

**University of Maine**  
**School of Computing and Information Science**

**Course Name:** Introduction to Software Engineering    **Number:** COS420/520    **Semester:** Spring 2024  
**Classroom:** Ferland Egr/Edu Design Ctr 106    **Class Hours:** 2:00 PM – 3:15 PM (Tu/Th)

**Instructor:** Sepideh Ghanavati    **Office:** Boardman Hall 234    **Email:** [sepideh.ghanavati@maine.edu](mailto:sepideh.ghanavati@maine.edu)  
**Instructor Office Hours:** Thursdays 12:30 PM – 1:30 PM or by appointment.

**TA:** Shuvra Smaran Das    **TA-Office:** 138 Boardman Lab    **TA-Email:** [shuvra.das@maine.edu](mailto:shuvra.das@maine.edu)  
**TA-Office Hours:** Mondays 10 AM – 2:00 PM

**Catalogue Listing:** Introduces theory and practice for software engineering. Topics include software life cycle, requirements, specification and analysis, software architecture and detailed design, project management, configuration management, testing, and quality assurance.

**Reading Materials (required):** The main textbook of the course is:

- Software Engineering - Ian Sommerville - 10th Edition, 2016
  - Chapters to read will be mentioned every week, under the mandatory part.

**Reading Materials (optional):** The optional/complementary textbook of the course is:

- Software Engineering – Modern Approach, 2<sup>nd</sup> Ed. – E. J. Braude and M. E. Bernstein, 2016.
- Object-oriented Software Engineering – An Agile Unified Methodology – David C. Kung, 2014

The instructor will include the required reading material from the list, at the end of each lecture slide.

**Course Prerequisites:** COS225

**Expected prior knowledge and skills in:** The successful student should have an introductory knowledge of software engineering, including requirements, design, and testing, as well as proficiency in programming.

**Key Topics:**

1. Software Development Lifecycle
2. Requirements Elicitation
3. Requirements Analysis
4. Project Management
5. Modeling Techniques
6. Architectural Design
7. Design Patterns
8. Configuration Management
9. Verification and Validation/Testing and Quality Assurance

**Course objectives:**

The purpose of this course is to introduce theories, methods, and tools in software engineering for developing software systems. Students who succeed in this course will:

- Understand the basic principles of Software Engineering.
- Be able to practice advanced software engineering techniques.
- Be able to model with the Unified Modeling Language (UML).
- Be able to apply software engineering management principles.

**Learning Outcomes & Assessment Methods:**

Students who have completed this course should have the ability to:

Objectives	ABET Outcomes	Assessment Methods
1. Ability to elicit and analyze customer requirements	b, f	P, A, E, D
2. Ability to design software systems using modeling techniques.	c	P, A, E, D, DP
3. Understanding of verification and validation techniques.	c	P, A, E, D
4. Understand project management concepts and teamwork.	d, e, i	P, A, E, D, PR
5. Professionalism and ethics.	d, e	P, A, E, D, PR
6. Understanding the use of software engineering tools, templates, and references.	h	P, A, E, D, DP

**Activities and Evaluation:**

Students' performance will be evaluated based on class participation/discussions, assignments, a project, and peer-review/presentation feedback.

- **Lectures** – There will be 150 minutes of lectures every week, on Tuesdays and Thursdays, in which students will learn about topics in software engineering.
- **Readings** – Students will be assigned readings from the course textbook or academic papers to learn and establish methods based on a strong engineering foundation. Additional readings will be selected and developed by the course instructor as well.
- **(D) – In-class Participation and Discussions on Discord (10%)** – Students reflect on reading materials and discussions in class as well as on the COS420/520 Discord channel. We discuss different subjects related to the course in class, and participation is required. Discussions are **individual** assessments.
- **(A) – Assignments (40%)** – Students have 5 take-home assignments during the semester whereby students apply methods taught in class to sample problems. All assignments will be 8%. All assignments are **individual** efforts.
- **(P) – Project (40%)** – Students will work in a group of 4 or 5 students on a project from the topics given by the instructor. The details of the topics must be approved by the instructor by the deadline specified below. The aim of these projects is to understand advanced software development processes and engineering topics and to develop software applications that are secure and have measures to protect the privacy of the users. The students will give two presentations for the project. The first presentation, which introduces their project, must not be more than 7 minutes (including the Q/A). The second presentation discusses the results of their project and a demo of the tool, and it will be given at the end of the semester. For the project, the students also need to write several documents. The details of the project and the grade rubrics are given in other documents.
- **(PR) – Peer-Review Reports (5%)** – Students are expected to write a peer-review report at the end of deliverables 1 to 5 of the projects about their teammates. Each report is worth 1%. The templates for these reports will be given on Brightspace. All these reports are **individual** efforts.
- **Presentations Feedback (5%)** – Students must assess and give feedback on other students' projects' presentations. Each feedback, i.e., the proposal and final presentation's feedback, is worth 2.5%. The templates for these reports will be given on Brightspace. All these reports are **individual** efforts.

- **(DP) – Design Patterns Presentation (Extra Credit – 5%)** – In a group of two, students are expected to pick one design pattern from the list provided in the design pattern document and create a voice-recorded presentation. More details will be provided in the related document. **This activity is optional for undergraduate students, but it is mandatory for graduate students.**
- **Attendance Policy** – Attendance is not directly mandatory in this course. The students are expected to attend the class on a regular basis, and if they cannot attend the class, they are required to check the lecture slides. All students are required to participate in discussions in class, or on COS420/520 Discord Server regularly to receive the class participation grades.
- **Note that, the total of possible grades in this class is 105, which includes 5% extra credit for undergraduate students. There is no extra credit for graduate students.**

### Grading Policy:

The grading scale for the final mark is as follows:

Letter Grades	Numerical Range	Letter Grades	Numerical Range
A	95 – 100	C	74 - 76.99
A-	90 - 94.99	C-	70 - 73.99
B+	87 - 89.99	D+	67 - 69.99
B	84 - 86.99	D	64 - 66.99
B-	80 - 83.99	D-	60 - 63.99
C+	77 - 79.99	F	0 - 59.99

This scale may be curved to raise student grades at the instructor’s discretion.

- Submitted work is due when specified. **With the instructor’s permission and only in special cases,** you may be able to submit **TWO** days late (with a penalty). For every 12 hours of late submission, 10% points will be deducted. That is, if you are late by *two full days*, the 40% points will be deducted. After 48h, your assignment, project, and reports will be marked as 0, **with no exception.**
- Every submission has to be done through Brightspace in a digital format. Submissions via email or in person will be marked as 0. If you encounter any problems with Brightspace, it is your own duty to inform the instructor **in a timely manner, before the due date.** Brightspace problems can’t be used as an excuse for a late submission.

**Course Schedule:** The table (below) provides the initial distribution of topics discussed over the weeks in the semester. This schedule is tentative and subject to change at the instructor’s discretion. All changes will be announced in class and on Brightspace. In the event of an extended disruption of normal classroom activities, the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

Week	Class (Tu/Th)	Activity	Material
1	01/16 01/18	L0 + L1 L2	Syllabus – Software Engineering Overview Software Process
2	01/23 01/25	L3 L4	Software Project Mng (Agile) – <b>Group Name/Topic (Due Date)</b> Lab – Introduction to GitHub/Docker – <b>Assignment 1 (Posted)</b>
3	01/30 02/01 02/04	L5 L6 -	Lab – Introduction to Android and iOS Development Lab – Introduction to Web Development – REACT/Web Dev <b>Deliverable 0 (Due Date)</b>
4	02/06 02/08 02/11	L7 L8 -	Software Requirements – Overview/Details Software Requirements – Overview/Details <b>Assignment 1 (Due Date)</b>
5	02/13 02/15 02/18	L9 L10 -	Soft. Pro. Mng – Waterfall + Arch. Design – <b>Assignment 2 (Posted)</b> Architecture Design <b>Deliverable 1 (Due Date)</b>
6	02/20 02/22 02/25	L11 L12 -	Architecture Design + Use Case Modeling Use Case Modeling <b>Assignment 2 (Due Date)</b>
7	02/27 02/29 03/03	L13 L14 -	<b>Proposal Presentations – All Teams (Submission 02/26 11:59 PM ET)</b> Introduction to Prompt Engineering – <b>Assignment 3 (Posted)</b> <b>Deliverable 2 (Due Date)</b>
8	03/05 03/07 03/10	L15 L16	Object Interaction Modeling Domain Modeling – <b>Assignment 4 (Posted)</b> <b>Assignment 3 (Due Date)</b>
9	3/11 – 15	-	Spring Break
10	03/19 03/21 03/24	L17 L18 -	Domain Modeling Lab – MongoDB <b>Deliverable 3 (Due Date)</b>
11	03/26 03/28 03/31	L19 L20 -	Design Patterns – <b>Design Pattern Topic (Due Date)</b> Design Patterns <b>Assignment 4 (Due Date)</b>
12	04/02 04/04 04/07	L21 L22 -	Configuration Management – <b>Assignment 5 (Posted)</b> Lab – CI Tools – GitHub Action and Travis CI <b>Deliverable 4 (Due Date)</b>
13	04/09 04/11 04/14	L23 L24 -	Software Testing – <b>Design Pattern Extra Credit (Due Date)</b> Software Testing <b>Assignment 5 (Due Date)</b>
14	04/16 04/18 04/21	L25 L26 -	Lab – Web Testing Lab – Android and iOS Testing <b>Deliverable 5 (Due Date)</b>
15	04/23 04/25 04/29	L27 L28 -	More on Prompt Engineering & ML Ops <b>Presentation Submissions (Due Date)</b> <b>Presentations Feedback (Due Date)</b>

**Academic Honesty Statement:**

Academic honesty is very important. It is dishonest to cheat on exams, to copy term papers, to submit papers written by another person, to fake experimental results, or to copy or reword parts of books or articles into your own papers without appropriately citing the source. Students committing or aiding in any of these violations may be given failing grades for an assignment or for an entire course, at the discretion of the instructor. In addition to any academic action taken by an instructor, these violations are also subject to action under the University of Maine Student Conduct Code. The maximum possible sanction under the student conduct code is dismissal from the University. Please see the University of Maine System's Academic Integrity Policy listed in the Board Policy Manual as Policy 314 (\***Date Issued:** September 1, 2020): <https://www.maine.edu/board-of-trustees/policy-manual/section-314/>

**COVID-19 Return:**

To keep our campus safe, students are expected to comply with all University policies related to the COVID-19 pandemic. For the latest guidance, please visit <https://umaine.edu/return>

The website address could be, alternatively, the system one: <https://www.maine.edu/together/community-guidance/students/>

**Students Accessibility Services Statement:**

If you have a disability for which you may be requesting an accommodation, please contact Student Accessibility Services, 121 East Annex, 581.2319, as early as possible in the term. Students who have already been approved for accommodations by SAS and have a current accommodation letter should meet with me, Dr. Sepideh Ghanavati, privately as soon as possible.

**Course Schedule Disclaimer (Disruption Clause):**

In the event of an extended disruption of normal classroom activities (due to COVID-19 or other long-term disruptions), the format for this course may be modified to enable its completion within its programmed time frame. In that event, you will be provided an addendum to the syllabus that will supersede this version.

**UMaine Student Code of Conduct:**

All students are expected to conform to [the UMaine Student Code of Conduct](#).

**Classroom Civility:**

Civility should be conveyed to all others through courteous expression, politeness, esteem and regard for others, and a general respect for others, regardless of differences from self.

**Inclusive and Non-Sexist Language:**

The University of Maine, as an equal opportunity educational institution, is committed to both academic freedom and the fair treatment of all individuals. It therefore discourages the use of sexist language. Language that reinforces sexism can arise from imprecise word choices that may be interpreted as biased, discriminatory, or demeaning even if they are not intended to be. Accordingly, all University communications, whether delivered orally or in writing, shall be free of sexist language.

This policy shall apply to all future University publications, whether produced through Public Affairs or elsewhere, that are intended for distribution to students, parents, faculty, staff, or other people interested in the University of Maine. University publications shall include, but not necessarily be limited to: University printing office publications; promotional materials distributed by all units of the University both academic and nonacademic; and policy booklets prepared for students and faculty. Inventory on hand of existing publications may be used until exhausted or a publication is revised.

Each member of the University community is urged to be sensitive to the impact of language and to make a personal commitment to eliminate sexist language. Supervisory personnel have a particular responsibility to discuss this policy with faculty and staff and to make available to them guidelines on nonsexist language. Guidelines of the American Psychological Association on the use of nonsexist language provide direction and are recommended because they are brief and list examples, but others may be used. Consult the Communications and Marketing Department or Women's Gender and Sexuality Studies Program for alternatives (<https://umaine.edu/womensgenderandsexualitystudies/>) .

#### **Observance of Religious Holidays/Events:**

The University of Maine recognizes that when students are observing significant religious holidays, some may be unable to attend classes or labs, study, take tests, or work on other assignments. If they provide adequate notice (at least one week and longer if at all possible), these students are allowed to make up course requirements as long as this effort does not create an unreasonable burden upon the instructor, department or University. At the discretion of the instructor, such coursework could be due before or after the examination or assignment. No adverse or prejudicial effects shall result to a student's grade for the examination, study, or course requirement on the day of religious observance. The student shall not be marked absent from the class due to observing a significant religious holiday. In the case of an internship or clinical, students should refer to the applicable policy in place by the employer or site.

#### **Sexual Discrimination Reporting:**

The University of Maine is committed to making campus a safe place for students. Because of this commitment, if you tell a teacher about an experience of **sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct or any form of gender discrimination** involving members of the campus, **your teacher is required to report** this information to Title IX Student Services or the Office of Equal Opportunity.

**If you want to talk in confidence** to someone about an experience of sexual discrimination, please contact these resources:

*For confidential resources on campus:* **Counseling Center: 207-581-1392** or **Cutler Health Center: at 207-581-4000.**

*For confidential resources off campus:* **Rape Response Services: 1-800-871-7741** or **Partners for Peace: 1-800-863-9909.**

**Other resources:** The resources listed below can offer support but may have to report the incident to others who can help:

*For support services on campus:* **Title IX Student Services: 207-581-1406, Office of Community Standards: 207-581-1409, University of Maine Police: 207-581-4040 or 911.** Or [see the OSAVP website for a complete list of services.](#)

#### **Copyright Notice for Materials Accessible through this Website**

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1. Unless the "fair use" provisions of copyright law apply or language is contained in a work permitting its use, permission should be obtained from the copyright holder for copying the work.

2. Use of the instructor prepared web pages and the slides affiliated with each lecture on the syllabus may be assumed to be controlled by the University of Maine System Broad Application Copyleft License (proposed, current, or future) or through a similar license that may be posted at the bottom of each web page.
3. All class videos (lectures) should be assumed to be copyright protected in accordance with the University of Maine System Statement of Policy Governing Patents and Copyrights.

**Contingency Plans in the Event of an Epidemic:**

In the event of influenza or similar epidemic that precludes the ability to meet in face-to-face sessions, assume that the instructor will either (1) host the course on our usual zoom URL for the class at the normal time and everyone will participate at a distance or (2) record a video of the lecture I would have otherwise presented in person and post it for viewing by downloading from the syllabus and/or from a web streaming video site (example: recorded on zoom or recorded and then posted on the Spatial Information Science and Engineering YouTube Channel). All other reading and module assignments should proceed as usual. If you yourself become sick, simply inform the instructor, and the instructor will arrange appropriate extensions based on your particular circumstances.