The University of Western Ontario
London, Ontario, Canada
Department of Computer Science

CS 2208a - Introduction to Computer Organization and Architecture
Course Outline - Fall (September--December) 2020

This course uses the *Online Western's Learning (OWL)* system (https://owl.uwo.ca)

Welcome to the CS2208A course outline (a.k.a. syllabus). It is a legal binding document that communicates essential information and subject matter about the course, such as instructor's information, course description and topics, course material and a full schedule, as well as the course expectations and grading structures.

Table of Contents:

A: Instructor

- Professor Mahmoud El-Sakka
  ~~Middlesex College, Room 419~~
  ~~Phone: 661-2111 x86996~~

  Email: elsakka <at> csd.uwo.ca (*preferred method of communication*)
  Students must use their Western (@uwo.ca) email addresses when contacting the instructor.

Office hours (*via Zoom at Western https://westernuniversity.zoom.us/*): Tuesday from 1:30 pm to 2:30 pm (tentative)

Office hours (*via Zoom at Western https://westernuniversity.zoom.us/*): Thursday from 1:30 pm to 2:30 pm (tentative)

B: Teaching Assistances

TBA

Teaching Assistances' Office hours: TBA

C: Lectures and Tutorials Schedule/Location

- Lectures Time & Place
  ~~Tuesday 12:30 pm - 1:30 pm~~
  ~~Thursday 12:30 pm - 2:30 pm~~

  3 hours of asynchronous online lectures per week

- Tutorials Time & Place
  ~~Monday 12:30 pm - 1:30 pm~~

  1 hour of asynchronous online tutorial per week

D: Course Description

The course covers the internal representation of various data types, including characters, integers, and floating-points. It also covers the addition and subtraction operations and how they are internally performed.

The course focuses on the architectural components of digital computers, how these components are interconnected, and the nature of the information flow between them. Assembly language is used to reinforce these issues.

The main purpose of this course is to give students an understanding of *how a computer works (organization)* and *what a computer does (architecture)*.

E: Course Topics

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

- Introduction to Computer Systems Architecture and Organization
- Computer Arithmetic
- Floating Point Numbers

- ARM Instruction Set Architecture
- ARM Assembly Language
- ARM Data Processing
- ARM Flow Control and Branching
- ARM Addressing Modes

- Subroutine Call and Return
- Data Storage and the Stack

- Data Processing and Data Movement
- Computer Performance

F: Prerequisites

- Computer Science 1027a/b or 1037a/b with a grade of at least 65%

Unless you have either the prerequisites for this course or written special permission from your Dean to enroll in it, you will 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.

Students are assumed to be familiar with a high-level programming language and with data structures such as stacks and queues.

G: Textbook

- Alan Clements, *Computer Organization & Architecture: Themes and Variations*, Cengage Learning, 2014, ISBN: 978-1-111-98704-6.

To accommodate courses that are being offered online, and students that are not residing in London, the Bookstore will offer the following services for the Fall term.

- Online ordering of physical (paper) books and/or Custom Course Materials (e.g., lab manuals) through the Bookstore website. Items can be shipped to students directly (online order at bookstore webpage) if they are learning remotely.

- Students buying books on campus will have the option of some form of curbside pickup

- Obtaining commercial electronic books to be sold through the Western Bookstore website (depending on publishers' availability).

If you have any questions or want to place an order, contact Rachel Sandieson, Course Materials Manager (rsandies@uwo.ca).

H: Course Website

The CS 2208a course uses the Online Western's Learning (OWL) system (https://owl.uwo.ca)

Course material and class information will be posted on this website. Students should check OWL (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. Students are responsible for checking OWL on a regular basis.

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

I: Material Accessibility Statement

Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Accessible Education--formerly SSD--(http://academicsupport.uwo.ca/accessible_education/index.html) at 661-2111 x82147 for any specific question regarding an accommodation.

J: Technical Requirements

CS2208A is an online course. It is the student's responsibility to secure access to

- a computer with a working microphone and webcam, and
- a stable internet connection.

During this course, students are required to download (from the course website on OWL) and install a Windows-based simulator software.

For MAC users, they need first to download Fusion VMware software (from the VMware Academic Program at https://www.csd.uwo.ca/help/software/vmware.html). For further help on how to install this Fusion VMware software on your MAC PC, please fill a Technical Support Ticket at https://help.sci.uwo.ca/servicedesk.

K: Online Etiquette

Some components of this course will involve online interactions. To ensure the best experience for both you and your classmates, please honour the following rules of etiquette:

- please *arrive* to class on time
- please use your computer and/or laptop if possible (as opposed to a cell phone or tablet)
- ensure that you are in a private location to protect the confidentiality of discussions in the event that a class discussion deals with sensitive or personal material
- to minimize background noise, kindly mute your microphone for the entire class until you are invited to speak unless directed otherwise
- In order to give us optimum bandwidth and web quality, please turn off your video camera for the entire class unless you are invited to speak
- please be prepared to turn your video camera off at the instructor's request if the internet connection becomes unstable
- unless invited by your instructor, do not share your screen in the meeting

The course instructor will act as a moderator for the class and will deal with any questions from participants. To participate, please consider the following:

- if you wish to speak, use the *raise hand* function and wait for the instructor to acknowledge you before beginning your comment or question
- remember to unmute your microphone and turn on your video camera before speaking
- self-identify when speaking.
- remember to mute your mic and turn off your video camera after speaking (unless directed otherwise)

General considerations of *netiquette*:

- Keep in mind the different cultural and linguistic backgrounds of the students in the course.
- Be courteous toward the instructor, your colleagues, and authors whose work you are discussing.
- Be respectful of the diversity of viewpoints that you will encounter in the class and in your readings. The exchange of diverse ideas and opinions is part of the scholarly environment. *Flaming* is never appropriate.
- Be professional and scholarly in all online postings. Cite the ideas of others appropriately.

Note that disruptive behaviour of any type during online classes, including inappropriate use of the chat function, is unacceptable. Students found guilty of Zoom-bombing a class or of other serious online offenses may be subject to disciplinary measures under the Code of Student Conduct.

L: Email Contact

In accordance with policy, http://www.uwo.ca/its/identity/activatenonstudent.html, the centrally administered email account provided to students will be considered the individual's official university email address. It is the responsibility of the account holder to ensure that the email received from the University at his/her official university address is attended to in a timely manner.

Losing emails is not an acceptable excuse for not knowing about the information that was sent.

M: Assignment Conduct

- There will be 5 equally weighted assignments.

- Assignment schedule

Assignment no.	To be posted on	Due in	Due by
1	Sunday, Sept. 13	6 days	Saturday, Sept. 19 @ 11:55 pm
2	Sunday, Sept. 20	6 days	Saturday, Sept. 26 @ 11:55 pm
3	Sunday, Sept. 27	6 days	Saturday, Oct. 03 @ 11:55 pm
4	Sunday, Oct. 25	15 days	Monday, Nov. 09 @ 11:55 pm
5	Sunday, Nov. 15	15 days	Monday, Nov. 30 @ 11:55 pm

- Assignment descriptions will be posted on the course website by the dates listed above.

- Any changes, updates, and clarifications to assignments will also be posted on the website. It is your responsibility to monitor these pages closely.

- All submissions will be submitted electronically. We reserve the right to use similarity detection software to detect possible cheating cases.

- Late assignments are strongly discouraged.
  - 10% will be deducted from a late assignment (up to 24 hours after the due date/time)
  - After 24 hours from the due date/time, late assignments will receive a zero grade.

- Assignments may involve concept questions (non-programming) related to the course material and Assembly programming.

- A program that produces the correct output is not necessarily a *working* program; it must also satisfy the specifications given in the assignment description. Other criteria in terms of which an assignment will be evaluated include coding style, comments, and efficiency.

- Your assignment solutions are expected to be your own individual work, not the products of a group effort.

- It is your responsibility to keep up-to-date backups of assignment disk files in case of system crashes or inadvertently erased files. Retain disk copies of all material handed in, as well as the actual graded assignment, to guard against the possibility of lost assignments or errors in recording marks. You should keep these materials at least until you are satisfied that your final mark for the course has been appropriately computed.

- Assignments will be marked either automatically or by the Teaching Assistant(s), who follow marking schemes provided by the instructor.

- Every effort will be made to have assignments marked and handed back within three weeks after the hand-in date, preferably sooner.

- When marking an assignment is completed, you will be informed via the course website and/or email.

- For assignments that are marked by the Teaching Assistant(s), you should direct any questions about marking in the first instance to your Teaching Assistant. If your discussion with the Teaching Assistant is not satisfactory, you may want to further discuss the issue with the course instructor.

  For assignments that are automatically marked, you can send your related questions directly to the instructor.

- A request for an adjustment in an assignment mark must be made within two weeks following the first handed-back day. All assignment marks are considered to be final after two weeks following the first handed-back day.

N: Quiz Conduct

- There will be 10 equally weighted weekly online quizzes.

- Quizzes schedule

Quiz no.	Due by date/time
1	Saturday, Sept. 12 @ 11:55 pm
2	Saturday, Sept. 19 @ 11:55 pm
3	Saturday, Sept. 26 @ 11:55 pm
4	Saturday, Oct. 03 @ 11:55 pm
5	Saturday, Oct. 17 @ 11:55 pm
6	Saturday, Oct. 24 @ 11:55 pm
7	Saturday, Oct. 31 @ 11:55 pm
8	Saturday, Nov. 21 @ 11:55 pm
9	Saturday, Nov. 28 @ 11:55 pm
10	Saturday, Dec. 05 @ 11:55 pm

- Quizzes will be posted on the course website before the dates listed above.

- Any changes, updates, and clarifications to quizzes will also be posted on the website. It is your responsibility to monitor these pages closely.

- All submissions will be submitted electronically. We reserve the right to use similarity detection software to detect possible cheating cases.

- Late quizzes are strongly discouraged.
  - 10% will be deducted from a late quiz (up to 24 hours after the due date/time)
  - After 24 hours from the due date/time, late quizzes will receive a zero grade.

- Quizzes will be marked automatically.

- A request for an adjustment in a quiz mark must be made within two weeks following the quiz due date. All quiz marks are considered to be final after two weeks following the quiz week.

O: Lab Conduct

- There will be 6 equally weighted labs.

- Labs schedule

Lab no.	Section 8 on Tuesday 3:30 pm - 4:30 pm	Section 3 on Tuesday 4:30 pm - 5:30 pm	Section 4 on Wednesday 12:30 pm - 1:30 pm	Section 6 on Wednesday 2:30 pm - 3:30 pm	Section 9 on Wednesday 3:30 pm - 4:30 pm	Section 7 on Wednesday 4:30 pm - 5:30 pm	Section 5 on Thursday 4:30 pm - 5:30 pm
1	Tuesday, Oct. 13	Tuesday, Oct. 13	Wednesday, Oct. 14	Wednesday, Oct. 14	Wednesday, Oct. 14	Wednesday, Oct. 14	Thursday, Oct. 15
2	Tuesday, Oct. 20	Tuesday, Oct. 20	Wednesday, Oct. 21	Wednesday, Oct. 21	Wednesday, Oct. 21	Wednesday, Oct. 21	Thursday, Oct. 22
3	Tuesday, Oct. 27	Tuesday, Oct. 27	Wednesday, Oct. 28	Wednesday, Oct. 28	Wednesday, Oct. 28	Wednesday, Oct. 28	Thursday, Oct. 29
4	Tuesday, Nov. 17	Tuesday, Nov. 17	Wednesday, Nov. 18	Wednesday, Nov. 18	Wednesday, Nov. 18	Wednesday, Nov. 18	Thursday, Nov. 19
5	Tuesday, Nov. 24	Tuesday, Nov. 24	Wednesday, Nov. 25	Wednesday, Nov. 25	Wednesday, Nov. 25	Wednesday, Nov. 25	Thursday, Nov. 26
6	Tuesday, Dec. 01	Tuesday, Dec. 01	Wednesday, Dec. 02	Wednesday, Dec. 02	Wednesday, Dec. 02	Wednesday, Dec. 02	Thursday, Dec. 03

All lab sessions will be online. Students will submit an online lab report for each lab session.

Lab no.	Due by date/time
1	Saturday, Oct. 17 @ 11:55 pm
2	Saturday, Oct. 24 @ 11:55 pm
3	Saturday, Oct. 31 @ 11:55 pm
4	Saturday, Nov. 21 @ 11:55 pm
5	Saturday, Nov. 28 @ 11:55 pm
6	Saturday, Dec. 05 @ 11:55 pm

- Lab descriptions will be posted on the course website before the dates listed above.

- Any changes, updates, and clarifications to labs will also be posted on the website. It is your responsibility to monitor these pages closely.

- All submissions will be submitted electronically. We reserve the right to use similarity detection software to detect possible cheating cases.

- Late labs are strongly discouraged.
  - 10% will be deducted from a late lab (up to 24 hours after the due date/time)
  - After 24 hours from the due date/time, late labs will receive a zero grade.

- Labs will be marked automatically.

- A request for an adjustment in a lab mark must be made within two weeks following the lab due date. All lab marks are considered to be final after two weeks following the lab week.

P: Ethical Conduct

Scholastic offences are taken seriously, and students are strongly encouraged 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.

Students must write their essays and 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.

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.

Assignments that are judged to be the result of academic dishonesty will, for the student's first offence, be given a mark of zero with an additional penalty equal to the weight of the assignment also being applied.

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.

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

Q: Tutoring

The role of tutoring is to help students understand the course material. Tutors should **not** write assignments or tests for the students who hire them. Submitting an assignment that contains material written by a tutor is 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.

R: Midterm Tests and Final Exam

*Tests and examinations in this course will be conducted using the **remote proctoring service, 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 is available at the following link:* https://www.proctortrack.com/tech-requirements/.

- First midterm test
  - Date: Thursday, Oct. 08, 2020 (tentative)
  - Time: from 12:30 pm to 2:00 pm (tentative)

- Second midterm test
    - Date: Thursday, Nov. 12, 2020 (tentative)
    - Time: from 12:30 pm to 2:00 pm (tentative)

  Every effort will be made to have the marks of midterm tests available within two weeks of the test, preferably sooner.

- Final exam
    - Date: During December final exam period
    - Time: TBA (tentatively--three hours long)

Calculators of any kind will NOT be allowed during tests and examinations.

S: Accommodation Policies

Students with disabilities work with Accessible Education--formerly SSD-- (http://academicsupport.uwo.ca/accessible_education/index.html), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The accommodation policy can be found here: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

In this course, both midterm tests and the final exam are timed, as shown in Section *Midterm Tests and Final Exam*. If you are a student with a disability and require extra time accommodation, please ensure your accommodations are active on the Accommodated Exams website https://studentservices.uwo.ca/Accommodatedexamssignup/ for this course at least 10 days prior to the assessment for which you require accommodation. Recommended accommodations posted there **on time** will be applied to your assessment.

T: Academic Accommodation for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an online portal to self-report an absence during the term, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are not met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation. Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For further information, please see https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's office) for visits to Student Health Services. The form can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

U: 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 at https://www.uwo.ca/equity/doc/multicultural_calendar_supplement.pdf.

V: Methods of Evaluation

- The overall course grade will be calculated as listed below
  - Assignments worth a total of 12%
  - Weekly quizzes worth a total of 9%
  - Labs worth a total of 7.5%
  - First midterm test worth 15.5%
  - Second midterm test worth 20%
  - Final exam worth 36%

- When calculating a student assignments grade average, the best 4 assignments (out of 5) will only be considered.

- If an assignment has to be cancelled for any reason, the remaining assignment weights will be prorated (scaled) to add up to the total of assignments worth.

- When calculating a student quizzes grade average, the best 9 quizzes (out of 10) will only be considered.

- If a quiz has to be cancelled for any reason, the remaining quiz weights will be prorated (scaled) to add up to the total of quizzes worth.

- When calculating a student labs grade average, the best 5 labs (out of 6) will only be considered.

- If a lab has to be cancelled for any reason, the remaining lab weights will be prorated (scaled) to add up to the total of labs worth.

- **To be eligible to receive a passing grade in the course, your total marks on the two midterm tests and the final exam must be at least 50%.**

- **To be eligible to receive a grade of C (60%) or higher (i.e., to be eligible for Honors Programs), your total marks on the two midterm tests and the final exam must be at least 60%.**

W: 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/

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.

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/

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

Students may refer to http://westernusc.ca/your-services for services provided by the USC.

Students may refer to http://www.registrar.uwo.ca for the Registrarial Services.