

# Foundations of Software Engineering

## COMP 7012, Spring 2024

Monday, Wednesday 12:40–2:05 p.m.  
Dunn Hall 124

<https://memphis-cs.github.io/comp-7012-2024-01spring/>

*Please send all emails to all instructors and TAs, and reply-all to all emails.*

Instructor: Dr. Scott Fleming <[Scott.Fleming@memphis.edu](mailto:Scott.Fleming@memphis.edu)>

Office Hours: By appointment; no set hours, but I will make every effort to respond to messages within one business day

Office: Dunn Hall 303; meetings held in [Discord](#),  
or in person by special appointment

Teaching Assistant: Md Muminul Hossain <[Md.Muminul.Hossain@memphis.edu](mailto:Md.Muminul.Hossain@memphis.edu)>

Consulting Hours: By appointment; meetings held in [Discord](#)

## 1 Catalog Description

*COMP 7012 - Fndtns/Software Engr (3)*

*Covers project management; software disciplines (requirements, analysis, design, implementation, testing); software modeling notations; mapping designs to code. Students work in teams to develop a significant software system.*

## 2 Topics

The course will emphasize the following topics (a subset of the knowledge areas in the [Guide to the Software Engineering Body of Knowledge](#)):

- **Software Requirements**, including elicitation, specification, and validation
- **Software Design**, including principles, methods, patterns, and notations
- **Software Construction**, including tools, platforms, and APIs
- **Software Testing**, including levels, techniques, and measures
- **Software Maintenance**, including types and cost
- **Software Configuration Management**, including version control
- **Software Engineering Management**, including planning and estimation
- **Software Engineering Process**, including life-cycle models and assessment

### 3 Course Outcomes

The following are some key learning goals that students in the course are expected to achieve:

1. Use modern software development tools (e.g., Git) to perform effective configuration management.
2. Design and model software using modern modeling languages and notations (e.g., UML).
3. Convey ideas orally through presentations to peers, clients, and faculty.
4. Gather and specify software requirements (e.g., as user stories).
5. Apply a modern software engineering process (e.g., Scrum) to the development of a software project.
6. Produce high-quality software-development artifacts for each phase of the development cycle.
7. Apply modern software testing tools and techniques (e.g., black- and white-box testing).
8. Develop software in collaborative teams.
9. Plan work and to distribute tasks among team members to maximize team productivity.

### 4 Required Equipment

Students will be required to bring a laptop computer to lecture and to have a computer to do the work required for the course.

System Requirements:

- Must have a webcam.
- Capable of simultaneously recording screen-capture and webcam video while running Rails web development tools.

### 5 Required Textbooks

No textbooks are required for this course. All reading materials will be provided by the instructor.

### 6 Evaluation

The following table specifies the **minimum requirements** to earn each letter grade.

	A	B	C	D
Attendance	≤ 3 absences	≤ 5 absences	≤ 7 absences	≤ 9 absences
Participation	≤ 4 demerits	≤ 6 demerits	≤ 8 demerits	≤ 10 demerits
Skills Assignments	6 passed	5 passed	4 passed	3 passed
Software Requirements and Design	A	B	C	D
Project Team Work	A	B	C	D
Project Individual Work	A	B	C	D

Achieving highest marks on all evaluation criteria will earn an A+ grade. Beyond this exception, no +/- grades will be assigned. Failing to meet the requirements for a D grade will result in an F grade.

#### 6.1 Attendance

Lecture attendance is required. Three unexcused absences are allowed without penalty. Having more than 3 unexcused absences will cause your grade to suffer (as per the table above). Arriving to class more than 20 minutes late will be counted as an absence.

### 6.1.1 Excused Absences

To have an absence excused, two criteria must be met:

- **Allowable Reason:** The reason for the absence must be an allowable extenuating circumstance. The instructor will determine if the reason is allowable. Things like an illness and the death of a close relative are typically allowable. Things like attending a wedding and taking a vacation are typically not allowable.
- **Documentation:** Documented evidence confirming the reason for the absence must be provided. The instructor will determine what documentation will be acceptable. One common acceptable form of documentation for an illness is a doctor's note – if you see a doctor, always get one!

## 6.2 Participation

Engagement and participation in the course are critical for learning. A student will receive a demerit for each instance in which they fail to meet expectations for participation. Some common demerits include (but are not limited to) the following.

- **Tardiness:** Each time a student arrives late to class, they will receive a demerit. Also, students are not allowed to enter the classroom beyond the first 20 minutes of class – *come to class on time or don't come at all!*
- **Unsatisfactory Participation:** Just because a student is in class, does not mean that they are engaged and participating (and learning). Examples of unsatisfactory participation include (but are not limited to) failing to complete an in-class activity, failing to bring a laptop to class, and failing to join the course Discord. Each time a student fails to meet expectations for participation, they will receive a demerit.
- **Special Days:** Certain days will be designated as special—for example, days on which assessments are administered or student presentations are given. An unexcused absence or other participation demerit on such days will result in an additional demerit.

## 6.3 Skills Assignments (SAs)

Skills Assignments will have students perform actual software engineering tasks using their laptop software development environments. A key aim of the Skills Assignments is to help student acquire the skills needed to perform core development tasks quickly and correctly. Such skill and efficiency are essential to being an effective software development team member.

- **SA Parts:** There will typically be three parts to each Skills Assignment. Each part will have a submission deadline and must be completed on time.
  - **Active Reading (AR):** Read and perform the steps in a specified set of development demos.
  - **Practice Test (PT):** In class, a task will be assigned that must be completed in a fixed amount of time (typically 30 minutes). Following the test, a demonstration will be given, and students who didn't successfully complete the task will have an opportunity to complete it.
  - **Explanation Video (EV):** Students will record themselves performing a third task, and they will explain each step they perform as they perform it.
- **Laptop Development Environment Requirement:** It is the student's responsibility to have and maintain a working laptop development environment to use for the Skills Assignments.
- **All-or-Nothing Pass/Fail Grading:** Each Skills Assignment will be graded as pass/fail (i.e., no partial credit). *All parts* of a Skills Assignment must be passed in order to pass the Skills Assignment. Failure to pass even one part of a Skills Assignment will result in a failing mark for the whole Skills Assignment.

## 6.4 Team Project

The centerpiece of this course is a team software project. Teams of roughly 4 students will work together to develop a software system for a customer.

*I reserve the right to assign the teams, and to reshuffle them as I see fit.*

Team projects in an educational setting must balance two concerns: (1) the need for students to work together as cohesive teams, and (2) the need for individual accountability. Thus, half of your project grade will be based on what your team as a whole is able to achieve, and half will be based on your individual contributions to the project (i.e., your individual productivity).

### 6.4.1 Team Achievement

Teams will complete a series of project milestones (M0, M1, and M2), each with its own goals and instructions. Milestones will be evaluated based on criteria, which include the following:

- Quality of planning and design artifacts
- Effectiveness of communication
- Discipline in following software engineering processes and procedures

The marks awarded for each of the above items will typically be applied to the team as a whole (i.e., everyone on the team will receive the same marks).

### 6.4.2 Individual Productivity

Each team member will be assigned certain tasks for each milestone. It is expected that each team member will complete their assigned tasks in a timely manner. It is also expected that team members will be continuously productive, and not to put off their work, rushing to slap something together at the last minute. Failure to do so may result in demerits. There are three categories of demerit associated with the project (listed in ascending severity): *minor*, *major*, and *no-productivity*.

- **Late Work:** Team members are expected to complete work on schedule, as deadlines are a part of the real world. Work will not be accepted late unless there are allowable extenuating circumstances and prior arrangements are made the instructor.

## 7 Academic Integrity

The University of Memphis expects all student to behave honestly. The [Student Code of Rights and Responsibilities](#) explains what constitutes a violation of our Academic Integrity policy.

Please see the Office of Student Accountability's website for more information:

<https://www.memphis.edu/osa/>. Plagiarism, cheating, and other forms of academic dishonesty are prohibited. Students who violate the academic misconduct policy, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class in addition to other possible disciplinary sanctions which may be imposed through the regular institutional disciplinary procedures.

Examples of academic dishonesty include, but are not limited to:

- Cheating – A student uses a smart phone to access the internet while taking a quiz.
- Copyright infringement – A student uses a photograph found on the internet in a presentation without obtaining permission from the photographer.
- Deception – A student gives a dishonest excuse when asking for a deadline extension.
- Denying access to information or material – A student makes library or shared resource material unavailable to others by deliberately misplacing those resources.

- Fabrication – A student invents data in an academic work.
- Facilitating academic misconduct – A student knowingly allows a portion of their work to be used by another student.
- Plagiarism – A student represents the ideas of another in a paper without citing and referencing the work or a student turns in the same or nearly the same assignment for credit in more than one class.
- Sabotage – A student prevents others from completing their work by opening a window to affect a temperature controlled experiment.
- Unauthorized collaboration – A student works with other students on a paper without the specific permission of the instructor.

## 7.1 Course-Specific Integrity Policies

*Any student caught cheating in the course will receive an F grade and be reported to the [Office of Student Accountability](#) (full stop).*

- Teammates (i.e., members of the same team) may collaborate and share work however they see fit; however, if asked to report what each team member’s contributions were, **students must provide honest responses.**
- Students from different teams may not collaborate in this way.
- Teammate collaboration is limited to project work and is not allowed on any other course work (e.g., homeworks, quizzes, exams), unless specifically noted.

## 8 Classroom Behavior

Students should be aware of the [Student Code of Rights and Responsibilities](#) which describes examples of unacceptable classroom behavior. Disruptive classroom behavior will not be tolerated. Instructors are empowered to remove students from class and refer behaviors for sanctioning to the Office of Student Accountability.

### 8.1 Course-Specific Classroom Policies

- Students must **remain silent while the instructor is lecturing.** Questions and discussion are welcome, but students must raise their hands and be given permission to speak.
- When students carry on conversations among themselves while the instructor is lecturing, it is disruptive to the class.
- Students caught engaging in this behavior will be told to leave the classroom immediately, and their final grade will be reduced by a full grade (e.g., an A would become a B).
- A second offence will be considered a pattern of disruptive behavior and will be treated as **student misconduct**, resulting in an F in the course and being reported to the Office of Student Accountability.

## 9 Equity, Inclusion, and Accommodations

Our class respects all forms of diversity. The University of Memphis embraces the diversity of students, faculty, and staff, honors the inherent dignity of each individual, and welcomes their unique perspectives, behaviors, and worldviews. In this course, people of all races, religions, national origins, sexual orientations, ethnicities, genders and gender identities, cognitive, physical, and behavioral abilities, socioeconomic backgrounds, regions, immigrant statuses, military or veteran statuses, size and/or shapes are strongly encouraged to share their rich array of perspectives and experiences. Course content and campus discussions will heighten your

awareness to each other's individual and intersecting identities. In accordance with [UofM Policy GE2004](#), the University will ensure students receive consistent and fair treatment and affirmation of the University's commitment to diversity. The University prohibits discrimination and harassment based on protected characteristics as stated in [UofM Policy GE2030](#).

Please see the instructor if you need accommodations for a disability, or to fulfill cultural or religious obligations. Students with requests for accommodations should contact [Disability Resources for Students](#) to register and learn about the services available to support their learning. Students with disabilities are encouraged to speak with us privately about academic and classroom accommodations. It is strongly encouraged that you register with Disability Resources for Students (DRS) to determine appropriate academic accommodations. Disability Resources for Students is located in 110 Wilder Tower, their phone number is (901) 678-2880 (V/TTY), their email is [drs@memphis.edu](mailto:drs@memphis.edu), and their website is <https://www.memphis.edu/drs/>. Disability Resources for Students coordinates all accommodations for students with disabilities.

Qualified students with disabilities will be provided reasonable and necessary academic accommodations if determined eligible by the appropriate Disability Resources for Students staff at the University. Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility for specific accommodations from the Disability Resources for Students staff at the University. It is the student's responsibility to initiate contact with University's Disability Resources for Students staff and to follow the established procedures for having the accommodation notice sent to the instructor.

## **10 Mental Health**

As a student you can sometimes feel overwhelmed, lost, experience anxiety or depression, and struggle with relationship difficulties or diminished self-esteem. Mental health challenges can interfere with optimal academic performance. However, many of these issues can be effectively addressed with some help. If you find yourself struggling with your mental or physical health this semester, please feel free to approach me. I will try to be flexible and accommodating. As your instructor, I am not qualified to serve as a counselor, but UofM offers confidential counseling services on-campus and via telehealth that are available to students taking six or more credits at no cost. UofM Counseling Center is staffed by experienced, professional psychologists, clinical social workers, and counselors, who are attuned to the needs of college students. I strongly encourage you to take advantage of this valuable resource. To connect with Counseling Center services, please visit 211 & 214 Wilder Tower, or call 901.678.2068. To know more about their services, you can visit their website at <https://www.memphis.edu/counseling>. In a crisis situation, please call 901.678.HELP (4357) to speak to the On-call counselor. Remember, getting help is an intelligent and courageous thing to do -- for yourself and for those who care about you.

## **11 Personal or Academic Challenges including Food & Housing Insecurity**

If you are experiencing personal or academic challenges including, but not limited to food or housing issues, family needs, or other stressors, please visit the [Dean of Students Office](#) to learn about resources that can help. Any student who faces personal challenges including, but not limited to securing their food or housing and believes this may affect their performance in the course is urged to contact the [Dean of Students Office](#) at 901.678.2187 located in the University Center, Suite 359 for assistance. If you are comfortable doing so, please also let the instructor know you are experiencing challenges as they may be able to assist you in connecting with campus or community supports.

## 12 Personal Relationships

There are special problems in any personal relationship between individuals where one party possesses direct academic, administrative, supervisory, evaluative, counseling or extracurricular authority over the other party. Such positions include, but are not limited to, teacher and student or assistant, supervisor and employee, senior faculty and junior faculty, mentor and trainee, advisor and advisee, counselor and client, teaching assistant and student, coach and athlete, and the individuals who supervise the day-to-day student living environment and student residents.

In accordance with [UofM Policy HR5050](#), no University employee shall enter into or maintain any personal relationships with students or with employees over whom they exercise or, reasonably can expect to exercise, direct or indirect control in areas such as academics, administration, supervision, evaluation, counseling or extracurricular authority or influence. No University employee shall exercise any direct or indirect control in the areas of academics, administration, supervision, evaluation, counseling or extracurricular authority over any student or employee with whom that employee had previously been involved in a personal relationship.

Any employee, including faculty, who is currently in a personal relationship or becomes involved in a personal relationship that might be covered by terms of this policy, must disclose the relationship immediately to Human Resources-Employee Relations and Engagement so that any and all steps are taken to comply with this policy.