Western Science

Department of Computer Science

CS4472A Software Specification, Testing and Quality Assurance
Course Outline - Fall Term 2025

1. Course Information

Course Information

Course Number and Title:	CS4472A	Software Specification, Testing and Quality Assurance
Lectures:	Tuesday	19:00 – 22:00

Instructor's Office Hours:

Marios Stavros Grigoriou	Thursday 10:00-12:00	On-line (Zoom) Only with appointment

List of Prerequisites

- Prerequisite(s): Computer Science 3307A/B/Y
- Students are assumed to be familiar with the Java programming language

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll in it, you may 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.

2. Instructor Information

Instructors	Email	Office	Office Hours
Mr. Marios-Stavros Grigoriou (Course Coordinator)	mgrigori@uwo.ca		TBA
TBA	TBA	TBA	TBA

Students must use their Western (@uwo.ca) email addresses when contacting their instructors.
All students will insert the prefix [CS4472A-2025] at the beginning of the subject line of every communication to the instructor or TA. Communications without this prefix might or might not be considered for reply.

Ways to reach the instructor and TAs:
My email, provided you use the necessary prefix.
The Brightspace conversations page once the relevant website is up and running will be monitored and replied to in a timely fashion.
Office hours will be held only when someone signs up on the related page on Brightspace.
Questions about course material should be preferentially directed towards the TA and only reach the instructor cc'ing the conversation with the TA only if the TA is unable to resolve a question.
Questions about course procedure should only be directed towards the instructor.

3. Course Syllabus, Schedule, Delivery Mode

Our classes will combine instruction on current technologies, and software engineering methods with collaborative note development and discussion of course topics.
Copies of lecture notes will be available on the course web site. They are not a substitute for attending lectures.

One of the most important phases of the software life-cycle is Testing. Software Testing does not occur in a vacuum. It aims to ensure that the system meets its functional and non-functional requirements. In this respect, it is driven by the system's specifications. Software Testing is applied at various levels. In the most granular level, Software Testing aims to verify that individual units (i.e. a class or a method) work properly. This is referred to as Unit Testing. Once individual units work, then the next level is to verify that the units work properly together. This is referred to as Integration Testing. Once all units work together, the system has to be tested to ensure that it works properly end-to-end, and that it does not enter an illegal or non-specified state. This is referred to as Functional Testing. In addition to these testing levels, there are testing approaches that are based on models (i.e. model-driven testing), and approaches that relate to object-oriented systems (Object-Oriented testing). Software Testing, however, is only one part of Quality Assurance. Assuming that testing is conducted properly, we have to evaluate the overall reliability of the software system, and measure some key metrics to estimate, within a certain degree of confidence, the quality level of the end system.

In this course, we will examine some key UML2 specification elements, namely sequence diagrams and state (activity) diagrams, and then we will discuss techniques for Unit, Integration, and Functional Testing. In the course we will use the Junit5 framework for hands-on training on Software Testing. In this course, we will also discuss reliability growth models, and software metrics that predict quality, effort, and cost.

The following list of topics may be covered, depending on time and the dynamics of the semester.

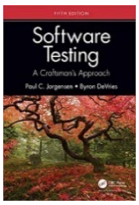
- Basic principles of software testing
- UML2 sequence and activity diagrams
- Unit testing
- Integration testing
- Functional and acceptance testing
- Junit
- Model-driven testing
- Life-Cycle based testing
- Object-Oriented testing
- Software metrics
- Software reliability growth models
- Effort and cost estimation
- Software technical reviews
- Build test automation

Key Sessional Dates

Classes begin: September 4, 2025
Reading Week: November 3–9, 2025
Classes end: December 9, 2025

4. Course Materials

This is the recommended/optional textbook for the course. It is NOT required, but will be useful if your career takes you this way after graduation



Software Testing: A Craftsman's Approach, Fifth Edition Hardcover – Oct 18 2013
by Paul C. Jorgensen (Author), ISBN-13: 978-0367358495,
ISBN-10: 0367358492

A useful link regarding ordering the book can be found at
https://lb.ca/cgi-bin/cgiwrap/additem.bbx?/Z107910/I9780367358495

The book is NOT required!!

We will be using OWL to host the course content. Eclipse will be used for software development, Junit5 as a software testing framework, Jira can be used for group collaboration, and any git type repository for source code version control.

Students should check the course's Web site on OWL (https://westernu.brightspace.com) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

All course material will be posted on OWL: https://westernu.brightspace.com/

If students need assistance, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

The strategy to study for this course is to read the lecture notes, attend the classes, keep notes in the class, and read the textbook and the supporting material in the hyperlinks posted after each class unit.

5. Methods of Evaluation

Methods of Evaluation

Individual	
--Midterm(Tentative Tuesday, November 11th)	20% Scheduled by the instructor during regular class but in a different classroom
--Final Exam (date TBD)	35% Scheduled by the Registrar
--System Testing/Reliability	15% (Tentative – Friday, Nov. 28th by EOD)
Team Assignments	
-- Unit Testing 1	15% (Tentative - Friday, October 31st by EOD)
-- Unit Testing 2	15% (Tentative – Friday, November 14th by EOD)

All deliverables are due by 23:59:59 on their specified due dates unless otherwise specified. Due dates are subject to change.

The Midterm will be covering the material up to the previous week the exam is held in. We expect that we will have covered by that time Chapters 1-8 from the textbook. Other details of the material to be covered in the Midterm will also be announced in the class. The final exam will be scheduled by the Registrar's office, and it will be posted on the Web and announced in the class. The final exam will cover the whole material of the class (Week-1 to Week-12). The textbook and the lecture notes will be a valuable part of the material covered in the course. The attendance and study of the material and the active participation in conducting the assignments are the best strategies for succeeding in this course.

Make up dates for the Midterm will be a week after the regular Midterm Examination. Make up dates for the final exam will be announced. Please note that there must be a valid documented reason for missing the Midterm, according to the policies outlined below in this document (see Absences section).

If, for any reason, the schedule given above cannot be adhered to, the marks will be prorated as follows:

- The individual components are worth a total of 55%. If any individual components must be cancelled, the remaining individual deliverable weights will be prorated to add up to 55%.
- The project components are worth a total of 45%. If any project components must be cancelled, the remaining project deliverable weights will be prorated to add up to 45%.

Each student will receive a mark for the project, which makes up 45% of their final grade in the course.

- Normally, the individual's combined project mark will be computed directly from the team marks for the team tasks. However, the instructors reserve the right to adjust an individual's mark – raising or lowering it – based on project participation, project presentation, meeting minutes, and the TAs' or instructor's knowledge of a student's attendance and participation in the course and/or mastery of the course material.
- Students are expected to complete a reasonable, fair, and equitable portion of their team project. Failing to do so may result in a significant deduction of the final mark allocated to the project at the discretion of the instructor.
- It is the student's responsibility to ensure that he/she is working to a satisfactory level. A student should consult with his/her TA or instructor if concerns or questions arise.

Team Project

- Students are required to work cooperatively in teams to design and implement their project.
- **You will be given the opportunity to form your own team. The deadline to do so is Monday September 22nd. After this date the instructors will decide on the composition of the teams. The instructors' decisions are final. The instructors will attempt to make sure that each team has 4 members.**
- Students are required to initiate contact and collaborate closely with their teammates.
- If specified by the project description, the project code must run on the specified environment for acceptance testing purposes, but team members can develop it on their own systems. The project code must be implemented in the Java programming language.
- Late project will be accepted for up to two days after the due date, with weekends counting as a single day. If the assignments are due on Thursday 11:55 pm. Submissions by Friday 11:55 pm will incur a penalty of 8% and submission later than Friday 11:55 pm and before Sunday 11:55 pm will incur a penalty of 20% in total. No submissions are accepted after Sunday 11:55 pm.

Meetings and Minutes

- During the course of the project, teams are required to have weekly meetings to discuss progress and plan for the future.
- Each team is required to write minutes of each meeting, listing the attendance, what the topics of discussion in the meeting were, any decisions that were made, and which team members were assigned which tasks. These minutes must be submitted with the project report in each deliverable and will provide input to be used for the overall assessment of the project.

General information about missed coursework

Students must familiarize themselves with the *University Policy on Academic Consideration – Undergraduate Students in First Entry Programs,* posted on the Academic Calendar: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration_Sep24.pdf,

This policy does not apply to requests for Academic Consideration submitted for **attempted or completed work**, whether online or in person.

The policy also does not apply to students experiencing longer-term impacts on their academic responsibilities. These students should consult Accessible Education.

For procedures on how to submit Academic Consideration requests, please see the information posted on the Office of the Registrar's webpage:
https://registrar.uwo.ca/academics/academic_considerations/
All requests for Academic Consideration must be made within 48 hours after the assessment date or submission deadline.

All Academic Consideration requests must include supporting documentation; however, recognizing that formal documentation may not be available in some extenuating circumstances, the policy allows students to make one Academic Consideration request **without supporting documentation** in this course. However, the following assessments are excluded from this, and therefore always require formal supporting documentation:

- **Examinations scheduled during official examination periods** (Defined by policy)
- **Midterm Examination**

When a student *mistakenly* submits their one allowed Academic Consideration request **without supporting documentation** for the assessments listed above or those in the **Coursework with Assessment Flexibility** section below, the request cannot be recalled and reapplied. This privilege is forfeited.

Evaluation Scheme for Missed Assessments
If you get academic consideration for missing the midterm exam, your final will be reweighted to include the weight of the midterm.

For the personal assessment the cutoff date for late submission having received **academic consideration** is before the end of the last day of lectures **(December 9th)**.
For the Team assessments the cutoff date for late submission having received **academic consideration** is before the end of the last day of lectures **(December 9th)**.
Seeing as Team assessments require a single submission, using an academic consideration for them would only make sense in extreme circumstances.
In the case where an academic consideration **IS** used for any of the assessments, the deadline will be pushed back 1 week at a time. Every academic consideration (documented or undocumented if the undocumented has not been used, will push back the deadline by 1 week until the above mentioned **strict** deadlines of the last day of lectures **(December 9th)**.
Those late dates can only be applied for extreme circumstances but are here to ensure that we will do everything possible to ensure an equal footing for everyone on the final exam.
If for any reason any of the assessments that has received appropriate accommodation cannot be handed in before the cutoff date, then the corresponding weight will be pro-rated to the final exam.

When a student misses the Final Exam and their Academic Consideration has been granted, they will be allowed to write the Special Examination (the name given by the University to a makeup Final Exam). See the Academic Calendar for details (under Special Examinations), especially for those who miss multiple final exams within one examination period.

6. Additional Statements

6.1 Religious Accommodation

When conflicts arise with a religious holiday that requires an absence from the University or prohibits certain activities, students should request an accommodation for their absence in writing to the course instructor and/or the Academic Advising office of their Faculty of Registration. This notice should be made as early as possible, but not later than two weeks prior to the writing of the examination (or one week prior to the writing of the test).

Please visit the Diversity Calendars posted on our university's EDID website for the recognized religious holidays - https://www.edi.uwo.ca

6.2 Academic 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.

6.3 General Academic Policies

The website for Registrar Services is https://www.registrar.uwo.ca/.

Use of @uwo.ca email: 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 email address. It is the responsibility of the account holder to ensure that emails received from the University at their official university address are attended to in a timely manner.

Requests for Relief (formally known as "appeals")

Policy on Request for Relief from Academic Decision:
https://uwo.ca/univsec//pdf/academic_policies/appeals/requests_for_relief_from_academic_decisions.pdf

Procedures on Request for Relief from Academic Decision (Undergraduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_requests_for_relief_procedure.pdf

6.4 Scholastic Offences

Policy on Scholastic Offences:
https://uwo.ca/univsec//pdf/academic_policies/appeals/scholastic_offences.pdf

Procedures on Scholastic Offences (Undergraduate):
https://uwo.ca/univsec//pdf/academic_policies/appeals/undergrad_scholastic_offence_procedure.pdf

Use of Electronic Devices During Assessments

In courses offered by the Faculty of Science, the possession of unauthorized electronic devices during any in-person assessment (such as tests, midterms, and final examinations) is strictly prohibited. This includes, but is not limited to: mobile phones, smart watches, smart glasses, and wireless earbuds or headphones.

Unless explicitly stated otherwise in advance by the instructor, the presence of any such device at your desk, on your person, or within reach during an assessment will be treated as a *scholastic offence*, even if the device is not in use.

Only devices expressly permitted by the instructor (e.g., non-programmable calculators) may be brought into the assessment room. It is your responsibility to review and comply with these expectations.

Use of Generative AI Tools

Unless otherwise stated, the use of generative AI tools (e.g., ChatGPT, Microsoft Copilot, Google Gemini, or similar platforms) is **not permitted** in the completion of any course assessments, including but not limited to: assignments, lab reports, presentations, tests, and final examinations.

Using such tools for content generation, code writing, problem solving, translation, or summarization—when not explicitly allowed—will be treated as a **scholastic offence**.

If the use of generative AI is permitted for a particular assessment, the conditions of use will be specified by the instructor in advance. If no such permission is granted, students must assume that use is prohibited. It is your responsibility to seek clarification before using any AI tools in academic work.

6.5 Support Services

Please visit the Science & Basic Medical Sciences Academic Advising webpage for information on adding/dropping courses, academic considerations for absences, requests for relief, 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.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. If you have any questions regarding accommodations, you may also wish to contact Accessible Education at

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

Learning-skills counsellors at Learning Development and Success (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.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: https://www.uwo.ca/se/digital/.

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