CS 4473a & 9551a
Software Requirements Engineering

Course Outline: Winter 2024

Logistics and Instruction:

Class Venue	FNB3220	
Day and Hours	Thu: 7-10 PM	
Instructor	Prof. Nazim H. Madhavji	<Last name><at>gmail<dot>com
TA	Haoran Wei	hwei53<at>uwo<dot>ca
TA Off. hrs	Appt. by email	
Instr. Off. hrs	Immediately after the class	
Last day of Lecture	8th April, 2024	

Course Description

Requirements engineering (RE) covers the activities of discovering, eliciting, negotiating, modelling, analysing, documenting, prioritising, and selecting a set of requirements to denote a desired solution for the envisaged computer-based system. This includes such issues as: feasibility analysis, quality attribute analysis, benchmarking, competitive product analysis, market predictions, requirements degradation analysis, alignment with cooperating systems, regulatory compliance and more.

For on-going evolution of an existing system, RE also includes analysis of the existing system and its old requirements. RE also involves maintaining the validity of the existing system requirements and keeping them under version and configuration control. Requirements essentially form the reason why specific functionality (or feature) is implemented in the system in first place to deliver the system's anticipated behaviour. Thus, there are explicit and implicit links between the system's implementation and the requirements that relate to the traceability of software artefacts.

In order to ensure that RE activities are effective and cost optimal, the RE process needs to be managed and improved on an on-going basis. The use of the term "engineering" implies that systematic and repeatable techniques should be used to ensure that system requirements are complete, consistent, relevant, etc.

RE is generally a front-end part of a software development process, which enables analysts to define what the operational context (where the system is supposed to run) is desired to be. It also helps to define what a software system is required to do and what the system's expected bahaviour is under what operational circumstances.

However, refinements of the initial (often high-level) requirements may be driven by the constraints posed by such issues as: precisely what the stakeholder needs at the time of design and

implementation, the existing system and infrastructure, development timeframe, developer expertise, the components and systems available in the marketplace, etc. As can be seen, RE is a complex process!

In this course, students will:

1 study how to elicit, analyse and validate requirements,
2 study different types of requirements,
3 study methods for formulating software requirements,
4 study issues related to requirements management,
5 study models of requirements, and
6 learn about requirements processes and the roles of the people involved.

Students will also carry out assignments and projects in requirements engineering. There shall be teamwork as well as individual work.

Prerequisites

- CS3307 -- Object-Oriented Design and Analysis
- IMPORTANT: The students are expected to be proficient in the use of UML, in modelling a software system using UML, and in using related tools.
- Also, please note the following **regulation from the university**:

  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.

Textbook & Lecture Notes:

Class textbook:

- Kark Wiegers and Joy Beatty: Software Requirements, 3rd Ed. Microsoft, 2013. ISBN: 978-0-7356-7966-5.

Highly recommended reference:

- Gerald Kotonya and Ian Sommerville: Requirements Engineering – Processes and Techniques, Wiley, 1998. ISBN: 978-0-471-97208-2

Supplementary Text books:

- Chapters 1-4, Software & Systems Requirements Engineering – In practice, by Brian Berenbach, Daniel Paulish. Juergen Kazmeier, Arnold Rudorfer, McGraw Hill, 2009. QA76.758.S6452 2009

- Chapters 2 & 4, Requirements Analysis and System Design – Developing Information Systems with UML, by Leszek A. Maciaszek. Addison Wesley, 2005. Available from the library.
- Ian Sommerville and Pete Sawyer: Requirements Engineering – A Good Practice Guide. Wiley, 1997.
- Eric J. Braude: Software Engineering – An Object-Oriented Perspective. Wiley, 2001.
- Leszek A. Maciaszek: Requirements Analysis and System Design – Developing Information Systems with UML. Addison Wesley, 2005.
- Len Bass, Paul Clements and Rick Kazman: Software Architecture in Practice, 2nd edition, Addison-Wesley, 2003.
- Roger Pressman: Software Engineering - A Practitioner's Approach, 5th edition, McGraw Hill, 2001.

Evaluation of Performance

(1) Evaluation of performance in the course consists of the breakdown shown in the table below.
(2) All material covered in the course (including lectures, books and other cited resources) is examinable.
(3) The teaching staff reserve the right to adjust (lower or raise) a particular student's marks based on their judgment of the student's participation in the course and on the articulated knowledge and understanding of the subject matter during the term.
(4) In group-work, every member's mark is the same (default case). However, circumstances may require that a member's mark is weighted by his or her participation and significance levels, judged anonymously by the group peers, as frequently as deemed necessary by the teaching staff – with the group maximum being the weight of one during any single measure.
(5) The grading criteria and detailed conditions, as applied to each evaluation component, will be described on the assignment/project/test/exam as appropriate.
(6) The date for any quiz or class test will be notified through OWL beforehand. Those who do not take the quiz/test will unfortunately receive zero marks (exceptions only as per the university policy).
(7) Late submissions of assignments and projects will not be accepted.
(8) If for any reason an evaluation component tabulated below cannot be adhered to by the teaching staff, the rest of the marks will be prorated.
(9) For groupwork, teams will be self-formed. This may not be appealed.

Component	Max. %	Dates
Summaries of assigned readings (TEMPLATES)	15**	(add/drop date)
**Summaries of assigned readings (Post-add/drop date till end of the term). This subsumes the Pre-add/drop date mark obtained. (TEMPLATES)	20	Weekly till the end of the term.
Topic research and presentation.	15	As scheduled.
Questions and Answers (in-class interactions)	5	Throughout the term.
Technical domain model resulting from the knowledge gained in the course.	15	Throughout the term.
Class project (PR1: 10 pts; PR2: 30 pts; Final: 70 pts)	40	As scheduled.
INDIVIDUAL Takeaways -- created in the class and posted on the designated storage while in the class. Not permitted to log Takeaways *after* the class time.	5 **(Missing Individual Takeaways get -5% for each class)**	Default: non-presentation days.
Show and Tell (S&T) class presentation (volunteers – accepted on a FCFS basis and by instructor's approval whose decision is final and not appealable). **Admin. volunteer of S&T gets up to 3% bonus.** **Bonus level decided by the instructor and is NOT disclosed.**	**BONUS** **Up to 3%.**	As scheduled.

Please Note:

- Class attendance is *mandatory*. Judged by the presence of Takeaways. Missing Takeaways are penalised as shown in the table above. Late submission of Takeaways will not be accepted.

- Conflict with any other course is not acceptable. Also, it will not be acceptable that you attend the class for only part of the class-duration (of 3 hours).

- It will not be acceptable that you miss the class due to reasons such as job interviews, extra-curricular activities, family trips, events, etc. Please arrange your other events accordingly or be prepared to lose 5% per class missed.

- University policy on absenteeism will prevail.

Topics

Introduction
Requirements Engineering Process
Requirements Elicitation & Analysis
Non-functional Requirements
Requirements Validation
Methods for Requirements Engineering
Business Requirements
Requirements Management
Requirements Change Management
Requirements Documentation
Tools for Requirements Engineering
Requirements Prioritisation
Domain Modelling

NOTE: Please note that the topics listed above are a general guideline and subject to change. Coverage of topics and pace may vary due to the course dynamics.

Email and OWL Policy

Staff contacting students:

- *We may need to send email messages to the whole class, or to students individually. Email will be sent to the UWO email address assigned to students by Western Technology Services (WTS), i.e. your email address @uwo.ca. It is each student's responsibility to read his/her email on a frequent and regular basis.*

  However, note that email at WTS (your UWO account) and other email providers such as google, hotmail.com or yahoo.com establish quotas or limits on the amount of space available to you. If you let your email accumulate there, your mailbox may fill up and you may lose important email from your instructors. Losing email is not an acceptable excuse for not knowing about the information that was sent. Similarly, emails may end up in your "Junk" mail folder for whatever reason. It is the student's responsibility that no email from the instructing team gets placed into the Junk mail folder.

- *OWL will be used to post announcements, assignments, material in the resource folder, etc. It is the student's responsibility to check OWL frequently and regularly to ensure that no course-related material is missed.*

Student contacting Staff

- *For **technical issues** concerning the course (e.g., topic research and presentation, class project, domain model, summaries, etc.), students must create communication channels (e.g., Slack) within their group or for class-wide forums to post their questions/answers on OWL Forum. Emails to staff for this purpose will **not** be responded to.*

- *For **administrative issues** (e.g., absenteeism, marks, and course registration) emails to the staff are acceptable.*
    - *Email **subject line** MUST include: "cs4473B/cs9551B:" <subject>. Without this, the email may be trapped by SPAM filter and may not be available, read or responded to.*

Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

https://multiculturalcalendar.com/ecal/index.php?s=c-univwo.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf.

Academic Policies

The website for Registrarial Services is http://www.registrar.uwo.ca.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: https://www.uwo.ca/sci/counselling/.

Students who are in emotional/mental distress should refer to Mental Health@Western (https://uwo.ca/health/) for a complete list of options about how to obtain help.

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 sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

You may wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (https://learning.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the USC, https://westernusc.ca/services/.