

# Foundations of Software Engineering

## COMP 7012, Spring 2023

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

<https://memphis-cs.github.io/comp-7012-2023-01spring/>

*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: TBA

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

Grading weights are as follows:

- 10% Participation
- 45% Skills Assignments (6 assignments × 7.5% each)
- 45% Team Project
  - 22% Team Achievement
    - 6% Milestone 0 (Initial Planning)
    - 4% Milestone 1
    - 4% Milestone 2
    - 8% Final-Product Evaluation
  - 23% Individual Productivity
    - 9% Milestone 1 Regular Productivity
    - 9% Milestone 2 Regular Productivity
    - 5% Above and Beyond Productivity

To convert from percentages to letter grades, see the following table:

≥ 97%	91–96%	89–90%	87–88%	81–86%	79–80%	77–78%	71–76%	69–70%	67–68%	60–66%	≤ 59%
A+	A	A-	B+	B	B-	C+	C	C-	D+	D	F

I reserve the right to *lower* the percentage threshold for letter grades as I see fit (i.e., I may make the grading scale better for you, but never worse).

## 6.1 Participation

Engagement and participation in the lecture activities is critical for learning in the course. Each student will begin the semester with 10 participation points (each point equal to 1 percentage point of their final score). Deductions from those points will be made as follows:

- **Unexcused Absences:** 3 unexcused absences will be forgiven without penalty; however, for each unexcused absence after the third, 1 participation point will be deducted.
- **Important Days:** Certain days will be designated as special—for example, days on which tests are administered or student presentations are given. For each unexcused absence on an important day, 2 participation points will be deducted, and the 3-absence forgiveness policy will **not** apply.
- **Tardiness:** *Come to class on time or don't come at all!* Arriving up to 10 minutes late to class counts as half of an absence. Tardiness beyond 10 minutes counts as a full absence. Also, students are not allowed to enter the classroom beyond the first 10 minutes of class.
- **Insufficient Participation:** Just because a student is in class, does not mean that they are engaged and participating (and learning). For each class that a student fails to meet expectations for participation, 1 participation point will be deducted (2 points on important days).

## 6.2 Skills Assignments

Skills Assignments will have students perform actual coding 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.

- There will generally be three parts to each Skills Assignment, all of which must be completed on time:
  - **Active Reading:** Read and perform the steps in a specified set of development demos.
  - **Practice Test:** 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:** Students will record themselves performing a third task, and they will explain each step they perform as they perform it.
- It is the student's responsibility to have and maintain a working laptop development environment to use for the Skills Assignments.
- **Skills Assignments (all parts) will be graded only as pass/fail (i.e., no partial credit).** Failure to pass even one part of a Skills Assignment will result in a failing mark for the whole Skills Assignment.

## 6.3 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 is able to achieve as a whole and half will be based on your individual contributions to the project (i.e., your productivity).

### 6.3.1 Team Achievement

Teams will complete a series of project milestones, 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

Additionally, at the end of the project there will be a final evaluation of the product produced by the team. This evaluation will focus mainly on the quantity and quality of features produced.

The marks awarded for each of the above items will generally applied to the team as a whole (i.e., everyone on the team will receive the same marks; see exceptions for low individual productivity below).

### 6.3.2 Individual Productivity

#### 6.3.2.1 Regular Productivity

The majority of your individual productivity points are associated with *regular 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 deductions from your regular productivity grade.

#### 6.3.2.2 Above and Beyond Productivity

To achieve the highest grades in the course (A/A+), you will need to go above and beyond the call of duty; thus, your individual productivity grade also accounts for *above and beyond productivity* (aka A&B). Throughout the course, you will have the opportunity to take on special roles or to negotiate A&B tasks to do in addition to your regular task assignments. There is no limit on the number of A&B points you can earn, but note that you will need at least 5 A&B points to get full credit.

#### 6.3.2.3 Additional Productivity Policies

- **Deduction for Unproductiveness:** A student who demonstrates unsatisfactory productivity may also lose points on the associated milestone and also the final-product evaluation. Such deductions are meant to account for the lack of contribution made by an unproductive team member to the project.
- **Late Work:** You 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 extenuating circumstances and prior arrangements are made with me.
- **Limit on weekly A&B earnings:** You may earn a maximum of 2 A&B points per week for negotiated A&B tasks. This policy is mainly to prevent students from putting off doing A&B work until the very end of the semester, and then flooding the instructor with low-quality work in an 11th-hour attempt to earn more points.

## 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 one half grade (e.g., an A- would become a B+).
- A second offence will result in a full-grade reduction (e.g., an A would become a B).
- A third 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.