

The University of Western Ontario  
London, Canada

## Department of Computer Science

# CS 2212A - Introduction to Software Engineering

## Course Outline - Fall 2022

### Course Description

The informal approaches that most individual programmers use when writing small programs do not work very well when applied to the development of large pieces of software and team programming situations. Software engineering is a discipline that applies principles of traditional engineering to improve software, as well as its development and maintainability.

In this course, we will examine the stages of the software engineering process, including requirements gathering, specification, design, implementation, and testing. We will also cover the practicalities of software engineering, covering a number of the key tools and technologies leveraged in successful endeavours. A large group project, completed by teams of students, will serve to reinforce concepts learned and give students practical experience developing software in a realistic work environment. Programming for this course will be done in Java.

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

- Overview of software engineering
- Software processes and workflows
- Agile software development
- Software requirements gathering and modelling
- Software design concepts
- Implementation of software
- Testing and software quality management
- Managing software projects
- Enterprise-scale software and collaboration tools

#### Prerequisite Requirements

- Computer Science 2210a/b and 2211a/b
- Students are assumed to be familiar with the Java programming language

#### Antirequisites

- Software Engineering 2203A/B

*Note: Unless you have either the requisites for this course or written special permission from your Dean 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.*

# Instructor Information

**Instructor:** Dr. Daniel Servos  
**E-Mail:** [dservos5@uwo.ca](mailto:dservos5@uwo.ca) (for course related questions please e-mail [cs2212@uwo.ca](mailto:cs2212@uwo.ca))  
**Office:** MC387  
**Office Hours:** By Appointment  
Book via: <http://danielservos.ca/apt>  
**Website:** <http://danielservos.ca>

## Office Hours

Instructor office hours must be booked 24 hours in advance using the above link. When booking an office hour, you should include a description of the topic you wish to discuss and any relevant files including a copy of any assignment, project, document, etc. that you wish to ask questions about.

## E-Mail Contact

Students must use their Western (@uwo.ca) email addresses when contacting their instructor and include “CS2212” in the subject line of their e-mail.

All e-mail’s regarding course content, general questions, project questions, etc. should be sent to [CS2212@uwo.ca](mailto:CS2212@uwo.ca). This e-mail is checked regularly by both the instructor and teaching assistants and will be the fastest way to get a response. Every attempt will be made to answer all e-mails within two business days.

E-mails regarding personal matters and medical accommodations may be sent directly to the course instructor ([dservos5@uwo.ca](mailto:dservos5@uwo.ca)).

E-mails regarding assignment marking and regrading should first be addressed to the TA who marked your assignment and only to the course instructor if your discussion with the TA was not satisfactory.

## Teaching Assistant Consulting

Teaching assistants will hold weekly drop-in consulting and question/answer periods. These sessions will be held in-person and the location, dates, and times for each will be listed on the OWL course site. The number of TA consulting sessions offered and the scheduling of each will depend on the number of teaching assistants assigned to the course and will be announced on the OWL course site once available.

A list of teaching assistants and their contact information will be posted to OWL once available.

# Course Format

This course will be taught in a blended format using in-person lectures, tutorials, and in-class activities as well as online resources and videos.

## Lecture Hours

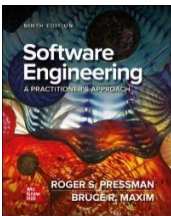
- Tuesday 3:30 PM to 5:30 PM, NCB-114
- Wednesday 3:30 PM to 4:30 PM, NCB-114

Students are expected to bring blank paper and writing utensils to class. Bringing a laptop is also highly encouraged to enable you to follow along with examples and tutorials.

# Course Materials

## Textbook

The following textbook is required and available for purchase [from the university bookstore](#) and other sources as both a physical book and eText:



Software Engineering: A Practitioner's Approach  
9<sup>th</sup> Edition

By Roger Pressman and Bruce Maxim

ISBN10: 1259872971

ISBN13: 9781259872976

<https://www.mheducation.com/highered/product/1259872971.html>

Readings from this text will be assigned weekly on OWL. Additional free online references and suggested readings may also be provided throughout the course as the project requires them. Please check the course OWL website weekly for updates and more information.

## Technology Requirements:

- Access to a modern personal computer running Windows or macOS.
- A webcam (can be built into a laptop).
- A microphone (can be built into a laptop).
- A reliable internet connection.

## Course Site

The course website is located within OWL. To access the website, navigate to <http://owl.uwo.ca> and login with your Western University personal computer account (user id and password). All course content, assigned readings, notes, assignments and class information will be posted to this site each week. You are responsible for checking the course site regularly.

If students need assistance with the course OWL site, 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.

## Student Evaluation

Element	Weight
Group Project	50%
Participation	10%
Final Exam	40%

To be eligible to obtain a passing mark in the course, your final exam grade **must** be 40% or higher **AND** **your** overall group project grade must be 40% or higher. A maximum grade of 45% will be given if you do not satisfy these requirements.

To be eligible to receive a grade of C or higher, your mark on the final exam must be at least 50%, and **your** overall group project grade must be at least 50%. Otherwise, the maximum overall mark you can receive is 58%.

Final grades will be rounded to a whole number by truncating the decimal places (i.e. taking the floor of the decimal final grade such that a 89.56% becomes a 89%). All other grades will be rounded to two decimal places using conventional rounding rules (i.e. a digit less than five will be rounded down, a digit of 5 or more will be rounded up).

## Group Project

All students are required to be an active participant in a term long group project that will involve the specification, design, and implementation of a reasonably large-scale software system, implemented using Java. While the project is a group project, grades will be assigned to each student based on both group and individual performance for each component. Individual performance will be based on a number of factors, some of which may include peer evaluations, contributions made during class, repository logs, individual reports of work completed, meeting minutes, individual performance during the project demonstration, and so on.

Details on the overall topic of the project will be posted to OWL by September 15<sup>th</sup>, with more details on each project component posted on the dates listed in the table below (these dates are tentative and subject to change). Any changes, updates, and clarifications to these descriptions and dates will also be posted on the OWL website. It is your responsibility to monitor these pages closely.

## Project Components (dates are tentative)

Component	Weight	Posted By (at the latest)	Due Date (by 6PM)
Requirements Documentation	5%	September 19 <sup>th</sup>	October 11 <sup>th</sup>
Project Management ( <i>individual</i> )	4%	September 19 <sup>th</sup>	Ongoing, final submission Dec. 8 <sup>th</sup>
Peer Review ( <i>individual</i> )	2%	September 19 <sup>th</sup>	Ongoing, final submission Dec. 8 <sup>th</sup>
Design Documentation	10%	October 3 <sup>rd</sup>	October 25 <sup>th</sup>
Implementation and Delivery	20%	October 3 <sup>rd</sup>	December 1 <sup>st</sup>
Testing Documentation	9%	October 3 <sup>rd</sup>	December 1 <sup>st</sup>

All dates listed above are tentative and subject to change.

If for any reason, the project schedule given above cannot be adhered to, the project marks will be pro-rated. The project components are worth 50% of the overall mark for the course. If a component must be cancelled for the whole class for any reason, the remaining project component weights will be pro-rated to add up to 50%.

## Team Project

- You will be given the opportunity to form your own teams of 4 or 5. The deadline to do so is September 16<sup>th</sup>. After this date the instructors will decide on the composition of the teams. The instructors' decisions are final. The instructor will attempt to make sure that each team has at least 4 members and no more than 5 members.
- If an instructor created team has less than 4 members, this will be taken into consideration during marking of project components.
- If a team has less than 5 members, the instructor may add additional team members at their discretion up until September 23<sup>rd</sup>.
- Individual students may submit a request to be taken out of the team to which they were assigned for a **good reason** (such as a prior conflict with one of the team members). Such requests must be made to the instructor before September 23<sup>rd</sup> and detail the good reason. **No changes are allowed in team composition after September 23<sup>rd</sup>.**

## Weekly Meetings

- Students are required to keep in contact and collaborate closely with their teammates through weekly meetings scheduled and organized by the team.
- Weekly meetings may occur in-person or virtually online (e.g. using Zoom or MS Teams). They cannot be done solely through e-mail or a text only medium.
- Each team is required to write minutes of each meeting, listing date, time, attendance, what the topics of discussion in the meeting were, any decisions that were made, and which team members were assigned which tasks.

- A weekly meeting is not required on reading week.
- Weekly meetings cannot be held on holidays recognized by Western University or on the weekend attached to Thanksgiving.

## **Project Demonstration**

- **Project demonstrations will take place between December 5th – December 8th.** The exact dates and length of the presentation will be posted later in the term. This involves a short presentation by the team that demonstrates the team's finished implementation of the project, as well as answering questions about the process and design of their project. All team members must be present for the demonstration.
- Teams will sign up for a demonstration date/time that works for all team members. Open dates/times will be posted on OWL once available. Demonstrations are currently planned to take place in person.

## **Submission**

- All components must be type-written for legibility and to facilitate electronic submission. If components require the creation of diagrams or illustrations, these too must be done electronically. Appropriate tools will be discussed in class and in the descriptions of the components.
- You are required to submit each component electronically through OWL. If final submissions are too large for OWL submission, alternate arrangements will be made.
- We reserve the right to use similarity and metadata detection software to detect possible plagiarism cases.
- Components are expected to be individual efforts (where individual could also mean designated group in the case of a group project component). Any code that is borrowed from an existing source or book must be clearly identified as such in the appropriate documentation; otherwise, this may constitute a plagiarism offence.
- While discussion about the project is encouraged between groups, directly using code or copying from another group (including groups from past semesters) is strictly prohibited and a scholastic offence for all groups involved. Groups should not share any project components with other groups.
- Borrowing to large amounts of code from outside sources (even if it is properly identified) will lead to a reduced implementation component grade. You will only be granted marks on code your team writes and implements. If you have any doubt about how much is too much, please ask the course instructor for guidance.

## Late Policy for Groupwork

- It is expected that groups budget enough time to properly submit their project components via OWL and allow for any unforeseen technological issues. Groups are expected to regularly backup their work and submit well before any deadline.
- Each group will be allocated 5 late coupons in total.
- Each late coupon allows a group to submit a project component one day late without penalty.
- At most 3 late coupons can be used per project component.
- If a group has no late coupons remaining or is late by more than 3 days, a zero grade will be given for that project component.
- Late coupons can only be used for project components done as a group and cannot be applied to the final exam, participation mark, or to move the date of the project demonstration.
- Late coupons cannot be stacked or combined with any other type of extension or accommodation unless discussed and approved in advance with the course instructor. In general, all late coupons must be used before accommodations are considered.

## Late Policy for Individual Components

- Individual project components such as the peer-review and project management components are subject to a 20% (of the total marks) late penalty per day late.
- Late coupons can **not** be used for individual components.
- After 3 days late, a zero mark will be given for the component.

## Marking

- Project components will be initially marked by a teaching assistant assigned to the course to provide feedback and assign a provisional grade for that project component to the whole group. The course instructor will adjust this grade at the end of the course based on the peer review, project demonstration, the various logs and records for the team (e.g. forum posts, use of Atlassian software, commits, etc.), meeting minutes, and how the project progressed since the component was submitted.
- Every effort will be made to have project components marked by the teaching assistant and feedback provided within 3 weeks of the submission date, preferably sooner. If we are unable to comply with our intended return dates, revised dates will be posted on the course website and/or e-mailed to the class.
- A request for adjustment in the provisional grade returned by the teaching assistant must be made within 1 week of the date your project component was returned.

- Such a request must be first made to the teaching assistant who marked your project component. If your discussion with the teaching assistant was not satisfactory, you may submit it in writing (e-mail) to the course instructor. You must include the specific reasons why you believe you deserve more marks.
- Component marks may be posted periodically throughout the term through OWL. It is your responsibility to check that your marks have been recorded correctly.
- Individual grades on groupwork components will be based on the group's grade adjusted for the individual's performance and contributions. This adjustment will be made at the end of the course and accounted for in your final grade. It will be based on peer evaluations, repository logs, individual reports of work completed, meeting minutes, individual performance during the project demonstration, and so on.

## Backups

It is your responsibility to keep up-to-date backups of all project components and project files in case of system crashes or inadvertently erased files. Retain copies of all material handed in, as well as the actual graded version, to guard against the possibility of lost components or errors in recording marks. It is not safe to discard these materials until you are satisfied that your final mark for the course has been computed properly.

## Participation

Participation will be evaluated individually based on the following factors:

- **Team Contributions:** Contributions to your team's project evaluated based on meeting minutes, source control logs, performance in the project demonstration, and any other evidence of contributions.
- **In-Class Activities:** Occasionally, the instructor may have in-class activities during lectures. Participation in and completion of these activities will be considered for your final participation mark. This also includes answering questions asked by the instructor in-class.
- **Contributions on Discussion Forum:** Posts on the course online discussion forums (e.g. OWL forums or the course Stack Overflow site) will be considered for participation. To count, posts must make a meaningful and novel contribution, post a useful resource, ask a good question that has not been addressed, or answer another student's question. The quality of the post will be considered over the quantity of posts. Upvotes on posts (on the Stack Overflow site) will be considered but will not be the sole determining factor for the quality of contributions.



- **Bonus Activities:** Occasionally and at the instructor's sole discretion, bonus opportunities for participation marks may be offered throughout the term.

The final subjective decision of what constitutes a “meaningful contribution” or how many points are assigned for a contribution is at the sole discretion of the course instructor. Quantity of posts or contributions is not a substitute for quality and multiple low-quality contributions do not add up to one meaningful contribution.

Missed in-class activities can be made up for by making additional high-quality contributions on discussion forums or above average team contributions.

## **Final Exam**

The final exam will be conducted in-person during the final exam period and covers all course material including assigned readings, tutorials, lectures, and material covered in the project. The exact date/time of the final exam will be scheduled by the Office of the Registrar and announced once available.

The format of the exam will be multiple choice, matching, short answer, and long answer questions.

The exam will be closed book, but students will be allowed to have a one-page handwritten cheat sheet (one sided and letter size).

The exam is to be completed individually, with no assistance from others, and following all rules listed on the cover sheet of the exam paper.

At the instructor's sole discretion, the final exam grades may be curved upwards or downwards to match historical averages and medians more closely. Should this be necessary all student's final exam grades will be curved identically, by adding or subtracting a fixed constant.

Student's absent from the final exam without approval from Academic Counselling will be given a zero grade for their final exam (this will result in a maximum overall final grade of 45%). See the section on student absences for details on approved final exam absences.

## **Contingency plan for an in-person class pivoting to 100% online learning**

In the event of a COVID-19 resurgence during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any remaining project components (including the

demonstrations and team meetings) will also be conducted online as determined by the course instructor.

Depending on the nature of the pivot to online learning, some project component due dates or posting dates may need to be changed. Should this be the case, any changes will be announced by the course instructor as soon as possible.

In such a case, the final exam will be conducted online using Proctortrack and OWL, but the rules and weighting of the exam will remain the same. You will be required to have access to a webcam, microphone, and computer that meets Proctortrack's requirements. By taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide personal information (including some biometric data) and the session will be recorded. More information about this remote proctoring service is available in the Online Proctoring Guidelines at the following link:

<https://www.uwo.ca/univsec/pdf/onlineproctorguidelines.pdf>

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link:

<https://www.proctortrack.com/tech-requirements/>

## **Email**

Occasionally email messages may be sent to the entire class or to students individually. Emails will be sent to your UWO email address as assigned to you by Information Technology Services (ITS). It is your responsibility to read this email on a frequent and regular basis.

You should note that email at the university and thru other providers have quotas or limits on the amount of space that is dedicated to each account. Unchecked email may accumulate beyond those limits and you may be unable to retrieve important messages from the university. Losing email is not an acceptable excuse for not knowing about the information that was sent.

## **Student Absences**

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible. For further information, please consult the University's medical illness policy at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf).

The Student Medical Certificate is available at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf).

### **Absences from Final Examinations**

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

**Note:** missed work can *only* be excused the mechanisms detailed above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

## **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](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](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](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

All required assignments/project components may be subject to submission for textual and metadata similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism or custom plagiarism detection software developed for this course. All assignments/project components submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the commercial service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

## Privacy Agreement

This course may make use of several third-party services and software packages that gather data for the evaluation of assignments/project components and participation. By taking this course you agree to the terms of service and privacy agreements of these services including:

**Stack Overflow Teams:** <https://stackoverflow.com/legal/terms-of-service/public>

**Plickers:** <https://help.plickers.com/hc/en-us/articles/360009090913-Terms-of-Service>

**Course Suite One:** <http://cs1.ca>

**Atlassian Services (Jira, Bitbucket, Confluence):** <https://www.atlassian.com/legal/cloud-terms-of-service>

**YouTube:** <https://www.youtube.com/static?template=terms>

**Kahoot!:** <https://trust.kahoot.com/terms-and-conditions/>

**Poll Everywhere:** <https://www.polleverywhere.com/terms>

**Gradescope:** <https://www.gradescope.com/tos>

Furthermore, when using these services regarding this course you agree to protect your account and allow no other student or person to access it. Allowing another person to use your account to submit work on your behalf is a scholastic offence.

## 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](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](mailto: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. You may also wish to contact Accessible Education at

[http://academicsupport.uwo.ca/accessible\\_education/index.html](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/>.