# Foundations of Software Engineering

# CPSC 362-01/07

# Spring 2023

## Description & Objectives

Basic concepts, principles, methods, techniques and practices of software engineering. All aspects of the Software Engineering fields. Use Computer-Aided Software Engineering (CASE) tools.

## Prerequisites

Prerequisite: CPSC 301 or passing score on Examination in Programming Proficiency if applicable; fulfill upper-division writing requirement (e.g. CPSC 311); declared major/minor in CPSC, CPEN or CPEI.

## Instructor


Instructor: Eric May
Phone: TBD
Email: ermay@fullerton.edu (preferred)
Office: CS 401
Office Hours: Mon 5-6 PM


### Meeting Information

Discussion
Room: CS 408
Time: Tuesday 1-2:50 (Section 1)
3-4:50 (Section 7)

Activity
Room: CS 408
Thursday 1-2:50 (Section 1)
3-4:50 (Section 7)

# Email Etiquette

Please include your name and class/section number clearly in your email subject line so I can respond clearly with as few misunderstandings as possible. You have a CSUF-supplied email account, and that is the only way I have of reaching you outside class. Check that account and/or our class Canvas page frequently for important class announcements and individual messages.

# Important Dates

CSUF's Academic Calendar is posted online at «http://apps.fullerton.edu/AcademicCalendar/». The Academic Calendar contains all the campus closures and holidays you should be aware of.
CSUF's Admissions Calendar is posted online at «http://www.fullerton.edu/admissions/Resources/Calendars.asp». The Admissions Calendar contains all the major dates with respect to adding, dropping, and withdrawing from your classes.

# Textbooks

## Recommended

*Software Engineering: A Practitioner's Approach, 8th Ed.*, Roger Pressman and Bruce Maxim, McGraw Hill, ISBN: `9780078022128`
(7th ed ok)

# Development Tool Resources

If you choose to work using Linux, there is an official Linux environment for CPSC 120, 121, and 131 at California State University, Fullerton. Additional tools and libraries are also included to support rich programming assignments, and courses aside from 120-121-131. This is available for use and **consistency**, but its use is not required for this course.

A CentOS-based shell server is available through secure shell (ssh) and secure file transfer protocol (sftp). The hostname is ecs.fullerton.edu. If your email address is malcolm@csu.fullerton.edu, then your username is ACAD\malcolm. If you are using a command-line ssh client, then your command to connect to

ecs.fullerton.edu will be `ssh 'ACAD\malcolm@ecs.fullerton.edu'`. Your password is the same password as your CSUF Portal password.

Useful Links:

- Tuffix installation guide https://github.com/kevinwortman/tuffix/blob/master/install.md (provides .ova machine image of our school's xubuntu variant)
- VS Code - https://code.visualstudio.com/ - Multiplatform text editor/ide, with a lot of simple and powerful tooling. Integrates with git and works with a large variety of languages and environments.
- Available software through Academic Alliance Program (useful, but not required):
    - http://www.fullerton.edu/ecs/cs/resources/labs.php (Windows 10, Visual Studio, Visio, etc.)
    - http://www.fullerton.edu/it/students/software/ (Office 365, Adobe, Dropbox, etc.)
- IBM, UML Resource Center, https://www-01.ibm.com/software/rational/uml/products/ , 2018.
    - https://www.ibm.com/developerworks/rational/library/769.html IBM, UML Basics,
- Object Management Group (OMG)
    - UML Resource Page, http://www.uml.org/ , 2018.
    - Introduction to Unified Modeling Language (UML), http://www.uml.org/what-is-uml.htm , 2018.
- UML Tools
    - (Provided for informative purposes only, this list is not complete nor have I extensively used each of the services listed)
    - (Please report any web-page (or their tools) if you find any problem with it.)
    - CASE Tools Comparison, https://www.gleek.io/blog/best-uml-tools
    - Altova UModel, https://www.altova.com/umodel/download
    - Astah, http://astah.net/download
    - Draw.io, https://www.draw.io/
    - Smart Draw, https://www.smartdraw.com/
    - UMLet, http://www.umlet.com/

# Learning Goals

1. Work collaboratively on a substantially complex software product
2. Identify requirements from both a client and engineer perspective
3. Designing software to meet requirements
4. Document the process of software development, producing expected diagrams and models
5. Utilize products of design and documentation to create and demo your software
6. Use Computer Aided Software Engineering (CASE) tools to aid and achieve above goals

# Grading

Plus and minus grading are not considered, only whole letter grades.

Final grades are computed by first finding the average score in each category described in the table below on the right. The average score for each category is then used to compute the weighted average according to the weights in the second table below.

| Grade | % of Total Points |
|---|---|
| A | 90–100% |
| B | 80–89% |
| C | 70–79% |
| D | 60–69% |
| F | Below 59% |

| Category | % of Final Grade |
|---|---|
| Midterm | 15% |
| HW 1 | 15% |
| HW 2 | 25% |
| Presentation | 15% |
| Final | 20% |
| Team Rating | 10% |

# Assignments

Class Project: There will be a project which consists of a set of documentation, including analysis, design, coding, testing, manual etc. Projects will be completed by groups of 5 decided before the end of the third week. Your group will get the same grade on the project, in addition to a portion determined by teammate reviews. Although your partners may work on different parts of your project, you are responsible for understanding all parts of the project you turn in.

Graded Items:
HW1/HW2: Written group submissions, one per group
Presentation: In-class at end of semester.
Team Rating: 50% HW1 50% HW2

Midterm/Final: To be administered in the classroom via Canvas. There is to be absolutely NO collaboration of any sort during these exams. Makeup only under the most serious circumstances with official documentation.

Reading Assignments: There will be lectures summarizing and reviewing key elements of read chapters, as well as discussion questions, ungraded quizzes, and other activities to accompany the material. These will cover topics that will be on the exams and project, but will not be directly graded.

# Course Outline

*Tentative*

| | | |
|---|---|---|
| Week 1 | 1/24 | Introduction of the course/class<br>Ch. 1 The Nature of Software |
| 2 | 1/31 | Ch. 2 Software Engineering<br>Ch. 3 Software Process Structure |
| 3 | 2/7 | Ch. 4 Process Models<br>Ch. 5 Agile Development<br>Ch. 7 Principles that Guide Practice<br>***Teams must be submitted.*** |
| 4 | 2/14 | Ch. 6 Human Aspects of Software Engineering<br>Ch. 8 Understanding Requirements<br>Ch. 9 Requirements Modeling: Scenario-Based Methods |
| 5 | 2/21 | Ch. 10 Requirements Modeling: Class-Based Methods<br>Ch. 11 Requirements Modeling: Behavior, Patterns, and Web/Mobile Apps<br>Ch. 12 Design Concepts |
| 6 | 2/28 | Ch. 13 Architectural Design<br>Ch. 14 Component-Level Design<br>Ch. 15 User Interface Design |
| 7 | 3/7 | Exam #1 - Through Ch. 11 |
| 8 | 3/14 | Ch. 16 Pattern-Based Design<br>Ch. 17 Web App design<br>HW #1 Due |
| 9 | 3/21 | Ch. 18 Mobile App design<br>Ch. 19 Quality Concepts |

| | | |
|---|---|---|
| | | Ch. 20 Review Techniques<br>*Class on 3/21 and 3/23 will be delivered online* |
| 10 | 3/28 | *Spring Recess* |
| 11 | 4/4 | Ch. 21 Software Quality Assurance<br>Ch. 22 Software Testing Strategies<br>Ch. 23 Testing Conventional Applications<br>Ch. 24 Testing Object-Oriented Applications |
| 12 | 4/11 | Ch. 31 Project Management Concepts<br>Ch. 36 Maintenance and Reengineering |
| 13 | 4/18 | Ch. 37 Software Process Improvement<br>HW #2 Due<br>Project Q&A |
| 14 | 4/25 | Project Q&A<br>*Class on 4/25 and 4/27 will be delivered online* |
| 15 | 5/2 | Project Presentations |
| 16 | 5/9 | Project Presentations<br>Examination Q&A |
| 17 | 5/16 | Final Examination<br>Section 01/02 - 1-1:50 P.M.<br>Section 07/08 - 5-6:50 P.M. |

# Collaboration

Any copying on the group project will be taken seriously and dealt with according to the guidelines described in the section on Academic dishonesty of this syllabus. In regards to your group project, all teammates are able to help each other freely. The following guidelines apply to collaboration with any person or resource other than your group:

- You may help each other understand the project and brainstorm general solutions, but each group must develop and submit their own distinct work.
- You may give each other technical support, for instance troubleshooting installing software or logging in to Canvas.
- You can share documented facts, such as the return value of a particular library function.
- Your group must separate to develop your own detailed solution to the problem, and type in your own source code and report.
- Group members should be able to explain any part of their submission, and why you wrote what you did, including the code written by other partners.

- You may never give your work or use another group's work: detailed algorithm, report and coding must be the student's own work. This also holds true for debugging; another student may identify the error but should not dictate, rewrite, or show the code to correct it.

This is not meant to discourage classmates from helping each other where appropriate, just to ensure that everybody is submitting their work and only their work.

# Attendance Policy

Attending class is mandatory. If a lecture is missed, you are responsible for catching up with any content and/or announcements that have been covered, and for communicating any expectations or information to teammates. Utilize your peers, office hours, or any of the other resources available to you. Missing class as part of a documented accommodation is guaranteed to be excused. The ADA accommodated student must make a reasonable effort to coordinate any absences with the instructor.

# Make Up Policy

Exams and quizzes cannot be taken after they have been given in class. Due to an act of nature, personal medical emergency, a family crisis, an act of terrorism, severe civil unrest, etc. students have 10 calendar days to petition the instructor to retake any exam/quiz or submit an assignment without late penalty.

Exceptions shall be made on a case by case basis, provided there is time to evaluate the merits of such an application.

# Etiquette

In the context of this course, participation is defined as the following:

- Arriving to class prepared and on time.
- Taking notes.
- Actively listening to the lecture and asking questions when appropriate.
- Annotating code listings and handouts.
- Bringing any required materials to class.
- When needed/desired, seeking assistance to complete assignments.
- Barring an emergency, not leaving the class session early unless the instructor consents.
- Not distracting oneself or others with smartphones, games, online diversions, etc.
- Respecting and treating the instructor and the student's peers civilly.

## Required Material

- A writing instrument
- A notebook
- A USB memory stick
- A personal computer with the requisite development tools or regular access to a computer lab

# Academic Dishonesty

Students are encouraged to assist one another and discuss the course materials with your peers. It is your responsibility to be aware of and follow the spirit of CSU Fullerton's academic honesty policy which can be found at «https://business.fullerton.edu/ethics/UPS300021.htm». Academic dishonesty will not be tolerated. The University Catalog and the Class Schedule provide a detailed description of Academic Dishonesty under *University Regulations*.

By submitting work for evaluation, you acknowledge that you have adhered to the spirit of the university's academic honesty policy and that your submission is an original work by you unless otherwise directed to work in groups. Failure to follow the spirit of the academic honesty policy will result in a severely negative evaluation of the work in question and may result in involving the Department Chair and the Judicial Affairs office to seek a disciplinary remedy.

# ADA Accommodations

Any student who, because of a disability, may require special arrangements in order to meet course requirements must register with the Office of Disability Support Services within the first week of classes. The Office of Disability Support Services' website is «http://www.fullerton.edu/DSS/». They can be reached by phone at 657-278-3117 or TDD at 657-278-2786. Their email address is «dsservices@fullerton.edu». Their office is located in University Hall, room 101. The instructor may request verification of need from the Dean of Students Office. Students requesting accommodations shall inform their instructors during the first week of classes about any disability or special needs that may require specific arrangements/accommodations related to attending class sessions, completing course assignments, writing papers or quizzes, tests or examinations.

# Emergency Procedures

For your own safety and the safety of others, each student is expected to read and understand the guidelines published at «http://prepare.fullerton.edu/campuspreparedness/». Should an emergency occur, follow the instructions given to you by faculty, staff, and public safety officials. An emergency information recording is available by calling the Campus Operation and Emergency Closure line at 657-278-4444.

# Instructional Continuity

Due to an event such as an epidemic or a natural disaster that disrupts normal campus operations, students must monitor the course Canvas site and their campus email address for any instructions and assignments that the instructor announces.

# Recording & Transcription of Class Content

Recording class content is governed by UPS 330.230, «http://www.fullerton.edu/senate/publications_policies_resolutions/ups/UPS%20300/UPS%20330.230.pdf». Each instructor must permit class content to be recorded or transcribed by students when mandated to do so by the Americans with Disabilities Act or by other federal or state laws. Any recording of class content is for private use and study and shall not be made publicly accessible without the written consent of the instructor and students in the class.

# Course Rules & Classroom Management

Unless an agreement or accommodation is reached between the student and the instructor, these rules must be followed.

- Attendance at all regularly scheduled lecture and discussion section is mandatory.
- Do not eat during lecture.
- If it makes noise, silence it.
- The student is responsible to be aware of any course announcements including changes to due dates and requirements.
- Homework, programming assignments, etc. may not be submitted late.
- Ask before recording any lectures