THE UNIVERSITY OF WESTERN ONTARIO

DEPARTMENT OF COMPUTER SCIENCE
LONDON   CANADA

Computer Science 2211B

Software Tools and System Programming

Course Outline – January 2025

1. Course Information

Course Name: Computer Science 2211B
Class Meetings: Tuesday 9:30am-10:30am, Thursday 9:30am-11:30am
Location: ████████

Lab Schedule

Section	Day	Time	Location
002	Tuesday	3:30-4:30pm	████
003	Thursday	4:30-5:30pm	████
004	Thursday	3:30-4:30pm	████
005	Thursday	5:30-6:30pm	████
006	Tuesday	4:30-5:30pm	████

Prerequisites

- Either: Computer Science 1027a/b, 1037a/b, or 2101a/b with a grade of at least 65%.
- Or: Integrated Science 1001X with a grade of at least 60%.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Advisors) 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.

Antirequisites

Software Engineering 2250a/b and the former Software Engineering 201a/b

2. Instructor Information

Instructor

Dr. Kaizhong Zhang

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Course Email: cs2211<at>uwo.ca
Office Hours: TBA
Office Hours format: In person or Zoom

3. Course Syllabus, Schedule, Delivery Mode

Course Description:

This course provides an introduction to software tools and systems level programming. Topics include: understanding how programs run (compilation, linking, and loading), an introduction to a complex operating system (UNIX), scripting languages, and the C programming language. As time permits, other topics will be chosen from: system calls, memory management, libraries, multi-component program organization and builds, version control, debuggers and profilers.

Course Topics

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

- **UNIX Fundamentals:** UNIX vs. Windows; logging on; files and directories; path names, and directory and file structure; editors; shells; I/O redirection; UNIX concurrency (processes); utilities; file permissions and security; regular expressions; shell programming.

- **C programming:** compiling, linking and loading; data types and operators; control structures; formatted I/O; file I/O; connections between I/O and the underlying operating system; function calls; structs; enumerations; arrays; pointers (pointer arithmetics, pointers and arrays, arrays of pointers, pointers to functions); memory management; linked lists and other dynamically allocated data structures; strings; calling C from UNIX; general libraries; standard libraries and headers; the C preprocessor; C program organization.

- **UNIX Tools:** building and managing multi-component programs; the make utility; version control and configuration management; debuggers; code performance and profiling.

Course-Level Learning Outcomes

Upon completion of this course, a student will be able to:

- Understand Program Execution and UNIX Fundamentals: Students will be able to explain how programs run by understanding compilation, linking, and loading processes, and demonstrate proficiency in using UNIX operating system tools

- Proficiency in C Programming: Students will develop the ability to write, compile, and debug C programs, utilizing data types, control structures, pointers, etc.

- Develop and Debug Multi-Component Software: Students will be able to build, manage, and debug multi-component software applications using UNIX tools and the C programming language,

- Utilize Libraries in C Programming: Students will demonstrate the ability to incorporate and use general and standard libraries in C programming

Delivery Mode

Lectures will be delivered in person.

Key Sessional Dates

Class Begin:	Monday, January 6, 2025
Spring Reading Week:	February 17-21, 2025
Class End:	Friday, April 4, 2025
Exam Period:	April 7 – 30, 2025

4. Course Materials

Required Textbooks

- S. Das, *Your UNIX/Linux: The Ultimate Guide.* McGraw-Hill: 3rd edition, 2013. The textbook costs $204.71 at amazon.ca.
- K.N. King, *C Programming: A Modern Approach.* Norton: 2nd edition, 2008. The textbook costs $136.14 at amazon.ca.
- Students are welcome to purchase second-hand of these textbook. Older editions will not be sufficient.

Course Website

The CS2211b website is accessible through OWL: https://westernu.brightspace.com. Lecture notes, labs, assignments, and class information will be posted on this website. You are responsible for reading this information frequently.

Students are responsible for checking the course OWL site (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.

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

Lecture Notes

Most of the course notes will be available online through the course OWL web site. Students are cautioned, however, that getting course notes is not a sufficient substitute for attending lectures.

Technical Requirements

Completion of this course will require you to have a stable internet connection and a device that meets the system requirements for Zoom. Information about the system requirements are available at the following link: https://support.zoom.us/hc/en-us.

Teaching Assistant Consulting:

Questions regarding assignments or lecture materials can be directed to a Teaching Assistant (TA). Questions requiring further information can be dealt with by contacting the course instructor through his office hour appointments. A list of teaching assistants and their contact information will be posted to OWL once available.

Computing Facilities

Each student will be given an account on the Computer Science Department undergraduate computing facility, GAUL. In accepting the GAUL account, a student agrees to abide by the computer science department's Rules of Ethical Conduct.

GAUL accounts are automatically created, normally within 24 hours, after enrollment and the username/password would be the same as your UWO email account. If a student is able to log into his/her UWO email, but is unable to log into the GAUL systems after 3 days of enrollment, please open a ticket with Science Technology Services. Access to GAUL is REQUIRED to complete this course. You are welcome to work on assignments and labs on your own Unix/Linux environment if you wish but everything you submit must work on GAUL.

During the winter term, if students need assistance with their GAUL accounts, they can contact, the Science Technology Services.

Email Contact

Emails related to the course should be directed to the course email account at cs2211@uwo.ca which will be attended by the designated TAs and the instructor. Students could ask questions via email, however if there are any large, somewhat complicated issues, it is recommended to discuss them during office hours. Moreover, students must use their UWO (@uwo.ca) email account in order to write to the course email account.

Online Conduct:

All Zoom contact will require that your video is turned on and that you can be seen by the instructor. Not only is this a simple curtsey and the standard of Zoom classes, but it allows for a positive interaction.

5. Methods of Evaluation

There are three components, labs, assignments, and exams, that will be used for the evaluation.

Element	Weight
9 (out of 11) Labs	9%
5 Assignments	31%
Midterm Exam	25%
Final Exam	35%

To be eligible to receive a passing grade in the course, the weighted average of the Midterm and Final exam marks must be at least 45%, and weighted average on the assignment marks must be at least 40%. Otherwise, the maximum overall mark you can receive is 45%. There will be no exceptions or waiving of this requirement for any reason or circumstance.

Examinations

There will be a Midterm exam and a Final exam. Midterm weights **25%** and final weights **35%**.

The Midterm exam will be (**tentative**) on Thursday March 6 at 9:30AM-11:20AM. (location: TBA). The Final exam will be three hours in April exam period (date and time: TBA).

Both exams are closed book; however, students will be allowed to bring in **one** double-sided 8.5 x 11 sheet of notes with font size at least 10. No electronic devices of any kind are allowed.

See the **Evaluation Scheme for Missed Assessments** subsection below in this document for information about how missed exams and coursework are evaluated.

Labs

- There will be 11 equal weight labs (1 per week).
- Labs begin the second week of classes.
- Lab descriptions will be posted on the course website. It will be available the beginning Sunday.
- You are encouraged to work on the labs ahead of time. Normally the content required by the lab should be already covered by the in-class lectures.
- However, in the event that the required content have not been covered by the lecture yet, these lecture notes will be posted and students should try to self-teach first using the posted notes.
- To be eligible for full marks, you must participate and complete at least 9 out of 11 labs, however participating and completing all 11 labs is recommended.
- The labs don't need to be handed in and reviewed because they are not an assessment of your ability to apply the subject matter, that is what the assignments are for. Labs act as practice/tutorial sessions where you can solve problems and interact with the TA and other students. You may also consider to collaborate and assist others.
- You will need to demonstrate your work to the TA. The TA will mark your lab participation as complete or incomplete in OWL.

Assignments

Students are expected to view the lecture materials and complete the lab exercises to prepare for the assignments. Once the assignment is completed, all parts of the assignment must be submitted on the OWL site. It is the **student's responsibility** to ensure that all parts of each assignment are correctly uploaded and submitted in OWL, to ensure that the assignment can be marked accordingly.

Note: Assignments emailed to the instructor or teaching assistant **will not** be accepted, unless there are extenuating circumstances and prior approval from the instructor.

The following is the tentative assignment schedule (subject to change):

Assignment	Weight	Due Date (by 11:55pm)
1	2%	Wednesday, January 22
2	7%	Wednesday, February 5
3	7%	Wednesday, February 26
4	7%	Wednesday, March 12
5	8%	Wednesday, April 2

The due dates of the assignments are shown in the table above. Please note that all these dates are tentative. The due dates will be confirmed when the assignments are posted on OWL. The dates will coincide with the class progression on subsequent topics.

Where possible, the instructions for each assignment will be posted on the course website at least 1 week in advance of the due date.

If for any reason the assignment schedule given above cannot be adhered to, the assignment marks will be pro-rated. The five (5) assignments are worth 31% of the overall mark for the course. If an

assignment must be cancelled for any reason, the remaining assignment weights will be prorated to add up to 31%.

All assignment are individual assignments. Students may discuss approaches to assignment problems. However, actual work (answering assignment questions, coding assignment questions, etc.) must be the student's individual effort.

The assignments have to be typed. We do not accept handwritten assignment. However, you can include handwritten figures if needed, but not text and formula, in your assignment.

Programming parts of the assignments must be able to run on Computer Science Department undergraduate computing facility, GAUL. In particular, programming parts of the assignments must be able to run on compute.gaul.csd.uwo.ca. This is the only platform we will test your programs.

The standard departmental penalty for assignments that are judged to be the result of academic dishonesty is described in this website.

You are also responsible for reading and respecting the Computer Science Department's policy on Scholastic Offences and Rules of Ethical Conduct.

Assignment Submission Policies

All assignments are submitted electronically through OWL course website. Instructions for the submission of assignments will be posted on the course website. It is each student's responsibility to read and follow the instructions.

All assignments are due by 11:55PM of the due date. Late assignments will be accepted, **with penalty**, for up to three days after the due date. After that the late work is no longer accepted regardless if the OWL assignment submission is open or not. The late penalty in percentage of the total mark of the assignment is 10% for one day late, 20% for two days late, and 40% for three days late. Lateness is based on the time the assignment is **received through OWL**, not on the time it was created on student's own computer or his/her gaul account.

If you have submitted an academic consideration for an assignment, you must provide approval information in the **CS2211 Assignment Academic Consideration Form** when you submit your assignment for penalty reduction, please check **Evaluation Scheme For Missed Assessments** subsection in this document.

By submitting an assignment, you declare that:

- You have read and understood the Departmental policies on Scholastic Offences.

- The assignment is exclusively your own work

- You have complied with the Departmental Rules of Ethical Conduct.

- You have taken all reasonable precautions to ensure that your work has not been copied by other students, including the protection of your files from access by other students.

Assignment Marking:

- Assignments will be marked by a TA within 2 weeks of the assignment due date where possible.

- Individual marks and a marking scheme will be posted on the OWL site once marks are returned.

- Questions regarding the marking of assignments should first be directed to the teaching assistant who graded your assignment. If your discussion with the teaching assistant was not satisfactory then the TA will discuss the situation with the instructor.

- Requests for mark adjustments will only be considered if they are made within **2 weeks** of the date on which it was first available. You should direct such request in the first instance to the teaching assistant who marked the assignment. After two weeks, **Assignment marks will be final**.

- Requests for mark adjustments will only be considered when they are for adjustments of **3 marks or greater**.

Late Policy for Assignments:

It is expected that students budget enough time to properly submit their assignments via OWL and allow for any unforeseen technological issues. **11:55 PM is a hard deadline** and no extensions or relief will be given for assignments that just miss this deadline or miss the deadline due to technological issues. Students are expected to regularly backup their assignments and submit well before any deadline.

The late penalty for assignments:

- Assignments will be accepted only up to three (3) days late.

- Assignments submitted after 11:55 PM on the due date but before 11:55 PM on the day after the posted due date will be **deducted 10% of the total grade**.

- Assignments submitted after 11:55 PM on the day after the due date but before 11:55 PM on the next day will be **deducted 20% of the total grade**.

- Assignments submitted after 11:55 PM two days after the posted due date but before 11:55 PM on the next day will be **deducted 40% of the total grade**.

- Assignments submitted after 11:55 PM three days after the posted assignment due date will receive a grade of zero (0).

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 Exam** (Designated by the instructor as the one assessment that **always requires documentation** when requesting Academic Consideration)

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

Missing Lectures

Student are encouraged to attend all the lectures, actively take notes, and engage by asking questions. However, if you miss lectures, you should read lecture notes and ask questions during lab hours or office hours.

Missing Labs

- Since we only require 9 out 11 lab marks, there is no accommodation for the first two missed labs.

- After the first two, follow the university procedure for Academic Accommodation.

- In this case, you should complete the missed lab by yourself in written form and then present it with the accommodation document to your lab TA in the **first lab after the approved days** of accommodation.

Missing An Assignment

If a student misses the deadline of an assignment, they may still submit it without an academic consideration within 3 days, with a penalty of 10%, 20%, or 40% depending on the number of late days.

If you need more time to submit an assignment, follow the university procedure for Academic Accommodation.

- If your submitted academic consideration for an assignment is approved by your dean's office, we acknowledge the university policy and extension will be given according to the **number of days approved** by academic counsellors.

- If the academic consideration submitted is the one **without documentation**, then you will get **three days** extension.

- The arrangement of the course is that you must provide approval information in the **CS2211 Assignment Academic Consideration Form**, downloadable from the course website, when you submit your assignment for penalty reduction.

- The approval information will be either the approval document or the approval email from student services allowing the extension. The teaching assistant grading the assignment will then apply the supplied extension to the grade.

- If the extension is within five days, you do not need to contact the instructor and we will not reply any such inquiry.

- If the extension is more than five days, contact the instructor through his office hours to arrange an appropriate deferred due date.

If you have registered with the university **Accessible Education**, you will get **three days** extension for each assignment.

Missing The Midterm Exam

- There will be no makeup midterm test. If you miss the midterm test for any reason, follow the university procedure for Academic Accommodation.

- If accommodation is approved by your Dean's office, your final exam mark will be reweighed to include the weight of the midterm test, in this case, the final exam will be worth 60% of the overall course marks.

- You must notify the course instructor within a week of the missed midterm test, and documentation must be received by your Dean's office within 2 weeks of the missed test.

- If you also miss the final exam and makeup final, then with the permission of the dean, you should either retake the course or write on the scheduled date for the midterm exam the next time the course is offered

Missing 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 both the final and the makeup final within one examination period.

Essential Learning Requirements

Even when Academic Considerations are granted for missed coursework, the following are deemed essential to earn a passing grade.

- To be eligible to receive a passing grade in the course, your weighted average of the midterm exam and final exam marks must be at least 45%.

- To be eligible to receive a passing grade in the course, your weighted average of assignments marks must be at least 40%.

- Otherwise, the maximum overall mark you can receive is 45%.

6. Additional Statement

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 his/her official university address is attended to in a timely manner.

No electronic devices (including phones, scientific calculators, etc.) are permitted on the final exam.

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

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All

papers 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 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.

In the event of health lock-down, tests and examinations in this course will be conducted using a remote proctoring service. 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. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: https://remoteproctoring.uwo.ca.

Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop 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 (http://www.health.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 Student 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 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.

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