon: 10:00AM-12:30PM; Wed: 10:00AM-12:30PM

Teaching assistant: Balaji Rao <brao@stevens.edu>

Course Description: This course introduces students to the discipline of developing useful and high-quality software-based systems. Students will be exposed to the techniques needed for the practice of effective software engineering as well as the skills required to succeed as a software professional. Students are expected to gain practical exposure to tools, processes, and principles of software engineering through hands-on projects while understanding models and research ideas behind the tools and processes. Lectures will include workshop style learning experiences, where students get to work on a problem set and receive feedback from the instructor and other classmates.

Prerequisites:

1. SSW 315 Object Oriented Software Engineering or equivalent
2. MA 134 Discrete Math or equivalent

Percentages for:

Attendance: 10%
Quizzes and Exams: 20%
Homework   20%
Labs   20%
Team Project   30%

Late Assignments: 10% off for the first day and 20% off for anything late more than one day.

Grades:

A   100 %   to 93.0%

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%

Course Learning Outcomes:

Program Outcome 1 (Scientific Foundations) - an understanding of the scientific and mathematical basis of engineering

1.1 Identify practices related to software processes (ABET Criterion 3-1)

1.2 Understand basic principles of performance analysis (ABET Criterion 3-1)

1.3 Identify configuration management practices for improving maintenance of software (ABET Criterion 3-1)

Program Outcome 2 (Engineering Foundations) - the ability to use applied scientific knowledge

Program Outcome 2 (Engineering Foundations)- the ability to use applied scientific knowledge

2.1 Implement software engineering practices in a team project (ABET Criterion 3-2)

2.2 Apply deployment practices and patterns   (ABET Criterion 3-2)

2.3 Implement different methods for traversing trees   (ABET Criterion 3-2)

2.4 Design and implement different algorithms for sorting and hashing for an application (ABET Criterion 3-2)

2.5 Compare and contrast design techniques and architectural patterns (ABET Criterion 3-2)

2.6 Measure the quality of software code (ABET Criterion 3-2)

2.7 Gain practical experience on software tools such as web development framework and configuration management (ABET Criterion 3-2)

Program Outcome 3 (Professionalism) - an ability to communicate effectively with a range of audiences

3.1 Discuss the performance tradeoffs between different implementations of data structures and algorithms (ABET Criterion 3-3)

3.2 Understand productivity strategies in personal and social software processes (ABET Criterion 3-3)

Textbook(s) or References:

1. Performance Solutions: A Practical Guide to Creating Responsive, Scalable Software, by Connie Smith and Lloyd Williams, First Edition. ISBN-13: 978-0201722291. ISBN-10: 0201722291.

2. Blaha, Michael R.; Rumbaugh, James. Object-Oriented Modeling and Design with UML (p. 3). Pearson Education

3. Gamma, E., Helm, R., Johnson, R., Vlissides, J. (1994). Design Patterns: Elements of Reusable Object-Oriented Software. India: Pearson Education.

4. The CRC Card Book, by David Bellin (Author), Susan Suchman Simone (Author), Addison-Wesley Professional; (January 1, 1997)

Approximate List of Topics to be covered, but order may be permuted:

1. **Introduction**
2. **UML**
3. **Object Oriented Modeling and Design with UML**
4. **Class Responsibility Collaboration (CRC) Modeling**
5. **Software Design Patterns and Architecture**
6. **Software Performance Modeling**
7. **Software Performance Analysis**
8. **Collaborative Documentation of Models**
9. **Source Control**
10. **Software Processes**
11. **Code Review**
12. **Autobuilds**
13. **Project Days**

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/ ⤴ **(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."

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)** .

Other Policies:

- In this class, we will be making use of active learning techniques such as think-pair-share and a flipped classroom, all of which are designed to strengthen your learning and knowledge acquisition. By working together, we often learn better, develop more sophisticated solutions to problems, and solidify our own understandings. Please come to class ready to collaborate with your peers and be an active participant.
- All students are to abide by the University's policy on academic honesty. The homework submitted should be your own work and not copied verbatim from other students or from other resources. You are allowed to work together, but you should each contribute and be able to explain the solutions if asked. If you work with others and one or more of you do not understand your solutions, it is your responsibility to ask other students or myself for assistance.
- Many of the materials and readings for this class have copyright protections. They are for your sole educational use and should not be shared, copied or distributed without permission of the instructor or the copyright holder. If you have questions about sharing specific materials outside the course, either with colleagues or on the internet, please ask me.
- ChatGPT, Google Bard, other etc. AI tools
  - If used, you must reference them.
  - "Use these tools to help you understand challenging passages in assigned readings, or to build preliminary foundational knowledge to help you understand more difficult concepts. Don't use AI to cheat — use it as a tool to help you learn."
  - Using copy/paste, without understanding the material, is to your own detriment as you will miss an opportunity to learn.

LEARNING ACCOMMODATIONS

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/student-diversity-and-inclusion/disability-services** ⬈ **(https://www.stevens.edu/student-diversity-and-inclusion/disability-services)** . 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). Appointments are can be made by phone (201-216-5177).

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.

ADDITIONAL RIGHTS RESPONSIBILITIES AND

ADDITIONAL RIGHTS, RESPONSIBILITIES, AND RESOURCES

- Students in this class are encouraged to speak up and participate during class meetings. Because the class will represent a diversity of individual beliefs, backgrounds, and experiences, every member of this class must show respect for every other member of this class. I am firmly committed to diversity and equality in all areas of campus life, and I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable, and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, or to participate in, or condone harassment or discrimination of any kind.
- Classroom rules:
  - Respect others' rights to hold opinions and beliefs that differ from your own. Challenge or criticize the idea, not the person.
  - Listen carefully to what others are saying even when you disagree with what is being said. Comments that you make should reflect that you have paid attention to the speaker's comments.
  - Be courteous. Don't interrupt or engage in private conversations while others are speaking.
  - Support your statements. Use evidence and provide a rationale for your points.
  - Allow everyone the chance to talk. If you have much to say, try to hold back a bit; if you are hesitant to speak, look for opportunities to contribute to the discussion.
  - If you are offended by something or think someone else might be, speak up and don't leave it for someone else to have to respond to it.
- Title IX prohibits all forms of gender-based discrimination, including sexual assault and harassment, in federally funded education programs. Title IX reads: "**No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance.**"
- You are encouraged to contact Stevens's Title IX Coordinator to report any incidents of sexual harassment, sexual violence, domestic/dating violence or stalking. The Title IX coordinator is located on the 2nd floor of the University Center and can be reached at **xruci@stevens.edu (mailto:xruci@stevens.edu)** or (201)-216-3383. For more information about Title IX and Stevens's Sexual Assault Response Team (SART) Sites or policies and procedures regarding sexual,

domestic/dating violence and stalking please visit: **https://www.stevens.edu/student-diversity-and-inclusion/title-ix** ⤷ **(https://www.stevens.edu/student-diversity-and-inclusion/title-ix)**

- If a student believes they have been discriminated against or harassed, they are encouraged to contact the Office of Diversity, Equity and Inclusion at 201-216-5624, DEI@stevens.edu, University Center 219, or see **https://www.stevens.edu/student-diversity-and-inclusion/office-of-diversity-equity-and-inclusion** ⤷ **(https://www.stevens.edu/student-diversity-and-inclusion/office-of-diversity-equity-and-inclusion)** for more information.

- The safety of students, faculty, and staff at Stevens is of the utmost importance. Stevens has partnered with RAVE Safety to help you connect with Stevens Campus Police Department in an emergency. **Stevens Guardian** ⤷ **(https://support.stevens.edu/support/solutions/articles/19000053295)** is a mobile app that turns any cell phone into a personalized protection network. It connects you directly with Stevens Campus Police during an emergency and provides important information instantly. Visit the **Stevens Guardian website** ⤷ **(https://support.stevens.edu/support/solutions/articles/19000053295)** for instructions regarding downloading the app.

Disclaimer

This syllabus is intended to give you guidance in what may be covered during the semester but slight modifications, as appropriate, may happen and you will be updated accordingly.