University of Windsor

School of Computer Science
https://cs.uwindsor.ca

Master of Applied Computing

COMP-8117
Advanced Software Engineering Topics

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Office Hours : Thursday & Friday (9.00am – 12.00pm EST on MS Teams)

Course Syllabus & Outlines

Section 1 : Monday – 11.30am to 2.20pm (EST)
Section 2 : Wednesday – 8.30am to 11.20am (EST)
Section 3 : Tuesday – 11.30am to 2.20pm (EST)
Location : Online (Blackboard, Zoom, Teams)
GA Consulting Hours : *Please see the course website for details*
https://blackboard.uwindsor.ca

Course content

This course addresses current practices in medium to large-scale software development projects. A comprehensive overview of important design patterns is provided, with emphasis on practical aspects of software analysis and design methodology, implementation techniques and system development paradigms, as well as software testing and verification practices. Strong technical communication and process documentation, including those associated with standard and agile practices, are a particular focus of the course.

Course restrictions : This course is restricted to students in the Master of Applied Computing program.

Course goals

This course will provide students with an opportunity to implement a comprehensive software project, using current software development techniques and practices. Students will learn advanced programming techniques, including object-oriented analysis and design. Students will also learn to use appropriate source control software for collaborative projects. The goal is to allow students to follow the complete software development lifecycle, as typically practiced in the IT industry.

Course topics

Course topics include :

- Software Development Lifecycles and Methodologies

    - From Waterfall to Iterative Models
    - Agile Methods and Software Craftmanship : Scientific or Engineering Approaches
    - ISO and CEI Standards
- Software Project Management and Continuous Integration
- Introduction to DevOps
- UML and OOAD Basics – Requirements, Specifications and Design
- Design Patterns & Software Architecture
- Test Driven Methodology
- Advanced techniques in Software Verification and Validation

The content and the topics of the course will be adapted according to the students' pace.

Course Delivery

Due to the pandemic situation, course lectures are delivered online through virtual classrooms on Blackboard (synchronous and asynchronous format). Other tools may be used in addition/in parallel to make access to the lecture easier, or in case of technical limitations/issues, including Microsoft Teams and Zoom. Each session will be recorded and available in VOD format on Blackboard (and/or Microsoft Stream according to technical limitations). Additional platforms may be considered by the instructor if needed. In case of unavailability (technical issues, etc.), a makeup session will be proposed by the instructor.

Course Materials

Attendance and participation to all lectures is strongly recommended. Students should keep the instructor informed if they have any problem or difficulty with the course contents.

Course materials and lecture slides are available on the course website. However, this should be regarded as a complementary source of information and not as a primary reference. It is the responsability of the student to attend classes and keep up with the latest course contents and announcements.

Course Philosophy

This course is taught through lectures and labs, with an emphasis on practical experimentations. Theoritical topics are systematically followed by practical examples from the real world, showing the gap between theory and practice. Students are encouraged to experiment by themselves in order to understand benefits and limits of the presented approaches, and to think about the relation between this course and the other courses of the program. Interactions between students and instructors are highly encouraged. Students are also encouraged to share their own ideas and points of view related to software engineering practices in general.

Schedule

Lecture: approx. 2 hours. Lab: approx. 1 hour. Credits: 3.0.
The lecture/lab ratio may change according to the topic and the preferred balance between theory and practice. There is no lab during the first week.

Each week a student is expected to spend:

- 1.5hrs Independent Study;
- 1hr Reading for the course;
- 3hrs Work for assessment (essays, papers, projects, laboratory work);
- 3hrs Meeting with others for group work/project assignments;
- 3hrs Studying for tests/examinations.

Evaluation

Assessment	Grade	Section 1	Section 2	Section 3
Poster Presentation	15%	July 9		
Mid-Term Exam	15%	June 12		
Lab assignments	5%	Every two weeks – starting May 17		
Weekly quizz (10 minutes)	5%	Every two weeks – starting May 24		
Project	Total : 30%			
	Proposal : 5%	May 28		
	Milestones : 5%	See below		
	Presentation : 5%	Last week of the term		
	Final Report : 15%	August 13		
Individual Report	5%	August 13		
Take home exam	25%	TBA		

Numeric final grade out of 100 will be assigned to each student based on the above-stated evaluation scheme. For more information please check the following link: https://lawlibrary.uwindsor.ca/Presto/content/GetDoc.axd?ctID=OTdhY2QzODgtNjhlYi00ZWY0LTg2OTUtNmU5NjEzY2JkMWYx&rID=MzU=&pID=MjMy&attchmnt=False&uSesDM=False&rIdx=MzU=&rCFU=

Poster Presentation

The students are required to prepare a presentation (or a poster) about one topic related to software engineering practices in industry (a list of topics will be provided during the first week). The poster will be due on July 9. Because of COVID, best posters will be selected for a presentation in a seminar expected on July 16, and gathering professionals, other students and faculty members. The assessment criteria and more details will be given during the first week. Group work (up to 3 students) is allowed.

Quizz

A MCQ will be organized every two weeks (up to 5) and given during the lecture (at the beginning or at the end of the session). The content of the quizzes may relate to any lectures (slides or additional materials precised by the instructor) preceding the quizz (including the content of the lecture given the day of the quizz if this quizz is given at the end of the session). No group work is allowed.

Labs

Students will have two weeks to to complete and submit lab assignements (up to 5). Each lab contains a mandatory part and an optional part. The optional part counts for additional credits (up to 5%). Work group (up to 2 students) is allowed. In this case, each student of a pair are required to submit their original individual report (not the same report) mentioning the name of the other student of the group.

Project

Project Description

The 10-week project involves a team of 8 students (40 students per section = 5 teams) working together using an iterative project development lifecycle to design, develop, test and produce a medium size software project. Exceptionally, students may create groups with students from other sections.

The choice of the methodology is left to the discretion of the teams among the following iterative methodologies : SCRUM, Water SCRUM Fall, UP and XP. Teams may work on different aspects of the product.

Students are encouraged to present their own ideas for software products (the only requirement is that the product fulfills initial client needs). Each project will be followed up by two instructors (a project manager and a customer). Assessment includes application of software engineering concepts, including technical realisationn, quality, management and communication.

Mandatory Milestones and Deadline

Project planning must include the following mandatory milestones and deadlines :

- Project proposal – Mai 28
- Milestone 1 – June 11
- Milestone 2 – July 2
- Milestone 3 – July 16
- Milestone 4 – July 30
- Release Deadline – August 9 to August 11

For these milestones, the students must present to the customer and the project manager the current state of the project and future works.

Note : June 19 to June 27 is reading week. No work on the project is expected.

Final Report

The final release is a technical report containing :

- All the produced artifacts (Intermediate artifacts ; Product backlog, Sprint backlog, etc.) ;
- Documentation : Initial and effective planning (Gantt Diagrams), Requirement analysis, Software design & architecture, Software Quality Assurance Plan, Risk plan, Source Code, Code Documentation ;
- Final Release (Deployed or Packaged executable) ;
- An analysis of the gap between the initial expectation and the final release (reasons of success/failures, possible improvements, etc.).

Submission and deployment modalities will be specified during the term.

Group Presentation

Teams will present their project and work during the last week of the term. Presentations will last 20 minutes followed by 10 minutes of questions. Group presentation is **mandatory**. Students are encouraged to attend presentations from other teams. Depending on the global quality of the projects, externals and professionnals might be invited to assess and give feedbacks to the students.

Other requirements & advices

- Teams are expected to demonstrate that their proposed project is *innovative* through a brief market research & study.

- Teams must choose appropriate technologies according to their proposed project. This choice must be justified and documented.

- Teams must use a version control system with proper continuous integration system, software testing and verification methods deployed;

- Intermediate artifacts are delivered using Files tab in MS Teams.

At any stage of the development, teams can require a meeting with the project director/customer (instructor or GA/TA) if needed. Teams are highly encouraged to request meetings at any moment (through MS Teams).

Individual Report

The students are required to write an **individual** report summarizing :

- The most important aspects of Software Engineering in an industrial context (according to the course and their own experience);
- A case of study (their project, a commercial software, etc.) ;
- Their opinion about the difference between theory and practice, and how they will apply Software Engineering concepts in their future job.

Extra Credits

Any additional work (optional part of the labs, completion of linkedin learning courses...) will be rewarded with extra credits (up to 5%). A list of additional works will be given during the lectures.

Textbooks

The following books are recommended (**not mandatory**) :

- Roger Pressman and Bruce Maxim, *Software Engineering: A Practitioner's Approach, 8th edition*, McGraw Hill, ISBN: 978-0078022128.
- Craig Larman, *Applying UML and Patterns: An Introduction to Object-oriented Analysis and Design and the Unified Process*, Prentice Hall, ISBN: 0130925691.
- Capers Jones, *Software Engineering Best Practices: Lessons from Successful Projects in the Top Companies*, Oct 8 2009.

Resources

- Course website – https://blackboard.uwindsor.ca
- Instructor website – https://www.y-az.one
- LinkedIn Learning

Student Evaluation of Teaching

Student Evaluation of Teaching forms will be administered in the last two weeks of classes, in accordance with Senate policy.

Course regulations

1. The last date to voluntarily withdraw from the course is July 18, 2021.
2. No student is allowed to take a course more than two times without permission from the Associate Dean.
3. If a student is sick, s/he **must inform** the instructor about his/her illness **within 7 days**, and with a supporting doctor's note which clearly states s/he is not able to attend the exam/test/assignment.
4. If a student has a medical condition, which may create problems during the term, s/he must inform the instructor in writing with supporting documents before the last day of classes.
5. Students who have special needs due to legitimate medical reasons should notify the Student Accessibility Services (http://www.uwindsor.ca/disability/) and the instructor at the beginning of the course and before any assessment.
6. **No extension to the labs will be allowed, and no make-ups will be considered**. Assignments, quizzes, projects and reports are expected to be completed on **the assigned due date and time**. Failure to submit the work in the correct format will be penalized.
7. No extension to the assignments, projects, reports will be allowed, and no make-ups will be considered. Late submissions will not be accepted, and the student will receive a mark of zero.

8. There is **no make-up exam for the quizzes**. In documented exceptional cases (as per the Senate Bylaws), the weight of missed quizzes may be added to the final percentage.
9. There is **no make-up exam for the midterm (even for having a valid reason).** In documented cases (cf. Senate Bylaws), the weight of midterm is shifted to the final exam.
10. If a student is caught adopting unfair means (e.g. plagiarism), that student will face **serious consequences** including official disciplinary procedures (see below).

Policy on Misconduct and Ethics

The instructor will put a great deal of effort into helping students to understand and learn the material in the course. However, the instructor will not tolerate any form of cheating and consider that as an important issue. Should the instructor or grader find a reason for suspicion – or just cause – in a plagiarized student's work (assignment, reports, tests or project), the work in question will not be graded. The instructor will inform the suspected student(s) and will report any suspicion of cheating to the Director of the School of Computer Science. If sufficient evidence is available, the Director will begin a formal process according to the University Senate Bylaws. The instructor will not negotiate with students who are accused of cheating but will pass all information to the Director of the School of Computer Science. The students accused of cheating will then have to answer to the department's head and the dean of Science.

The following behaviour will be regarded as cheating (this list is not exhaustive – more examples in Appendix A, Senate Bylaws 31:

- Copying and reusing existing source code without reference and/or permission
- Copying assignments or labs or presenting someone else's work as your own
- Allowing another student to copy an assignment/project from you and present it as their own work
- Copying from another student during a test or exam
- Referring to notes, textbooks, etc., during a test or exam (unless otherwise stated)
- Talking during a test or exam
- Not sitting at the pre-assigned seat during a test or exam
- Communicating with another student in any way during a test or exam
- Having access to the exam/test paper prior to the exam/test
- Explicitly asking a proctor for the answer to a question during an exam/test
- Modifying answers after they have been marked
- Any other behaviour which attempts unfairly to give you some advantage over other students during the grade-assessment process
- Refusing to obey the instructions of the officer in charge of an examination

Especially, sharing questions or answers from any assignements, quizzes, exams (even from another section), including previous work, copying/pasting without citation, or any other form of plagiarism will be considered as an attempt of cheating. The only authorized collaborations (or group work) are clearly mentioned in these outlines. In doubt, the students are required to ask for permission to the instructor.

Several University of Windsor students have been caught cheating during the last few years. In most cases the evidence was sufficient to invoke a disciplinary process which resulted in various forms of punishment including letters of censure, loss of marks, failing grades, and expulsions. As an example, a student who copied a project from another student and presented it as his own was expelled from the university. Another student who was caught copying in a midterm was suspended for one year. Do not cheat, if you are caught and found guilty, you could be expelled from the university and will have to explain why when you search for a job.

Please refer to the University's policy on Plagiarism in the senate bylaws :

- University of Windsor Academic Integrity and Student Conduct (Services for Students): https://www.uwindsor.ca/aauheads/resources/academic-integrity-student-conduct.html

Confidentiality

Course materials prepared by the instructor (e.g., Live/Streamed lectures, Lecture notes, PowerPoint slides, Labs, Class assignments, Exams, Quizzes, Projects) are considered by the University to be an instructor's intellectual property covered by the Copyright Act, RSC 1985, c C-42. These materials are made available to you for your own study purposes, and cannot be shared outside of the class or "published" without explicit permission. Reproduction or dissemination of examinations or the contents or format of examinations/quizzes in any manner whatsoever (e.g., sharing content with other students), without the express permission of the instructor, is strictly prohibited. Students who violate this rule or engage in any other form of academic dishonesty will be subject to disciplinary action under Senate Bylaw 31: Student Affairs and Integrity.

Students who do not have the necessary accommodations may be permitted by the instructor to record lectures in any format (audio, video, photograph, etc.). Otherwise, recording without permission is strictly prohibited.

Posting course materials or any recordings you may make to other websites without the express permission of the instructor will constitute copyright infringement.

Support for the students

Feeling Overwhelmed ? From time to time, students face obstacles that can affect academic performance. If you experience difficulties and need help, it is important to reach out to someone. For help addressing mental or physical health concerns on campus, contact (519) 253-3000:

- Student Health Services at ext. 7002 (http://www.uwindsor.ca/studenthealthservices)
- Student Counselling Centre at ext. 4616 (http://www.uwindsor.ca/studentcounselling)
- Peer Support Centre at ext. 4551

24 Hour Support is Available

My Student Support Program (MySSP) is an immediate and fully confidential 24/7 mental health support that can be accessed for free through chat, online, and telephone. This service is available

to all University of Windsor students and offered in over 30 languages. Call: 1-844-451-9700, visit https://keepmesafe.myissp.com/ or download the My SSP app: Apple App Store/Google Play.

A full list of on- and off-campus resources is available at: http://www.uwindsor.ca/wellness. Should you need to request alternative accommodation, contact your instructor, head or associate dean.

Bylaw Compliances

This syllabus and course are compliant with senate bylaws and regulation, especially :

- Bylaw 31: Academic Integrity
- Bylaw 32: Procedural Irregularities and Discrimination Regarding Academic Instruction, Academic Evaluation and Academic Grade Appeals
- Bylaw 55: Graduate Academic Evaluation Procedures

More informations on https://lawlibrary.uwindsor.ca/Presto/home/home.aspx