Course Information

Computer Science 2211A

Software Tools and System Programming

Course Outline – **Fall Term 2022**

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 arithmetic, 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.

Calendar 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.

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 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

Instructor

Will Beldman (Instructor and Course coordinator)

Office: https://westernuniversity.zoom.us/j/4311561924
Office Hours: Friday 10:30-11:30am
E-Mail: wbeldman@uwo.ca

TAs TBD

Office: -
Office Hours: -
E-Mail: -

Course Schedule

Lecture Times (NC-1)

- Tuesday 11:30 am - 12:30 pm
- Thursday 10:30 am - 12:30 pm

Lab Times (MC-244)

- 002 - Thursday, 2:30pm - 3:30pm
- 003 - Friday, 12:30pm - 1:30pm
- 004 - Thursday, 1:30pm - 2:30pm
- 005 - Thursday, 4:30pm - 5:30pm
- 006 - Wednesday, 12:30pm - 1:30pm
- 007 - Wednesday, 1:30pm - 2:30pm
- 008 - Friday, 1:30pm - 2:30pm
- 009 - Thursday, 3:30pm - 4:30pm
- 010 - Wednesday, 5:30pm - 6:30pm
- 011 - Thursday, 5:30pm - 6:30pm
- 012 - Wednesday, 2:30pm - 3:30pm
- 013 - Wednesday, 3:30pm - 4:30pm
- 014 - Thursday, 12:30pm - 1:30pm
- 015 - Wednesday, 4:30pm - 5:30pm
- Check your personal schedule to determine which time slot you registered for

Lectures

This course is in person as required by the University. Accompanying course slides will be provided prior to the lecture.

In the event that the University requires delivery to change to "asynchronous", all lecture materials will consist of videos and accompanying course slides.

Lab Schedule

- There will be 12 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 beginning Sunday.
- To be eligible for full marks, you must participate and complete at least 10 out of 12 labs, however participating and completing all 12 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's what the assignments are for. Labs act as practice/tutorial sessions where you can solve problems and interact with the TA and other students. Collaboration and assisting others is encouraged.
- You are welcome to work on the labs ahead of time but you will need to demonstrate your work to the TA. The TA will mark your lab participation as complete or incomplete in OWL
- In the event that the University requires delivery to change to "asynchronous", all labs will be managed over Zoom sessions.

Required Materials

Required Textbooks

- S. Das, *Your UNIX/Linux: The Ultimate Guide*. McGraw-Hill: 3rd edition, 2013.
- K.N. King, *C Programming: A Modern Approach*. Norton: 2nd edition, 2008.

Course Web Page

Students are responsible for checking the course OWL site (http://owl.uwo.ca) 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.

All course material will be posted to OWL: http://owl.uwo.ca.

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
5 Assignments	30%
2 Online Quizzes	20%
10 (out of 12) Labs	10%

Final Exam   40%

To be eligible to obtain a passing mark in the course, the final exam grade must be 49% or higher AND the weighted assignment average must be 49% or higher. There will be no exceptions or waiving of this requirement for any reason or circumstance.

Assignments

Students are expected to view the lecture materials and complete the online 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 11:55 PM)
1	6%	September 27th, 2022
2	6%	October 11th, 2022
3	6%	October 25th, 2022
4	6%	November 15th, 2022
5	6%	November 29th, 2022

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.

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 30% 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 30%.

Assignment Marking:

- Assignments will be marked by a TA within 2 weeks of the assignment due date where possible.
- Individual marks and a detailed 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 that

graded your assignment and then the course instructor assigned to your section if your discussion with the teaching assistant was not satisfactory.

- Requests for mark adjustments will only be considered if they are made within **1 week** of receiving the assignment mark and have been first discussed with the teaching assistant who marked the assignment. **Assignment marks will be final after that date.**
- Requests for mark adjustments will only be considered when they are for adjustments of **5 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 technical issues. Students are expected to regularly backup their assignments and submit well before any deadline.

- Assignments will be accepted only up to two (2) 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 25% of the total grade.**
- Assignments submitted after 11:55 PM on the next day after the posted assignment due date will receive a grade of zero (0).
- Late assignments will have a penalty of **10% or 25% of the maximum mark** for the assignment deducted based on time of submission as listed in OWL. Thus, if a student would have received 90% on an assignment based on 100%, then if it was submitted three hours late the student would receive 80%, if it was submitted twenty hours late the student would receive 65%

Exceptions to the deadline and late policy

Life happens and sometimes it will not be possible to submit your assignment on time. If events cause you to require flexibility, you can take advantage of one of the following options:

- **Academic counselling**
  - https://www.uwo.ca/sci/counselling/procedures/academic_consideration_for_absences/academic_considerations.html (or academic counselling appropriate for your program)
  - If there are circumstances beyond your control that precludes you from submitting on time, connect with an academic counsellor who can recommend an extension on your behalf. Documentation will likely be required for the academic counsellor. Documentation should not be sent to the instructor.
  - Then connect with the instructor to decide an appropriate deadline given your circumstances. If it is not possible to determine an appropriate deadline, the weight of the assignment will be placed on the final exam.
  - This can be applied proactively or retroactively but only if recommended by the academic counsellor
- **Self-Reported absence**
  - The trial period of SRA ended, and the focus group did not introduce in a new model in time for 2022-23. Meanwhile, we do not have any SRA or alternatives.
  - Therefore, in lieu of an SRA, at the end of the semester, if you have one assignment submitted late, the late penalty will be reversed automatically. If you have multiple assignments with a late

penalty applied, the assignment with the lowest grade will have the late penalty reversed <u>automatically</u>.

Quizzes

Up to two (2) quizzes will be given online via the OWL platform. The tentative quiz schedule is as follows (subject to change):

Quiz	Weight	Date
1	10%	October 4
2	10%	November 15

Quizzes must be started within the given date range. Failing to complete the quiz during the given times will result in a 0 grade being entered for the quiz.

Quizzes are open book but must be done individually and without the assistance of others. Sharing quiz questions/solutions, completing a quiz for or with another person or otherwise cheating on a quiz will result in a 0% quiz grade for ALL quizzes.

If less than two (2) quizzes are given or a quiz must be cancelled for any reason, the weight of the cancelled quiz will be placed on the final exam.

Make-up quizzes

A student must have an approved absence from an academic counsellor to be eligible to take a makeup quiz. If for any reason the student also cannot complete the makeup quiz, then the weight of a quiz will be placed on the final exam.

The makeup quizzes will be scheduled within one week after the original quiz.

Final Exam

The final exam will be conducted in person and cover all course material including assigned readings, tutorials, lecture slides, and materials covered in assignments and lab homework. The final exam will be scheduled during Finals Period at Western or, if not applicable, at a suitable date and time after the course completes.

The final exam is to be completed individually, with no assistance or contact with others. Violation of this rule, any other exam rule, or cheating of any kind will result in a 0% grade for the final exam and the possibility of additional penalties as deemed appropriate by the course instructor, department or university including but not limited to a failing grade being entered for the course.

Online proctoring

If the University requires that final exams be delivered online, the final exam will be conducted online and cover all course material including assigned readings, tutorials, lecture slides, and materials covered in assignments and lab homework. The final exam will be scheduled during Finals Period at Western or, if not applicable, at a suitable date and time after the course completes.

The final examination in this course will be conducted using the remote proctoring service, such as Proctortrack. 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/

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.

Time zone and Scheduling of Course Components

All times listed in this document and on the OWL course site are assumed to be in Eastern Time (the local time of the Western University campus) unless otherwise stated. Quizzes and exams will be scheduled for the Eastern Time Zone. Students must ensure they are available during these times even if they are located outside of Ontario. No alternative deadlines, quiz dates/times, or exam dates/times will be offered for students outside of the Eastern Time Zone.

Email contact

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

You should note that email at the university and through 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.

Email contact with the course instructor is encouraged, and I endeavour to reply to messages within 24 hours between Monday and Friday and within 48 hours on Saturday, Sunday and holidays.

Students can ask questions via email, however if there are any large, somewhat complicated issues, it is recommended to discuss them during office hours. You **must** use your UWO account in order to write to

the course email for security and privacy reasons.

NOTE: In the subject line, please include **[2211]** and include a title or topic description of the contents of the email in the subject line and send e-mails from your @uwo.ca e-mail account. The instructor will be unable to respond to questions about your personal grades, assignment, etc. if they are not sent via a known @uwo.ca e-mail account for security and privacy reasons.

For example, please ensure your e-mails look like this:

```
From: Student Name <sname123@uwo.ca>
Subject: [2211] Assignment 3 part 1: Question about strings
```

and not like this:

```
From: Crazy ALIAS name <super+crazy_email@weirddomain.tv>
Subject: RE: RE: FWD: re: Subject FW: Bunch O' Questions
```

Online conduct

For any class content not delivered in person, the content may be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings.

If you are participating in a Zoom session, you should enable audio and video both at the beginning and the end of the session, but please leave your **audio muted** and **video turned off <u>if you are not speaking</u>**. Unnecessary audio/video uses up computing resources, bandwidth, distracts from the conversation.

For any online interaction related to this course (Zoom or otherwise), as one should with any online interaction, please conduct your self with maturity and responsibility.

Computing facilities

Each student will be given an account on the Computer Science Department senior undergraduate computing facility, GAUL. 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 submit a ticket. with Science Technology Services at https://helpdesk.sci.uwo.ca. In accepting the GAUL account, a student agrees to abide by the computer science department's *Rules of Ethical Conduct*.

Access to GAUL is **<u>REQUIRED</u>** 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.

Accommodation and Accessibility
Absences

For work totalling 10% or more of the final course grade, 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

and for the Student Medical Certificate (SMC), see:

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

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

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

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD) which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

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

Special Examinations

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 Academic Calendar for details (under Special Examinations).

Academic Policies

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

In accordance with policy, https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

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

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/

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 Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

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/.

Learning-skills counsellors at the Student Development Centre (http://www.sdc.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.

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

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

Ethical Conduct

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.

Plagiarism

All required assignments, quizzes and exams may be subject to submission for textual and metadata

similarity review to plagiarism detection software. All assignments, quizzes and exams submitted for such checking may be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of such services are subject to the licensing agreement with The University of Western Ontario. These services and software may include but are not limited to Turnitin (http://www.turnitin.com), MOSS, SCANEX, and custom plagiarism detection software developed for the course.

Computer-marked multiple-choice quizzes and exams may be subject to remote proctoring software (Proctortrack) and submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. For details on Proctortrack and remote proctoring see the final exam section.

Students must write their assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

All **assignments** are individual assignments. You may discuss approaches to problems among yourselves; however, the actual details of the work (assignment coding, answers to concept questions, etc.) must be an individual effort. All assignments will be subject to both content and metadata plagiarism analysis.

All **quizzes** and the **final exam** are to be written individually, the content and questions not shared and provided rules followed.

Tutors and Outside 'Help' on assignments

Students may receive the help of a tutor on assignments, so long as the tutor only identifies errors or demonstrates sample problems that are **not** part of the assignment. If the content of your assignment is significantly different than if you had not received help, then this is an indication you may have crossed the line into cheating. Again, if you are unsure about how much help is too much, ask your instructor.

The role of tutoring is to help students understand course material. Tutors should not write any part or all of an assignment for the students who hire them. Tutors should not 'advise' or 'suggest' what is to be entered into an assignment or the solutions to any portion of the assignments. Any aid beyond what you would have received directly from the instructor will be considered an academic offense. Having employed the same tutor as another student is not a legitimate defense against an accusation of collusion, should two students hand in assignments judged similar beyond the possibility of coincidence.

Academic dishonesty

Evidence of purposeful or accidental academic dishonesty will result in an **academic offence** for __both__ students.

For **assignments**, this includes (but is not limited to):

- Sharing assignments either in person or through online channels. This includes
  - Using another student's assignment or work as a "template" or "starting point" for your own work
  - Using sites dedicated to sharing assignment solutions or aiding cheating, including but not limited to Course Hero, OneClass, and Chegg
  - Using code from an external source (text, instructor, course website) where a student's own code is expected. **If in doubt, ask your instructor.**

- Completing an assignment for or with another person. This includes
  - Unacceptable collaboration. What is unacceptable? There is a difference between discussing assignments and solutions with fellow students and working together on the solutions to the point where the work submitted is clearly not individual work. **If in doubt, ask your instructor**.
- Any other activity that could be reasonably considered cheating off another student
- Any other activity that could be reasonably considered helping another student cheat off you (accidentally or on purpose)

For **quizzes**, this includes (but is not limited to):

- Sharing quiz questions or solutions either in person or through online channels
- Completing a quiz for or with another person
- Any other activity that could be reasonably considered cheating off another student
- Any other activity that could be reasonably considered helping another student cheat off you (accidentally or on purpose)

The penalty for academic dishonesty in any course component is receiving 0% for that component **AND** the possibility of additional penalties as deemed appropriate by the course instructor, department or university including but not limited to an additional penalty equal to the course component, or a failing overall grade being entered for the course. Note that receiving 0% on an assignment may make you ineligible for a passing grade due to the 49% requirement given in the Student Evaluation section. Receiving 0% on the final exam, will make you ineligible for a passing grade in this course.

You are responsible for reading and respecting the Computer Science Department's policy on:

Scholastic Offences:

https://www.csd.uwo.ca/undergraduate/current/policies/scholastic_offenses.html

and Rules of Ethical Conduct:

https://www.csd.uwo.ca/undergraduate/current/policies/ethical_conduct.html