CPSC 430 Software Engineering Syllabus

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Term: Spring 2023
Classroom: Monroe 112 (430-01 9-10:50) -- Monroe 110 (430-02 12-1:50)
Office Hours: Basement of Monroe MW 8-9am and 11-12pm (More specifics TBA) Jepson Lounge in New Area T 8:30 – 9am

Description:	Writing a computer program is a challenging and creative experience, motivated by the desire to solve problems. The task of developing even a small computer program is not an easy one. Programmers are continually required to keep their attention focused on many different aspects of both problems and solutions. The software engineering course attempts to help students prepare for application development and their future jobs by teaching Object Oriented Analysis and Design, UML, and Rational Rose (CASE Tool). This class requires that students work in groups just as if they were in a company. Rarely do programmers design and program large-scale applications on their own.
Prerequisite:	CPSC 340 & 350
Text:	• Beginning Software Engineering ISBN:978-1-11896914-4 Publisher WROX: A Wiley Brand (pdf version on Canvas) • Course Packet that is available at Bookstore • Course information, selected handouts, and all assignments are available electronically on Canvas.

"Teaching software engineering to undergraduate students in a classroom setting is a challenging task. Students enter the class with "academic" programming skills and a lack of practical experience. Practical software development experiences include familiarity with larger codebases, ability to work as a team and following the scheduled timelines while demonstrating professionalism in understanding difficult project situations. In addition, it is expected that students learn how to deal with customer requirements by understanding the customer domain. They must be able to extract the software requirements, organize the findings by extracting details, combine and/or decompose the tasks as necessary, and model them. Finally, scheduling and tracing the requirements completion within the proposed schedule and keeping up with the time pressure and hard deadlines.

It is the general consensus of the software engineering faculty that most often students coming to undergraduate software engineering courses have not yet developed proper systemic thinking and model designing skills. For instance, it is reported that students often consider the requirement engineering as a soft skill and they pay much less attention to system requirements rather than coding, testing, and other technical parts of software developments." [Dorodchi]

Dorodchi, Mohsen, et al. "Teaching an undergraduate software engineering course using active learning and open source projects." *2019 IEEE Frontiers in Education Conference (FIE)*. IEEE, 2019.

Software engineering faculty emphasized that the students are not used to practice requirements elicitation and they faced difficulty in relating the system requirements to other technical parts. As a result, the software engineering faculty teach requirements engineering and emphasizing on project based approaches.

Course Summary: *Subject to Change*

Activity Name	Time Range	General Theme
Resume	Weeks 1	Software Engineering
User Stories Functional and Non-Functional Requirements	Week 2	Requirements
Use Case Modeling	Weeks 3	Requirement Analysis
Unified Modeling Language (UML)	Weeks 4	From Requirements to Design
Data Flow Diagram (DFD)	Weeks 5	Structured Modeling
Decomposition Diagram	Weeks 6	Requirement Modeling
Intro to Code Repository	Weeks 7-8	MAMP, Git, Installation, Toubleshooting
Sprint 0	Week 9-10	Code Reusability
Sprint 1	Week 11	Agile Development
Sprint 2	Week 12	Agile Development
Sprint 3	Week 13	Prototype Demo
Sprint 4	Week 14	Testing
Sprint 5	Week 15	Product Demo

"Developers are expected to learn fast, with little guidance and little more incentive than the faint rattling of the pink-slip guillotine. You also must get used to the idea that at any moment you might need to learn a new framework or language. Software engineering is a lucrative field, but the transformation from "coder" to "engineer" is challenging." [Farag]

Basel Farag May 10, 2016 on TechCrunch++ https://techcrunch.com/2016/05/10/please-dont-learn-to-code/

Course Goals and Objectives

At the end of the semester, you will be able to

- Identify and describe a specific problem requiring a software solution.
- Design an efficient system to solve the problem
- Use CASE tools to assist in designing and developing a
- Locate and learn to use useful
- Define a timeline for team members and project
- Present and communicate the current standings of a
- Maintain software
- Develop testing

General Education Goals and Objectives (old requirements)

This course satisfies the Experiential Learning Requirements. The following goals are associated with these requirements.

- Students will be able to apply what was learned in coursework to new scenarios outside standard university courses
- Students will be able to identify their personal values and learning goals and direct themselves by creating personalized learning experiences that may include alternative means of learning
- Students will be able to clarify and refine their understanding of their strengths and weaknesses in content of relevant disciplines and in skills such as time management, organization, professionalism, and so forth
- Students will be able to recognize their knowledge and lack of knowledge
- Students will be able to connect their undergraduate experiences and their post-graduation lives

General Education Goals and Objectives (new requirements)

Must pick one or the other not both

- Beyond the Classroom: One faculty supervised experience involving a significant experiential learning component designed to challenge students to go outside of the bounds of the typical classroom.
    - Learning Outcomes:
        - Students will apply what was learned in coursework to new scenarios outside standard university courses.
        - Students will identify their personal values and learning goals and direct themselves by creating personalized learning experiences that may include alternative means of learning.
        - Students will clarify and refine their understanding of their strengths and weaknesses in the content of the relevant disciplines.
        - Students will clarify and refine an understanding of their strengths and weaknesses related to skills such as time management, organization, and professionalism.
        - Students will connect their undergraduate experiences and their post-graduation plans.
- After Mary Washington: One experience focused on translating the liberal arts experience for life after Mary Washington.
    - Learning Outcomes:
        - Students will explore their own values, interests, skills, and strengths that guide their personal and professional aspirations.
        - Students will develop and articulate their personal and professional identities in appropriate modalities.
        - Students will create professional relationships which support life-long career growth and satisfaction.

Across the Curriculum Goals and Objectives

Writing Across The Curriculum

- to enhance students' understanding of course material by having them write frequently about that material and (b) to help students become better writers

Speaking Across the Curriculum

- Students will understand and be able to explain the conventions and expectations of oral communication as practiced within the discipline of the course
- Students will apply theories and strategies for crafting messages (verbal, nonverbal, and visual) for particular audiences and

- Students will be able to craft oral messages after a conscious process in which various options are reviewed and will be able to explain and support their
- Students will be able to metacommunicate about their own communication

CPSC 430 Honor Policy
Students are allowed to work together on all aspects of this class except the midterm and quizzes. However, for the some homework assignments, each student must submit his or her own write up/presentation, clearly stating the collaborators. Your submission must be your own. When in doubt, contact the instructors about whether a potential action would be considered plagiarism. If you discuss material with anyone besides the class staff, acknowledge your collaborators in your write-up. If you obtain a key insight with help (e.g., through library work or a friend), acknowledge your source and write up the summary on your own. **It is the student's responsibility to remove any possibility of someone else's work from being misconstrued as the student's**. Never misrepresent someone else's work as your own. It must be absolutely clear what material is your original work. Plagiarism and other anti-intellectual behavior will be dealt with severely. Note that facilitation of plagiarism (giving your work to someone else) is also considered to be plagiarism, and will carry the same repercussions.

Students are encouraged to use the Internet, literature, and other publicly available resources, **except the homework solutions and test (including quizzes, midterms, finals, and other exams) solutions, from past terms' versions of this course and other academic courses, whether at UMW and at other institutions**. To reiterate, the students are not allowed to view and use past homework and test solutions, unless explicitly distributed by the CPSC 430 staff as study material.

Whenever students use Internet, literature, and other publicly available resources, they must clearly reference the materials in their write ups, attributing proper credit. This cannot be emphasized enough: **attribute proper credit to your sources**. Failure to do so will result in a zero grade for the assignment and possibly a failing grade for the class, at the instructor's discretion. Copying directly from resources is not permitted, unless the copying is clearly identified as a quote from a source. Most use of references should be written in the words of the student, placing the related work in proper context and describing the relevant comparison.

Students who violate University standards of academic integrity are subject to disciplinary sanctions, including failure in the course and suspension from the university. Since dishonesty in any form harms the individual, other students, and the university, policies on academic integrity have been and will be strictly enforced.

Group Project Deliverables:

- Turn in each major document electronically
  - Requirements
  - Design
  - Testing
- Turn in the final project in electronic format (zip file)
- Make your group presentation/project demo during the last week of class and during finals

Individual Deliverables

- You must make at least one individual oral presentations in class over the course of the semester. You select the weeks that you want to present.
- There are several in class activities over the course of semester. Due dates will be given when lab is assigned.

Grading:

- Weekly Quizzes 20%
- Writing Assignment 20%
- Speaking Presentations 20%
- Final Project 10%
- Sprints 10%

The goal is that you learn how to effectively develop software. You must have a large part of the software done and this will be demoed in the final presentation and graded appropriately, peer evaluation will also be factored into the final project grade. If the project is not complete then you will give a justification as to what is not completed and why it is not completed on the final turn in, which will be graded appropriately, this will be an automatic 10% off your final project grade if you have nothing to demo.

Letter grade distribution:

□ 100-93%: A,	□ 82-85%: B,	□ 71-75%: C,
□ 90-92%: A-,	□ 79-81%: B-,	□ 69-70%: C-,
□ 86-89%: B+,	□ 76-78%: C+,	□ 66-68%: D+,

□ 60-65%: D, □ < 60%: F.

Mid Semester Grade:

The University provides the opportunity to provide grading feedback midway through the semester. This will take into account your midterm exam, homework, quizzes, and labs submitted up to that point. Any student receiving less than a 70% will receive an unsatisfactory (U) for their mid-semester grade. Students receiving a U should schedule a meeting with me to discuss how we may improve your performance in the class.

Sprint Status Reports and Sprint Retrospectives(Written and Speaking):

They are a summary of what happened in a Sprint. For example, they might contain:

- The date the Sprint started and the date it ended
- Who was in the team
  - Information about the team and its team members with an overview of their capacity and effort done in the sprint.
  - How many hours they estimated something would take and how long it actually took
  - What they designed, implemented, tested and integrated.
  - How many pull, push, commit, how many builds happened during the Sprint
- A list of all associated tasks of the Sprint and their status. You should clearly see how many of those tasks weren't completed and were pushed back to the backlog or reprioritized.
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Final Group Project Deliverable:

- At the end of the semester, your group must turn in a zip containing ALL of the following items:
  - Report Folder: Containing updated versions of all reports including the project plan, requirements, design and testing documents.
  - Presentation folder: PowerPoint files for each presentation made by group members over the course of the semester
  - Final code folder: All code
  - A README file explaining how to install and run the program
  - Project Explanation: A reflective paper describing the progress that was made toward completing the project. If the project was not completed, explain what work was not done and why. Explain how the project could be improved or expanded in the future.

OVERVIEW OF 'CLASS PARTICIPATION'

"Class Participation" (sometimes referred to as "Participation" or "In-Class Participation") refers to any discussion/interaction/exchange, written or oral, during the course of classroom lecture, discussion, or small group work.

PARTICIPATION + ATTENDANCE

One of the reasons for having a lengthy set of guidelines such as this is that students often equate participation with attendance. Some students who may have attended every class during the course of a term, may be confused as to why their participation mark at the end of the term was not quite what they expected.

Attendance and participation are related but, nevertheless, quite different. Attendance is required, of course. At the same time one's contributions to the course are never based on sheer presence or merely "showing up" regularly. "Showing up" is your attendance. What you do *when* you show up is your participation: it is the measure of your engagement in the readings/discussions/lectures of the course. "Participation" is not just a measure of the quality and quantity of your exchanges with your instructor but also with your peers in the class, especially those you might find who will critique, question, or simply seek clarification about your own stances taken or interpretations offered about our the readings in our class.

GUIDELINES FOR CLASS PARTICIPATION

This course is based on the assumption that students take part not as *passive* consumers of knowledge but as *active* participants in the exchange, production, and critique of ideas—their own ideas and the ideas of others. Therefore, students should come to class not only having read and viewed the materials assigned for that day but also *prepared* to both *participate* in creating your teams project portions and *contribute* your ideas.

While students may be regularly keeping up with the required readings and assignments it also important that they come prepared to *show* that they are keeping up with those readings/assignments through active class participation. Your in-class participation mark therefore is an index not just of what you do/say during class time, but how well you prepare your comments and responses before class time, and with what level of consideration and thoughtfulness you respond to the ideas of others within the classroom space.

While the guidelines for in-class participation, verbal and written, are broad, there are several discernible ranges of in-class participation.

Disability Statement

"The Office of Disability Resources has been designated by the university as the primary office to guide, counsel, and assist students with disabilities. If you receive services through the Office of Disability Resources and require accommodations for this class, please provide me a copy of your accommodation letter via email or during a meeting. I encourage you to follow-up with me about your accommodations and needs within this class. I will hold any information you share with me in the strictest confidence unless you give me permission to do otherwise.

If you have not made contact with the Office of Disability Resources and have reasonable accommodation needs, their office is located in Lee Hall, Room 401. The office will require appropriate documentation of disability."

Classroom Recording

Classroom activities in this course may be recorded by students enrolled in the course for the personal, educational use of that student or all students presently enrolled in the class only. They may not be further copied, distributed, published, or otherwise used for any other purpose without the course instructor's express written consent. All students are advised that students may tape classroom activities for this purpose. Distribution or sale of class recordings is prohibited without the instructor's written permission and other students who are recorded. Distribution without permission is a violation of copyright law. This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Title IX Statement

University of Mary Washington faculty are committed to supporting students and upholding the University's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence.* Under Title IX and this Policy, discrimination based upon sex or gender is prohibited. If you experience an incident of sex or gender based discrimination, we encourage you to report it. ***While you may talk to me, understand that as a "Responsible Employee" of the University, I MUST report to UMW's Title IX Coordinator what you share***. If you wish to speak to someone confidentially, please contact the below confidential resources. They can connect you with support services and help you explore your options. You may also seek assistance from UMW's Title IX Coordinator. Please visit http://diversity.umw.edu/title-ix/ to view UMW's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence* and to find further information on support and resources.

Stefanie Lucas-Waverly, M.S.
Title IX Coordinator
Fairfax House
1301 College Ave.
Fredericksburg, VA 22401

Phone: 540-654-5656
E-mail: slucaswa@umw.edu

Website: http://diversity.umw.edu/title-ix/

Confidential Resources

On-Campus

Talley Center for Counseling Services

Lee Hall 106, 540-654-1053

Student Health Center

Lee Hall 112, 540-654-1040

Off-Campus

Empowerhouse

24-hr hotline: 540-373-9373

Rappahannock Council Against Sexual Assault

(RCASA)

24-hr hotline: 540-371-1666