Western University
Faculty of Engineering
Department of Electrical and Computer Engineering

SE 4450 – SOFTWARE ENGINEERING DESIGN II

Course Outline 2023-24

Description:

Design and implementation of a large software engineering project. Design, coding, testing and implementation are carried out in groups under the supervision of a faculty member. Progress reports, deliverables and a final engineering report are prepared; each student must give a public lecture on the work performed.

There is more to producing software than just writing programs. It is now widely recognized that the engineering of software systems has a pivotal role to play in the production of quality software systems that are produced on time, to budget, and to correct level of reliability. Software is the secret elixir that transforms electronic devices into interactive tools capable of real magic. That puts software designers in the driver's seat of the high-tech revolution. The aim of this course is emphasize the idea of what makes a good design as a key aspect within software engineering.

The course emphasizes teamwork, and hones your creative and entrepreneurial skills while putting the methods and techniques learned in past courses into real practice. The project involves forming four- to six-person teams to analyze, design, build, test, and evaluate a software system to meet the requirements of a real independent user. The main objective of this course is the development of a new generation of innovators.

Contact Hours:
6 laboratory hours, both terms, 1.0 course.

Pre-requisites:
Completion of Third Year of the Software Engineering Program. Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Anti-requisites:
ECE 4416, CBE 4497, CEE 4441, MME 4499, ES 4499

Co-requisites:
SE 4452A/B, SE4455A/B.

CEAB Academic Units:
Eng. Design: 100%

Required Textbook:
C.W. Dawson, Projects in Computing and Information Systems, 2009, 2nd edition, published by Addison-Wesley, ISBN 978-0-273-72131-4.

Other Required References:
Course notes and supplementary material will be available at the Course Web site.

General Learning Objectives (CEAB Graduate Attributes):

Knowledge Base		Use of Engineering Tools	A	Impact on Society and the Environment	
Problem Analysis	A	Individual and Teamwork	A	Ethics and Equity	A
Investigation		Communication Skills	A	Economics and Project Management	A
Design	A	Professionalism		Life-Long Learning	A

Notation*: I: Introductory, D: Intermediate, A: Advanced, or blank*. I – The instructor will introduce the topic at the level required. It is not necessary for the student to have seen the material before. D – There may be a reminder or review, but the student is expected to have seen and been tested on the material before taking the course. A – It is expected that the student can apply the knowledge without prompting (e.g., no review).

Objectives and Specific Learning Outcomes	**CEAB GA Indicators**
At the end of the course, students will be able to use modern methods, technologies, languages, principles and practices that make it possible to conceive, design, create, test, document, and present sizeable software systems.	
1. Create an Engineering Project Proposal	
At the end of this section, students will be able to:	
a. Write a project proposal to define an engineering problem (Software System)	**PA1**
b. Manage time for the project (Gantt Chart, Burndown Chart)	**ITW1**
c. Manage human resources for the project (Matrix of Responsibilities)	**ITW1**
2. Software development models	
At the end of this section, students will be to:	
a. Frame a scope for a complex, open ended software system (Requirements, User Stories, Sprint Backlog)	**PA2**
b. Formulate a strategy to create the software (Architecture)	**D1**
c. Ability to incorporate change management (with Github)	**EPM4**
d. Consider myriad software development processes to be create software	*D2*
e. Choose the development model that suites their project and their team	**D3**
f. Implement the chosen model throughout the project until completion	**D4**
g. Release version 1.0 with partial implementation of features	**D3**
h. Release version 2.0 with most features and demonstration to peers	**D4**

i. Ability to reach substantiated conclusions (Deliverables)	**PA3**
3. Prototyping	
At the end of this section, students will be to:	
a. Recognize the benefits of prototyping for requirements capture, explore the concepts of the proposed system and explore the technical feasibility of the requirements of the system (Demo-1)	**D3**
b. Apply incremental development during the life cycle of their projects (Demo-2)	**D4**
c. Demonstrate the ability to identify and select the appropriate technology and tools to develop the system (Walkthrough)	**ET1**
d. Create two detailed Sprint plans	**EPM2**
4. Individual and Teamwork	
At the end of this section, students will be to:	
a. Ability to assume responsibility and perform individual (Github contribution)	**ITW1**
b. Ability to contribute to team goals (Poker Game Method)	**ITW2**
c. Ability to evaluate peer and self-performance based on team effectiveness (Engagement Survey)	**ITW3**
d. Demonstrate knowledge of professional ethics in software development (ACM code of ethics)	**EE1**
e. Awareness of diversity and equity in software development (Forums)	**EE4**
5. Communications Skills	
At the end of this section, students will be to:	
a. Present the project orally using appropriate material, language, non-verbal communication and effective graphical tools (Demo-1)	**CS2**
b. Ability to articulate ideas in writing using appropriate language and effective graphical tools (Retrospective)	**CS3**
6. Lifelong Learning	
At the end of this section, students will be to:	
a. Lessons learned front the project (Retrospective)	**LL1**
b. Recognize gaps in the knowledge and pursue knowledge independently	*LL2*

Evaluation:

Course Component	**Weight**	**Tentative Due Dates**
Project Proposal (PA1, ITW1)	5%	October 9
Walkthrough (PA2, ET1, D1)	5%	October 30
Two Sprints Plans (EPM2, ITW2)	15%	October 30
Demo-1 of Release-1 (D3, EPM4)	10%	December 8
Final Demo (D4, PA3)	20%	March 22
Public Presentation (CS2)	10%	March 22
Retrospective and Wrap-up (LL1, CS3)	10%	March 29
Attendance/Engagement (ITW3)/Forums (EE1, EE4)	25%	Along the course, April 5
*Bonus: best project	up to 5%	End of the course

In order to pass the course, a student must obtain a passing grade in each component. A student who fails any component shall receive a final grade not greater than 48%.

A student must design and implement a large software engineering project. Design, coding and testing are carried out by individual students or by teams. In case of team projects, a clear division of the work should be identified as suggested by the team members and approved by the faculty advisor. Progress reports during the course and a final engineering report should be prepared. Factors considered in the evaluation of the reports include the level of challenge involved in the project, the manner in which the project is carried out, and the clarity and accuracy of the reports. Each student must deliver a public lecture on the work performed. The reports must be submitted electronically through OWL.

Team Project grades:
When working on team projects, all individuals will normally receive the same grade. If students feel that another team member is not a positive contributor, students are requested to resolve matters professionally and respectfully. If after drawing someone's attention to their ineffective contribution their behavior continues, students may discuss concerns with the instructor. After consulting with the concerned students and considering any impact of a student's behavior on the team's performance, the instructor may adjust course grades for any or all individuals in the team. If there is unbalance in the workload among group members, marks will be accordingly adjusted to reflect each member's effort put into the project.

We will vehemently deny any cross-discipline project, i.e. SE4450 students should team up with their peers in SE4450 only.

Online Activities:
Lectures may be delivered in class and online, mostly synchronously or sometimes asynchronously. Walkthroughs, demonstrations and presentations will be mostly asynchronous. Discussions, deliverables, and reports will be conducted/submitted online.

All of the remote learning sessions and the final video presentations for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

Importantly, participants are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor. For the sake of everyone's privacy, it is prohibit to post the recordings, discussions, content, and other course materials in social media/networks.

Internet, Website, e-Mail, Forums, and Bulletin Board:
Students are responsible for regularly checking their Western e-mail and the course web site (https://owl.uwo.ca/portal/) and making themselves aware of any information that is posted about

the course. If the student fails to act on information that has been posted on these media and does so without a legitimate explanation (i.e., medical reasons), then there are NO grounds for an appeal.

Late Submission Policy:
There will be strict deadlines for the project components. Since one of the requirements of a professional engineer is on-time delivery, severe penalties are assessed for overdue submissions: penalties of 50% after 1 day, 100% after two or more days. There will be no rescheduling of tasks.

Attendance Policy:
Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). Attendance does not mean participation. Students should immediately consult with the instructor or department Chair if they have any problems that could affect their performance in the course. The student should seek advice from the instructor or department Chair regarding how best to deal with the problem. Failure to notify the instructor immediately (or as soon as possible thereafter) will have a negative effect on any appeal. Students are required to meet regularly with their faculty advisor, at least once a month, and keep a log of their work.

Cheating and Plagiarism Policy:
Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning; it is zero tolerance.

All required papers may be subject to submission for textual similarity review to commercial plagiarism-detection software under license to the University for detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com (http://www.turnitin.com). MOSS system will be used to detect program similarity.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, can be found at:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

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NEW TO COURSE OUTLINE – FACULTY OF ENGINEERING FROM 2023-2024

STATEMENT ON GENDER-BASED AND SEXUAL VIOLENCE

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced gender-based or sexual violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts, here. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

INSTRUCTIONS FOR STUDENTS UNABLE TO WRITE TESTS OR EXAMINATIONS OR SUBMIT ASSIGNMENTS AS SCHEDULED

If, on medical or compassionate grounds, you are unable to write term tests or final examinations or complete course work by the due date, you should follow the instructions listed below. You should understand that academic relief will not be granted automatically on request. You must demonstrate to your department (or the Undergraduate Services Office) that there are compelling medical or compassionate grounds that can be documented before academic relief will be considered. Different regulations apply to term tests, final examinations and late assignments. Please read the instructions carefully.

A. *GENERAL REGULATIONS & PROCEDURES*

1. All first-year students will report to the Undergraduate Services Office by submitting the Academic Consideration Request Form, for all instances.
2. If you are an upper year student and you are missing a test/assignment/lab or examination you will report the absence by submitting Academic Consideration Request Form. Absences worth LESS THAN 10% of your mark, will be processed by your department office. If your course work is worth 10% OR MORE of your final grade, your request will be processed by the Undergraduate Services Office.
3. Check the course outline to see if the instructor has a policy for missed tests, examinations, late assignments or attendance.
4. Documentation must be provided as soon as possible. If no one is available in your department office or the Undergraduate Services Office, leave a message clearly stating your name & student number and reason for your call. The department telephone numbers are given at the end of these instructions.
5. If you decide to write a test or an examination you should be prepared to accept the mark you earn. Rewriting tests or examinations or having the value of a test or examination reweighted on a retroactive basis is not permitted.

B. *TERM/MIDTERM TESTS*

1. If you are in first year and you are unable to write a midterm/term test, contact the Undergraduate Services Office, SEB 2097 PRIOR to the scheduled date of the test.
2. If you are an upper year student and you are unable to write a midterm/term test, inform your instructor PRIOR to the scheduled date of the test and request relief through the Academic Consideration Request Form. If the instructor is not available, leave a message for him/her at the department office. If the test is worth LESS THAN 10% of your mark, your request for relief will be processed by your department office. If the test is worth MORE THAN 10% of your final grade your request for relief will be processed by the Undergraduate Services Office.
3. Be prepared to attach supporting documentation to the Department Chair and/or the Undergraduate Services Office through the online form (see next page for information on documentation).
4. Discuss with the instructor if and when the test can be rescheduled. The approval of the Chair or the Undergraduate Services Office is required when rescheduling midterm/term tests.

C. *FINAL EXAMINATIONS*

1. If you are unable to write a final examination, contact the Undergraduate Services Office PRIOR TO THE SCHEDULED EXAMINATION TIME to report your absence using the Academic Consideration Request Form and request permission to write a Special Final Examination. If no one is available in the Undergraduate Services Office, leave a message clearly stating your name & student number.
2. Be prepared to provide the Undergraduate Services Office with supporting documentation (see next page for information on documentation) the next day, or as soon as possible (in cases where students are hospitalized). The following circumstances are not considered grounds for missing a final examination or requesting special examinations: common cold, headache, sleeping in, misreading timetable and travel arrangements.
3. In order to receive permission to write a Special Examination, you must obtain the approval of the Chair of the Department and the Associate Dean and in order to apply you must submit an "Application for a Special Exam" form. The Undergraduate Services Office will then notify the course instructor(s) and reschedule the examination on your behalf.

PLEASE NOTE: It is the student's responsibility to check the date, time and location of the Special Exam.

D. *LATE ASSIGNMENTS*

1. Advise the instructor if you are having problems completing the assignment on time (prior to the due date of the assignment).
2. Be prepared to submit the Academic Consideration Request Form and provide documentation if requested by the instructor (see reverse side for information on documentation).
3. If you are granted an extension, establish a due date. The approval of the Chair of your Department (or the Assistant Dean, First Year Studies, if you are in first year) is not required if assignments will be completed prior to the last day of classes.
4. i) Extensions beyond the end of classes must have the consent of the instructor, the department Chair and the Associate Dean, Undergraduate Studies. Documentation is mandatory.
   ii) A Recommendation of Incomplete Form must be filled out indicating the work to be completed and the date by which it is due. This form must be signed by the student, the instructor, the department Chair and the Associate Dean, Undergraduate Studies.

E. *SHORT ABSENCES*

If you miss a class due to a minor illness or other problem, check your course outlines for information regarding attendance requirements and make sure you are not missing a test, laboratory or assignment. Cover any readings and arrange to borrow notes from a classmate.

F. *EXTENDED ABSENCES*

If you are absent more than one week or if you get too far behind to catch up, you should consider reducing your workload by dropping one or more courses. (Note drop deadlines listed below). You are strongly encouraged to seek advice from your Academic Counsellor in the Undergraduate Services Office.

G. *DOCUMENTATION*

If you consulted an off-campus doctor or Student Health Services regarding your illness or personal problem, you must provide the doctor with a Student Medical Certificate to complete at the time of your visit and then bring it to the Department (or the Undergraduate Services Office). This note must contain the following information: severity of illness, effect on academic studies and duration of absence. Regular doctor's notes will not be accepted; only the Student Medical Certificate will be accepted.

In Case of Serious Illness of a Family Member: Provide a Student Medical Certificate to your family member's physician to complete and bring it to the Department (or the Undergraduate Services Office if you are in first year).

In Case of a Death: Obtain a copy of the death certificate or the notice provided by the funeral director's office. You must include your relationship to the deceased and bring it to the Department (or the Undergraduate Services Office if you are in first year).

For Other Extenuating Circumstances: If you are not sure what documentation to provide, ask the Departmental Office (or the Undergraduate Services Office if you are in first year) for direction.

Note: Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence (see below).

H. *ACADEMIC CONCERNS*

1. You need to know if your instructors have a policy on late penalties, missed tests, etc. This information may be included on the course outlines. If not, ask your instructor(s).
2. You should also be aware of attendance requirements in some courses. You can be debarred from writing the final examination if your attendance is not satisfactory.
3. If you are in academic difficulty, check out the minimum requirements for progression in the calendar. If in doubt, see your Academic Counsellor.

Calendar References:

Check these regulations in your 2023 Western Academic Calendar available at www.westerncalendar.uwo.ca.

Absences Due to Illness:
https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_135

Academic Accommodations for Students with Disabilities:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_10

Academic Accommodations for Religious or Holy Days:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_16

Course Withdrawals:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=6&SelectedCalendar=Live&ArchiveID=#Page_75

Examinations:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?PolicyCategoryID=5&command=showCategory&SelectedCalendar=Live&ArchiveID=

Scheduling of Term Assignments:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_78

Scholastic Offences:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#Page_20

Student Medical Certificate:
https://www.eng.uwo.ca/files/undergraduate/student-medical-certificate.pdf

Engineering Academic Regulations:
http://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=4&SelectedCalendar=Live&ArchiveID=#Page_86

Note: These instructions apply to all students registered in the Faculty of Engineering regardless of whether the courses are offered by the Faculty of Engineering or other faculties in the University.

Add Deadlines:	First term half course (i.e. "A" or "F")	September 15, 2023
	Full courses and full-year half course (i.e. "E", "Y" or no suffix)	September 15, 2023
	Second term half course (i.e. "B" or "G")	January 16, 2024
Drop Deadlines:	First term half course without penalty (i.e. "A" or "F")	November 13, 2023
	Full courses and full-year half courses without penalty (i.e. "E","Y" or no suffix)	November 30, 2023
	Second term half or second term full course without penalty (i.e. "B" or "G")	March 7, 2024

Contact Information:

Undergraduate Services Office:	SEB 2097	Phone: 519-661-2130	E-mail: engugrad@uwo.ca
Chemical & Green Process Engineering:	TEB 477	Phone: 519-661-2131	E-mail: cbeugrad@uwo.ca
Civil Engineering:	SEB 3005	Phone: 519-661-2139	E-mail: civil@uwo.ca
Computer, Electrical, Mechatronic & Software Engineering	TEB 279	Phone: 519-661-3758	E-mail: eceugrad@uwo.ca
Integrated Engineering	ACEB 2410	Phone: 519-661-6725	E-mail: engceli@uwo.ca
Mechanical Engineering:	SEB 3002	Phone: 519-661-4122	E-mail:
mmeundergraduate@uwo.ca			

August 26th, 2023.