DALHOUSIE UNIVERSITY
Faculty of Computer Science

CSCI-1120 --- Introduction to Computer Systems
Course Syllabus

Instructor Information

Instructor:	Brent Crane	**Office:**	(I don't have one)
E-mail:	brentcrane@dal.ca	**Office Hours:**	TBA
Class Meeting Time:	MWF 8:35-9:25	**Lecture Room:**	LSC-C242
Lab Meeting Time	T 14:35-15:55	**Lab Room:**	Rowe 1028 (potter)
Course Homepage:	https://dal.brightspace.com/		

Important Dates

https://www.dal.ca/academics/important_dates.html

- Classes begin for Winter term: January 8, 2024
- Final Withdrawal Date without financial penalty: January 22, 2024
- Last day to drop Winter term classes without a "W": February 6, 2024
- Winter Study Break (no classes or labs): February 19-23, 2024
- Last day to drop Winter term classes with a "W": March 6, 2024
- Holidays (University closed - no classes, labs, or office hours):
  - February 2: Munro Day
  - February 19: Nova Scotia Heritage Day (Note: this overlaps with the winter study break)
  - March 29: Good Friday
- Final day of classes for Winter term: April 9, 2024
- **Deadlines: Three Tests (25% ea), see tentative test schedule**
- **Deadline: Lab component test (10%), see tentative test schedule**

Course Description

This course introduces key concepts in computer systems. Students will learn fundamental systems concepts and apply them to explain how the hardware and software environment affects program behaviour. Topics include data and program representation, program translation, and structure of systems. Students are introduced to unix in the labs.

High-Level Learning Outcomes

A student MUST demonstrate minimum competency in ALL high-level learning outcomes.

- Interpret the value represented by a binary string given a data representation format.
  - Formative Assessments: Labs and Assignments
- Describe how a program is executed by a computer and the different levels of execution, e.g., gate-level, block-level, machine-level, language-level.
  - Formative Assessments: Labs and Assignments
- Use a unix shell to perform simple tasks such as create files and directories, compile programs, disassemble programs, and edit files
  - Formative Assessments: Labs
- Explain the concept of layering in computer systems and apply it to examples of systems in computer organization, and programming languages.
  - Formative Assessments: Assignments

Low-Level Learning Outcomes

- Explain the concept of layering in computer systems and apply it to examples of systems in computer organization, programming languages, operating systems, and networks.
- Interpret the value represented by a binary string given a data representation format.
- Convert between different number representations (dec, binary, hex, 2sC, and IEEE-754).
- Use simple C programs to interpret data.
- Explain how a block component of a CPU, such as an ALU, works.
- Describe the components and functions of the CPU at the block level.
- Trace machine execution through a modern computer architecture from instructions in assembly language.
- Trace the execution of software from C statements to machine instructions with control flow
- Explain pointers from the perspective of both C and machine level.
- Explain the build process for C programs: compile, assemble, link.
- Use a unix-based system to manipulate directories and files, and execute commands to complete simple tasks
- Create, transfer, and edit files in a unix system
- Use tools (such as gcc, gdb, and objdump) on a unix system to compile and examine execution of code, and interpret data files.
- Use a modern system to build, disassemble, run, and trace programs.

Course Rationale

This introductory course assumes no prior knowledge regarding computer science. This is a foundational course on computation on which other courses float.

Course Format and Course Communication

- Content will be delivered using live, in-person lectures and labs.
- Students will be expected to use their own laptops to complete exercises as well as participate in activities held in lectures and labs.
- Students will be expected to use **Brightspace**. Course announcements and content will be posted to Brightspace. It is the student's responsibility to check both their Dalhousie email and Brightspace daily. To access your Dal email account please see: https://www.dal.ca/dept/its/o365/services/email.html.

Texts and Resources

The textbook we recommend (but do not require) is: Randal E. Bryant (Author), David R. O'Hallaron, "Computer Systems: A Programmer's Perspective (2nd Edition)", Pearson (2015), ISBN: 978-0134092669
Other resources: Code: The Hidden Language of Computer Hardware and Software by Charles Petzold, (2022)

Contact Information

- For any questions related to course content, personal or confidential issues, or emergencies, please contact your instructor directly: **brentcrane@dal.ca**.
- For waitlist and registration questions, please email **undergrad@cs.dal.ca**

Evaluation Criteria

Assessment	#	Weight	Total
Lab Submissions (formative)		15%	25%
Lab End of Term Summative Assessment		10%	
Test 1, Final Exam Part 1	1	25%	75%
Test 2, Final Exam Part 2	2	25%	
Test 3, Final Exam Part 3	3	25%	
FINAL GRADE OUT OF 100%			**100%**

Tentative Test Schedule

Description	Time	Date	Location
Test Module 1	14:35-15:55	Tuesday 30th January	Rowe 1028 (potter auditorium)
Test Module 2	14:35-15:55	Tuesday 27th February	Rowe 1028 (potter auditorium)
Lab Assessment	14:35-15:55	Tuesday 26th March	Rowe 1028 (potter auditorium)
Test Module 3	14:35-15:55	Tuesday 2nd April	Rowe 1028 (potter auditorium)
Final Exam Date TBD, will be during Dal exam period			

Each module has **two attempts,** and you must obtain a grade of 60% or more on at least 1 attempt to pass this course. Only the **best attempt is used** for final grade calculation.

Attendance & Late policy:

1) Lab completion will be assessed 15 days after the day of the lab.
2) Tests missed for any reason implies that a student must write the corresponding section in the final examination.
3) Requests for any grades to be reviewed must be submitted within 2 weeks of the release of the grade in question. For example, if a student believes they unfairly lost points on an assessment, they have 2 weeks from the time they got that grade back to request that the grade be revised. **Requests to review grades that are greater than 2 weeks old will be denied.**

Passing Criteria: To get **a C or better** in the course, a student must also note that:

- Each module (1 to 3) test is paired with a part of the final and each student must pass with 60% at least one of the elements of the pair to pass the course.
- Receive a 60% overall (grade C or better) As per Faculty regulations, CS students must obtain the final grade of C to have this course count toward degree requirements.

Absence for tests

Missed module tests are deferred to the final examination. The corresponding final section is worth 25% and must be passed.

Missing 3 tests will trigger a fail.

Notes

- A minimum grade of C is required in this course if it is core to your FCS degree, or if it will be used as a prerequisite for a subsequent CSCI course.
- As of 2019, students who receive a grade lower than C in the same required CS course twice, will be dismissed.
- The grade conversion scale in Section 17.1 of the Academic Regulations, Undergraduate Calendar will be used. https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=111&chapterid=6817&topicgroupid=29869&loaduseredits=False

Formative Assessments

A formative assessment is a type of evaluation to provide ongoing opportunities to practice and receive feedback on your progress and understanding during the course. These exercises are designed to track progress, identify areas that need improvement, and improve learning effectiveness.

Lab Exercises (15%)

- Attendance in labs to complete coursework is crucial in applying the knowledge gained in lectures. By attending labs, you will retrieve and apply notions that you have learned on a regular basis throughout the week to help solidify concepts.
- Teaching assistants will guide activities throughout the session where you can collaborate with your peers, receive guidance, ask questions, and seek clarifications in a timely manner.
- You are expected to **attend in-person at least 5** out of the scheduled lab sessions (does not include the test sessions – those are mandatory, of course). Attendance will be tracked through a combination of sign-in sheets and log interactions with exercises.

Summative Assessments

A summative assessment is a type of evaluation that is administered at the end of each course module. Its purpose is to evaluate your overall learning outcomes in relation to the learning objectives.

Tests/Exam Component (85%)

- Tests are completed in-person, during your lab. The aim of this assignment is to assess your ability to understand the course material, to provide feedback.
    - The length of the assignment is a duration of no more than 80 minutes to complete a set of questions.
    - Use of one A4 (Letter) summary document is allowed, and scratch paper will be provided, you will not be allowed to contact external help, nor allowed to use any other environment than Brightspace.
    - The tests will be administered using the traditional method of pen and paper delivery.
    - Photo ID is required, and no cell phones or other electronic aids are allowed.

Course Policies

Student Declaration of Absence

- If you have a **recurring short-term or long-term absence**, I strongly encourage you to meet your Faculty Program Coordinator and myself to discuss whether an alternate grading scheme is appropriate. Missed academic requirement for the course will be graded as 0 due to insufficient evidence of understanding of the subject matter.

Final Exam Requirements

- Photo ID is required.
- No calculators, smart watches, cell phones, PDAs, talking slide rulers, or other electronic devices.

Academic Standards

Failure to properly attribute sources in your work will be treated as an academic standards issue and points may be deducted for not following citation requirements. For example, forgetting to quote text taken from other sources, failure to include in-text citations, or a failure to include required information in the citations or references. Please see the resources on proper citation provided by the Dalhousie Writing Center (https://dal.ca.libguides.com/c.php?g=257176&p=5001261).

Please note that if it appears that the error was made with intent to claim other people's work as your own such as a lack of both citations and references, an allegation of plagiarism will be submitted to the Faculty Academic Integrity Officer, which could result in consequences such as a course failure.

Tentative List of Topics

- Module 0 (Introduction)
  - Layering
- Module 1(Data Encoding)
  - Bytes
  - Integers
  - Floating Points
  - Strings
- Module 2 (Computer Architecture)
  - Gates & Logic
  - Combination Circuits
  - Sequential Circuits
  - RAM Registers
  - ALU
  - ALU Mem Tracing
- Module 3 (Machine Execution)
  - Execution
  - Assembly
  - Instructions
  - Branching
  - Functions & Stacks
  - Memory Organization
  - Build Process

Responsible Computing Policy

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies (https://www.dal.ca/dept/university_secretariat/policies/information-management-and-technology/acceptable-use-policy-.html) and the Faculty of Computer Science Responsible Computing Policy. For more information please see https://www.dal.ca/content/dam/dalhousie/pdf/faculty/computerscience/policies-procedures/fcs_policy_local.pdf

Use of Plagiarism Detection Software

If a student does not wish to have their assignments passed through plagiarism detection software, they should contact the instructor for an alternative. Please note, that code not passed through plagiarism detection software will necessarily receive closer scrutiny. https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf

Use of Artificial Intelligence Tools

You may use AI-driven tool to assist you in learning but remember that the objective is for you to acquire these competencies and outcomes in this course. You are responsible for all work you produce, whether assisted by an AI-driven tool or not. You must acknowledge all tools used to assist you. If applicable, you must provide links to chat logs. If the work you produce is suspected to misrepresent your own competencies, you may be asked to complete a supplemental assessment to evaluate your mastery of course outcomes..

Student Health and Wellness

Taking care of your health is important. As a Dalhousie student, you have access to a wide range of resources to support your health and wellbeing. Students looking to access physical or mental health & wellness services at Dalhousie can go to the Student Health & Wellness Centre in the **Dairy Building**. The team includes: registered nurses, doctors, counsellors and a social worker. Visit **dal.ca/studenthealth** to learn more and book an appointment today.

Students also have access to a variety of online mental health resources, including telephone/texting counselling and workshops/training programs. Learn more and access these resources at d**al.ca/mentalhealth**.

Culture of Respect[1]

Every person has a right to respect and safety. We believe inclusiveness is fundamental to education and learning. Misogyny and other disrespectful behaviour in our classrooms, on our campus, on social media, and in our community is unacceptable. As a community, we must stand for equality and hold ourselves to a higher standard.

What we all need to do:

1. **Be Ready to Act:** This starts with promising yourself to speak up to help prevent it from happening again. Whatever it takes, summon your courage to address the issue. Try to approach the issue with open-ended questions like "Why did you say that?" or "How did you develop that belief?"
2. **Identify the Behaviour:** Use reflective listening and avoid labeling, name-calling, or assigning blame to the person. Focus the conversation on the behaviour, not on the person. For example, "The comment

[1] Source: Speak Up! © 2005 Southern Poverty Law Center. First Printing. This publication was produced by Teaching Tolerance, a project of the Southern Poverty Law Center. Full "Speak Up" document found at: http://www.dal.ca/dept/dalrespect.html. Revised by Susan Holmes from a document provided April 2015 by Lyndsay Anderson, Manager, Student Dispute Resolution, Dalhousie University, 902.494.4140, lyndsay.anderson@dal.ca www.dal.ca/think.

you just made sounded racist, is that what you intended?" is a better approach than "You're a racist if you make comments like that."

3. A**ppeal to Principles:** This can work well if the person is known to you, like a friend, sibling, or co-worker. For example, "I have always thought of you as a fair-minded person, so it shocks me when I hear you say something like that."
4. **Set Limits:** You cannot control another person's actions, but you can control what happens in your space. Do not be afraid to ask someone "Please do not tell racist jokes in my presence anymore" or state "This classroom is not a place where I allow homophobia to occur." After you have set that expectation, make sure you consistently maintain it.
5. **Find or be an Ally:** Seek out like-minded people that support your views, and help support others in their challenges. Leading by example can be a powerful way to inspire others to do the same.
6. **Be Vigilant:** Change can happen slowly, but do not let this deter you. Stay prepared, keep speaking up, and do not let yourself be silenced.

University Statements

This course is governed by the academic rules and regulations set forth in the University Calendar and the Senate. https://academiccalendar.dal.ca/Catalog/ViewCatalog.aspx?pageid=viewcatalog&catalogid=117&loaduseredits=False

Territorial Acknowledgement

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

Dalhousie acknowledges the histories, contributions, and legacies of the African Nova Scotia people and communities who have been here for over 400 years.

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." https://www.dal.ca/about-dal/internationalization.html

Academic Integrity

At Dalhousie University, we are guided in all of our work by the values of academic integrity: honesty, trust, fairness, responsibility and respect. As a student, you are required to demonstrate these values in all of the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. (read more: http://www.dal.ca/dept/university_secretariat/academic-integrity.html)

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion please contact: https://www.dal.ca/campus_life/academic-support/accessibility.html for all courses offered by Dalhousie with the exception of Truro.

Conduct in the Classroom — Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion — Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). (read more: http://www.dal.ca/cultureofrespect.html)

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner—perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. (read more: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/Code%20of%20Student%20Conduct%20rev%20Sept%202021.pdf)

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. (read more: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html)

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality Checking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work, and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. (read more: https://cdn.dal.ca/content/dam/dalhousie/pdf/dept/university_secretariat/policy-repository/OriginalitySoftwarePolicy.pdf)

Student Use of Course Materials

These course materials are designed for use as part of the CSCI courses at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading material to a commercial third party website) may lead to a violation of Copyright law.

Learning and Support Resources

Please see https://www.dal.ca/campus_life/academic-support.html