Western Engineering

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

SE 3352 – Requirements Analysis and Engineering

Course Outline Fall/Winter 2024-25

COURSE DESCRIPTION:

Requirements Engineering is crucial in the software development life cycle (SDLC). However, given the uncertain nature of software engineering projects, requirements engineering is not seen as a one-time task that's done and got over with, but rather as an ongoing process that intervenes and integrates with the various tasks in the SDLC, as the agile methodologies make the lines between the tasks of the SDLC more and more blurry. This is especially true with the task closest to the requirements engineering in the SDLC, which is the system/architecture design.

This course introduces the students to requirements engineering tools and techniques as well as system/architecture design as part of an agile process.

ACADEMIC CALENDAR:

Requirements includes a feasibility study of the desired systems, elicitations and analysis of user's needs, the creation of a precise description of what the system should and should not do along with any constraints on its operation and implementation, and the validation of this specification by the users.

PRE OR COREQUISITES:

> **Prerequisites:** (SE 2203A/B and SE 2205A/B), or (Computer Science 2210A/B and Computer Science 2212A/B/Y).
>
> 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.

ANTIREQUISITES: Computer Science 4473A/B.

CEAB ACADEMIC UNITS: Engineering Science 65%, Engineering Design 35%.

INSTRUCTOR INFORMATION:

> **Name:** Shaimaa Ali, Ph.D., P.Eng.
>
> **Office/Office Hours:** Tuesdays 1:30 – 2:30 @TEB-251
>
> **Phone:** 5196612111 ext. 81268
>
> **Email:** sali242@uwo.ca

CONTACT HOURS:

Timetable information is available at https://draftmyschedule.uwo.ca/.

LECTURE:	2 hours weekly starting Sept. 5th
LAB:	2 hours weekly starting Sept. 8th

RECOMMENDED TEXTBOOKS:

- Bernd Bruegge, Object-Oriented Software Engineering Using UML, Patterns, and Java, 3rd Edition, ISBN: 0-13-606125-7, 2010, Prentice Hall.
- David C. Kung, Software Engineering: An Agile Unified Methodology ISE, 2nd Edition, Feb.2nd, 2023, **ISBN-10:** 0073376256, **ISBN-13:**978-0073376257, McGraw Hill.

OTHER RECOMMENDED RESOURCES/REFERENCES: Course notes and supplementary material will be available on the Course Web site.

GENERAL LEARNING OBJECTIVES (CEAB GRADUATE ATTRIBUTES)

Knowledge Base	A	Engineering Tools		Impact on Society	
Problem Analysis	D	Individual & Teamwork		Ethics and Equity	
Investigation	D	Communication	D	Economics and Project Mgmt.	
Design	D	Professionalism		Life-Long Learning	

Notation: x represents the content level code as defined by the CEAB. blank = not applicable; I = introduced (introductory); D = developed (intermediate) and A = applied (advanced).

Rating: 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).

COURSE MATERIALS: Weekly content and guides for the laboratories will be available on the course OWL site.

COURSE TOPICS AND SPECIFIC LEARNING OUTCOMES:

The following table summarizes the course learning outcomes along with CEAB GAIs where the GAIs in bold indicate ones to be measured and reported annually.

Course Topics and Specific Learning Objectives	**CEAB GAI**
1. Introduction to the Software Process	**KB3**
At the end of this section, students will be able to:	
a. Explain and illustrate what design is, how design is related to problem-solving, and how problem-solving informs design activities, structures design processes, and provides design techniques.	
b. Explain and illustrate the role of abstraction and modelling in design and where design fits into the software life cycle.	
2. Requirements elicitation	
At the end of this section, students will be able to:	
a. List and explain several needs elicitation heuristics and techniques.	**KB 3**
b. Plan proper requirements elicitation activities suitable to the project's context.	**I1**
c. Conduct requirements elicitation activities as planned	**I2**
d. Explain, organize and illustrate the different types of requirements involved in a software project.	**I3, CS1**
3. Software analysis and System Decomposition	
At the end of this section, students will be able to:	
a. Use UML to formulate the requirements specification. **b.** Validate, correct and clarify the requirements specification if any errors or ambiguities are found.	**KB3, PA1**
b. Identify objects, their behaviour, relationships, classification, and organization.	**PA2**
c. Define the system from the developers' point of view.	**PA2**

d. Define the system's architecture in terms of design goals and subsystem decomposition.	**PA3**
4. Addressing Software Design Goals	
At the end of this section, students will be able to:	
a. Understand global issues, such as the mapping of the system onto hardware, the storage of persistent data, and global control flow.	**D1**
b. Apply architectural styles, components, and UML to deal with solution domain complexity.	**D2, D3**
5. Reusing Pattern Solutions	
At the end of this section, students will be able to:	
a. Describe the detailed modelling and construction activities related to the solution domain.	**D2**
b. Identify and apply design patterns and frameworks to realize specific subsystems.	**D3**
6. Software Development Life Cycle	**KB 3**
At the end of this section, students will be able to:	
a. Identify software development activities from initial inception to phasing it out	
b. Describe software life cycle models, such as Waterfall, Incremental and Iterative, Prototype, and Extreme Programming and SCRUM models, that provide an abstract model of development activities.	

EVALUATION:

Name	% Worth	Assigned	Due Date	CEAB GAs ASSESSED
In-Class Activities	5%	During class time		
Review Questions	5%	Thursday after class	Wed. of the next week	
Group Project	20%	- Task1: Friday of week 8 - Task2: Friday of Week 9 - Task3: Friday of Week11	- Task1: Friday of week 9 - Task2: Friday of Week 8 - Task3: Friday of Week12	
Individual Labs	20%	- Lab 1: Friday of week 2 - Lab 2: Friday of week 3 - Lab 3: Friday of week 4 - Lab 4: Friday of week 5 - Lab 5: Friday of week 7 - Lab 6: Friday of week 10 - Lab 7: Friday of week 12	- Lab 1: Friday of week 3 - Lab 2: Friday of week 4 - Lab 3: Friday of week 5 - Lab 4: Friday of week 6 - Lab 5: Friday of week 8 - Lab 6: Friday of week 11 - Lab 7: Friday of week 13	- I1,I2,I3 - CS1
Midterm Exam	25%	October 10th, during class time		KB3
Final Exam	25%	Scheduled by OOR		

Note that the dates listed above are **tentative** and may be adjusted if needed. Marks will be assigned on the basis of method of analysis and presentation, correctness of solution, clarity and neatness.

COURSE POLICIES:

- Evaluation items with a weight less than 10% will not be accommodated.
- **In order to pass the course a student is required to have at least 50% in each of the evaluation categories with weight >= 10%, otherwise the student will receive a final grade of 48%.**
- Students Seeking academic consideration for the midterm exam will be required to provide formal supporting documentation. A Make-up exam will be scheduled for students after they're granted academic consideration.
- Lab and project assignments will be acceptable 72 hours after the due date without penalty to accommodate for any potential emergencies. Accommodations needed for more than 72 hours will require supporting documentation.
    - **Please do not treat the 72-hour flexibility period as an automatic extension to the deadline. Only use it for emergencies; otherwise, you may risk losing the grade of that assignment, as emergencies that occur after the due date will not be considered accommodations.**
- Accommodations are granted for individual students, not for groups. If one group member was granted accommodation, the rest of the group is still required to submit partial work on the due date, stating the responsibilities of each group member and missing only the work of the accommodated student, with the possibility of submitting an amendment to include the accommodated student's work according to their accommodation. Consult with the instructor if you're in doubt regarding your group assignments before the due date to clarify what's required in your case.

ABSENCE FROM MANDATORY COURSE COMMITMENTS: Students must familiarize themselves with the Policy on **Academic Consideration for Absences:**
https://www.eng.uwo.ca/undergraduate/academic-consideration-for-absences.html

I. Missed/Late Accommodation Policy

1. The Academic Consideration Request Form is available through the STUDENT ABSENCE PORTAL.
2. Documentation must be provided as soon as possible. Requests for academic consideration must include the following components:
   a. Indication of the course(s) and assessment(s) affected by the request
   b. Medical note, and
   c. Additional supporting documentation as relevant
3. Requests for academic consideration without a medical note or other supporting documentation may be accepted once per term, per course.
4. Undocumented absences cannot be used for examinations scheduled by the Office of the Registrar during official examination periods (including take-home final exams and December mid-year exams for full courses) and practical laboratory and performance tests typically scheduled in the last week of the term. Undocumented absences also cannot be used for the "designated assessment" in each course. When flexibility in assessment exists and is clearly stated on the course outline, both undocumented absences and academic consideration requests with documentation may be denied.
5. Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence.

II. Exam Accommodation

1. If you are unable to write a final examination, report your absence using the Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
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 the Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
   PLEASE NOTE: It is the student's responsibility to check the date, time and location of the Special Examination.

III. LATE ASSIGNMENTS

IV. Medical Accommodation

1. Requests for Academic Consideration Request Form through STUDENT ABSENCE PORTAL.
2. Requests for academic consideration must include the following components:
   a. Self-attestation signed by the student (*This is only accepted for the first/one absence*)
   b. Medical note. Forged notes and certificates will be dealt with severely. To submit a forged document is a scholastic offence.
   c. Indication of the course(s) and assessment(s) affected by the request
   d. Supporting documentation as relevant
3. Requests without supporting documentation are limited to one per term per course.
4. **Students must request academic consideration as soon as possible and no later than 48 hours after the missed assessment.**

5. Once the request and supporting documents have been received and reviewed, appropriate academic consideration, if granted, shall be determined by the instructor in consultation with the academic advisor, in a manner consistent with the course outline.

   Academic consideration may include extension of deadlines, waiver of attendance requirements for classes/labs/tutorials, or re-weighting of course requirements. Some forms of academic consideration, such as arranging Special Examinations, assigning a grade of Incomplete, or granting late withdrawals without academic penalty, may only be granted by the Academic Advising office of the Faculty of Registration.

6. **An instructor may deny academic consideration for any assessment that is not required in the calculation of the final grade** (e.g., "8 of 10 quizzes"). Assessment flexibility must be indicated on the course outline.
7. **An instructor may deny academic consideration relating to the timeframe submission of work where there is already flexibility in the submission timeframe** (e.g., 72-hour submission window). This assessment flexibility must be indicated on the course outline.

V. Religious Accommodation

When scheduling unavoidably conflicts with religious holidays, which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), no student will be penalized for absence because of religious reasons, and alternative means will be sought for satisfying the academic requirements involved. If a suitable arrangement cannot be worked out between the student and instructor involved, they should consult the appropriate Department Chair and, if necessary, the student's Dean.

It is the responsibility of such students to inform themselves concerning the work done in classes from which they are absent and to take appropriate action.

VI. Academic Integrity

In the Faculty of Engineering, we encourage students to create a culture of honesty, trust, fairness, respect, responsibility, and courage, befitting the professional degree you are pursuing.

Please visit Academic Integrity Western Engineering for more information

VII. Academic Offences

Plagiarism means using another's work without giving credit. The university has rules against plagiarism and other scholastic offences. Western Engineering has a zero-tolerance policy on plagiarism. The minimum penalty is zero on the course work and a repeat offence will earn you zero on the course. A third offence may lead to expulsion from the university.
Scholastic Discipline for Undergraduate Students & Cheating, Plagiarism and Unauthorized Collaboration: What Students Need to Know

Students must write their reports, 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.

All required papers may be subject to submission for textual similarity review to commercial plagiarism detection software under license to the University for the 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 the University of Western Ontario and Turnitin.com (http://www.turnitin.com). Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

VIII. Faculty of Engineering AI Policy

The use of generative Artificial intelligence (GenAI) tools won't be discouraged in the Faculty of Engineering. As we pride ourselves on building the future we can't hide from the use of GenAI tools to contribute to the understanding of the course materials. However, the use of GenAI tools in any assignment or contribution during the course will have to be disclosed, as a resource.

GenAI tools use won't be permitted in any type of examination or other assessments where the faculty have prohibited their use. If use of GenAI tools is detected by the instructor in these instances, academic offences penalties might be imposed against the student.

IX. Use of English Policy

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally, poorly written work except for the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

X. Accessibility

Western is committed to achieving barrier free accessibility for persons with disabilities studying, visiting and working at Western. As part of this commitment, there are a variety of services, groups and committees on campus devoted to promoting accessibility and to ensuring that individuals have equitable access to services and facilities. To help provide the best experience to all members of the campus community, please visit the Accessibility Western University for information on accessibility-related resources available at Western.

Students with disabilities may arrange for academic accommodation at Western. For a more detailed explanation, please visit Academic Support & Engagement -Academic Accommodation.

XI. Inclusivity, Diversity, and Respect

The Faculty of Engineering at Western University is committed to creating equitable and inclusive learning environments that value diverse perspectives and experiences. We recognize that university courses often marginalize students based on social identity characteristics such as, but not limited to, Indigeneity, race, ethnicity, nationality, ability, gender identity, gender expression, sexuality, age, language, religion, and socioeconomic status. Understanding this, we strive to facilitate equitable experiences and inclusion within the classroom by respecting and integrating multiple ways of knowing, being, and doing. Please visit the Office of Equity, Diversity and Inclusion.

XII. Health and Well-Being

- Health & Wellness Services – Students - Offers appointment-based medical clinic for all registered part-time and full-time students.
- Mental Health Support - Provides professional and confidential services, free of charge, to students

needing assistance to meet their personal, social and academic goals. Services include consultation, referral, groups and workshops, as well as brief, change-oriented psychotherapy.

- Crisis Support - For immediate assistant, please visit Thames Hall Room 2170 or call 519-661-3030. The crisis clinic operates between 11:00 am - 4:30 pm. For after-hours crisis support, click here.
- Gender-Based Violence and Survivor Support - 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.

Important Contacts

Engineering Undergraduate Services	SEB 2097	519-661-2130	engugrad@uwo.ca
Electrical and Computer Engineering	TEB 279	519-661-2111 x86264	eceugrad@uwo.ca
Office of the Registrar/Student Central	WSSB 1120	519-661-2100	

Important Links

- WESTERN ACADEMIC CALENDAR
- ACADEMIC RIGHTS AND RESPONSIBILITIES
- ENGINEERING PROGRESSION REQUIREMENTS AND ACADEMIC REGULATIONS
- UNIVERSITY STUDENTS' COUNCIL (USC) - SERVICES
- IMPORTANT DATES AND DEADLINES
- ACADEMIC CONSIDERATION FOR MEDICAL ILLNESS - UNDERGRADUATE STUDENTS
- ACCOMMODATIONS FOR RELIGIOUS HOLIDAYS
- SCHEDULING OF ASSIGNMENTS, TESTS, AND EXAMINATIONS
- STUDENT FORMS
- OFFICE OF THE REGISTRAR
- RETENTION OF ELECTRONIC VERSION OF COURSE OUTLINES (SYLLABI)
- ACADEMIC APPEALS
- STUDENT ABSENCE PORTAL