

CS3307B Course Outline

1. Course Information

Course Information

Software development comprises many activities (e.g., technical, managerial, governance, customer relations, market analysis, etc.) among which are those that take requirements as input, and yield, as output, software code that is intended to satisfy the requirements. In this development process is a key artefact, the *design of the system*, that embodies the various components of the system interacting with each other so as to provide the desired solution. Prior to, or even during, designing the system is the *analysis* of the environment in which the system is to operate, including discovering the system's requirements. Arguably, without these two sets of activities – analysis and design -- in the development process, it would be difficult to build large-scale, quality systems.

The most widely-used approach to system design and requirements analysis nowadays is the object-oriented approach. Here, the Unified Modeling Language (UML) notation is used to capture the user interaction with the system being built, and how the system will be structured, and how it will interact within to provide the desired outcomes. Over the years, the software engineering community has identified many useful patterns of how system components are structured and how they interact with one another. Thus, the developer can attempt to reuse these patterns as partial solutions in the design of new systems, saving design time and costs and attaining higher quality. These design patterns can be implemented using object-oriented (OO) programming languages such as Java and C++.

In this course, students will learn about object-oriented analysis and design, and will be introduced to the programming language C++. They will subsequently carry out specific assignments, and a group project where they are expected to design and implement a reasonably large-scale system in the language C++.

Lecture Hours - Section 001

9:30 - 11:30am, Tuesdays, [REDACTED]

9:30 - 10:30am, Thursdays, [REDACTED]

List of Prerequisites

Either (Computer Science 2212A/B/Y) or (Computer Science 2210A/B, 2211A/B, Electrical and Computer Engineering 3375A/B, and registration in the fourth year of a BESC program in Computer Engineering or Mechatronic Systems Engineering.)

Antirequisites: Software Engineering 3350A/B if taken before the 2022-2023 academic year.

Note: Unless you have either the prerequisites 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	██████	
TA	TBA	TBA	TBA

Students must use their Western (@uwo.ca) email addresses when contacting their instructors. All emails must have a subject line starting with the string [CS3307B] in order to not be filtered out. This goes both for emails to the instructor and towards the TAs.

Office hours will be offered either through Zoom or in person depending on TA availability for either. We will also be using the Discussions tab under Communications on the Brightspace website. Any question that is related to the course material should be asked on the discussions first.

Every student, and later group of students, will have their assigned TA, given the nature of the work you will have to carry out, this is going to facilitate communication with your assigned TA.

3. Course Syllabus, Schedule, Delivery Mode

Classes begin: January 6, 2025

Spring Reading Week: February 17 – 21, 2025

Classes end: April 4, 2025

Exam period: April 7 – 30, 2025

Course Topics

The course will address as many of the following topics as time will allow:

- Overview of Object-Oriented programming
- Programming in C++
- The Unified Modeling Language (functional, structural, and behavioural modelling)

- Architectural patterns
- Design patterns (creational, structural, behavioural, ...)
- Object-Oriented metrics and other software metrics
- Quality Assurance (inspections)
- Enterprise-scale software and collaboration tools (Jira, Confluence, Bitbucket, ...)

Lecture Notes

Course lecture notes will be made available in PowerPoint and PDF formats on the course website on a weekly basis, as they are developed. They are provided as a courtesy by the course instructor. Possessing (and even reading) these notes is not a suitable substitute for the lectures.

4. Course Materials

Course Texts

While there are no required texts for this course, the following books are recommended as references for this course, and may be available for purchase from the Book Store at Western:

- [The C++ Programming Language](#), 4th Edition by Bjarne Stroustrup, published by Addison-Wesley Professional, 2013.
- [Programming Principles and Practice Using C++](#), 2nd Edition by Bjarne Stroustrup, published by Addison-Wesley Professional, 2014.
- [Design Patterns: Elements of Reusable Object-Oriented Software](#) by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides, published by Addison-Wesley Professional, 1995
- [UML Distilled: A Brief Guide to the Standard Object Modeling Language](#), Third Edition by Martin Fowler, published by Addison-Wesley Professional, 2004.
- [Object-Oriented Analysis and Design with Applications](#), Third Edition by Grady Booch, Robert A. Maksimchuk, Michael W. Engle, Bobbi J. Young Ph.D., Jim Conallen, Kelli A. Houston. Published by Addison-Wesley Professional, 2007.
- [Exploring Raspberry Pi: Interfacing to the Real World with Embedded Linux](#) by Derek Molloy. Published by Wiley, 2016.

All course material will be posted to OWL: <https://westernu.brightspace.com/>

Students are responsible for checking the course OWL site (<https://westernu.brightspace.com/>) regularly for news and updates. This is the primary method by which information will be disseminated to all students in the class.

If students need assistance with the course OWL site, they can seek support on the [OWL Brightspace Help](#) page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

Additional references and suggested readings may be provided throughout the course as the project requires them. Please check back to the course website for updates and more information.

Technical Requirements

Every student should have access to a personal computer for software development, a stable internet connection, working microphone and camera.

5. Methods of Evaluation

Grading Scheme and Assessment Dates

The overall course grade will be calculated as listed below:

Individual Assignments (1)	15%
Group Assignment (1)	55%
Final Exam	30%

Student Evaluation

Grades will be based on assignment and project work worth 70% and a final exam worth 30%. There will be one individual assignment (15%) and a group project (55%) split into separate deliverables including an initial stage (worth 5%), two intermediate stages (each worth 10%), the final project submission (25%), and final documentation (5%).

To be eligible to receive a passing grade in the course, your mark on the final exam must be at least 40%, and your average on the assignment and project components must be at least 40%. Otherwise, the maximum overall mark you can receive is 45%. To be eligible to receive a grade of C or higher, your mark on the final exam must be at least 50%, and your weighted average on the assignment and project components must be at least 50%. Otherwise, the maximum overall mark you can receive is 58%.

Assignment, Project, and Test Feedback

Every effort will be made to have assignments and project components marked and handed back within 3 weeks of the handing-in date, preferably sooner. If we are unable to comply with our intended return dates, revised dates will be posted on the course website.

Test and Exams

Final: 3 hours during the April exam period

As an important note, computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. Furthermore, there will be no cheat sheets, books, or other reference materials allowed for the exam. No calculators, cell phones, or other electronic devices will be permitted either.

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](#)), especially for those who miss multiple final exams within one examination period.

Assignment and Project Components

Due Dates (tentative)

Individual Assignment:	15% (medium)	Assigned January 16, 2024	Due February 6, 2024
Group Project - Stage #1:	5% (light)	Assigned January 16, 2024	Due January 30, 2024
Group Project - Stage #2:	10% (light)	Assigned January 30, 2024	Due February 13, 2024
Group Project - Stage #3:	10% (medium)	Assigned February 13, 2024	Due March 12, 2024
Group Project - Final Project Submission:	25% (heavy)	Assigned March 12, 2024	Due April 1, 2024
Group Project - Final Documentation:	5% (light)	Assigned March 12, 2024	Due April 8, 2024

If, for any reason, the project schedule given above cannot be adhered to, the project marks will be prorated. (The assignment and project components are worth 70% of the overall mark for the course. If a component has to be cancelled for any reason, the remaining project component weights will be prorated to add up to 70%.)

About the Assignment and Project Components

- Component descriptions will be posted on the course website by the dates listed above.
- Unless noted in the descriptions otherwise, components will be due by 11:55pm on their due date.
- Any changes, updates, and clarifications to these descriptions will also be posted on the website. It is your responsibility to monitor these pages closely.
- As mentioned earlier, the assignment and project components will involve design, analysis and implementation of a reasonably large-scale software system, implemented using C++.
- 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, and so on.

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.) Details will be given in the descriptions. We reserve the right to use similarity 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.

Late Policy

- Late components will be accepted for up to two days after the due date, with weekends counting as a single day; the late penalty is 20% of the available marks per day, not the earned marks. Lateness is based on the time the assignment or project component is submitted.
- Extensions will be granted only by your course instructor. If you have serious medical or compassionate grounds for an extension, you **must** take supporting documentation to the Academic Counselling unit of your faculty, who will contact the instructor.

Marking

- Assignment and project components are marked by the instructor and/or a teaching assistant assigned to the course. We will attempt to include some information about the marking criteria in the appropriate descriptions.
- When marking has been completed, you will be informed via the course website and/or e-mail.
- A request for adjustment in a mark must be made within 2 weeks of the date grades were first available. (Beyond that date, regrading will not be considered.) Such a request must be submitted in writing, and must include specific reasons why you believe you deserve more marks. The request must be accompanied by all materials that were originally handed in, as well as the original marker's grade summary sheet. Regrading requests will take a minimum of 24 to 48 hours to process; you will be informed when it is complete.
- Component marks may be posted periodically throughout the term through OWL. It is your responsibility to check that your marks have been recorded correctly.

Backups

It is your responsibility to keep up-to-date backups of all assignment 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.

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)
- Group Project Final Deliverable

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 miss the deadline for the individual assignment, you will have to contact the instructor.

If you miss any of the deadlines for the group assignment you will have to contact the instructor.

6. Additional Statements

Religious Accommodation

When conflicts 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 or 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>.

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 Registrar Services is <https://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.

During the April period final exam you will all be allowed the use of only a simple (non-programmable) calculator.

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:

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

Support Services

Please visit the Science & Basic Medical Sciences Academic Advising 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.

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

if you have any questions regarding accommodations.

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.