DALHOUSIE UNIVERSITY
Faculty of Computer Science

CSCI-2132 — Software Development
Course Syllabus

Instructor Information

Instructor:	Dr. Norbert Zeh	**Office:**	MC 4246
E-mail:	nzeh@cs.dal.ca	**Office Hours:**	MWF 12:00–2:00
Class Meeting Time:	MWF 3:35–4:25	**Room No:**	FASS Auditorium 1
Lab Meeting Time:	Section B01: M 8:35–9:55	**Room No:**	Mona Campbell 1201
	Section B02: M 8:35–9:55	**Room No:**	Goldberg 143
	Section B03: M 10:05–11:25	**Room No:**	Mona Campbell 1201
	Section B04: M 10:05–11:25	**Room No:**	Goldberg 143
Course Homepage:	https://www.cs.dal.ca/~nzeh/Teaching/2132		
Course Mail List:	all-cs2132@cs.dal.ca		

Important Dates

1. First class: Jan 7, 2018
2. Munro Day (university closed): Feb 1, 2018
3. NS Heritage Day (university closed): Feb 18, 2018
4. Study break (no classes): Feb 18–22, 2018
5. Last class: Apr 8, 2018
6. Midterm Exam #1: Feb 4, 2018, 6:30–8:30 pm
7. Midterm Exam #2: Mar 4, 2018, 6:30–8:30 pm
8. Final Exam: TBA in the period of Apr 10–26, 2018

Course Description

This course gives an introduction to using the Unix operating system, shell scripting, programming in C, software testing and debugging, version control systems, and basic software development methodologies.

Learning Outcomes

- Use the command line of a UNIX-style environment.
- Describe the various testing methodologies and their purpose.
- Describe the life cycle of a software project.
- Explain the role and function of build tools.
- Execute a program development cycle starting with a problem specification.
- Use pointers in C and manage memory.
- Design regular expressions and use tools such as `grep` and `sed` to manipulate text streams.
- Explain the C build cycle (preprocess, compile, assemble, link).
- Select an appropriate testing methodology given a problem specification.
- Use the UNIX command line environment to perform all parts of a software development cycle.

- Write short (50 line) shell scripts to solve simple problems such as running regression tests.
- Use a standard build tool, such as `make` and Makefiles, given source dependencies.
- Write command pipelines composed of multiple tools in the UNIX environment to solve simple problems.
- Describe the various kinds of software errors that can occur and their causes.
- Implement a test suite for a given module, program, function or library.
- Implement moderately complex programs in C.
- Implement simple data structures (linked list, stack, queue) in C.
- Explain the purpose of version control systems.
- Explain the role of software testing and testing methods.
- Identify methodologies for dealing with various software errors.
- Select appropriate testing methodologies given a piece of software and list of exhibited error symptoms.
- Identify and rectify software errors within a piece of software of moderate complexity.

Class Format and Course Communication

- Content will be delivered using a combination of lectures and hands-on labs.
- Students must ask the instructor permission before recording class lectures.
- Course announcements will be posted to the course mail list, which comprises the instructor's and students' Dal emails. It is the student's responsibility to check their Dal e-mail on a daily basis. To access your Dal e-mail account please see: `https://www.dal.ca/dept/its/o365/services/email.html`

Evaluation Criteria

1. Assignments (30%)

    - Tentatively, 7–10 assignments
    - The best $n-1$ assignments count.
    - **Late assignments will not be accepted.**
    - Assignments must be submitted electronically.
    - No collaboration is permitted on the assignments.

2. Two Midterm Exams (20%)

    - To be held in the evenings of Feb 4, 2018 and Mar 4, 2018.

3. Final Exam (50%)

    - Scheduled by the university.
    - Will cover all material in the course.
    - If the final is better than the average of the two midterms, the midterms will be ignored and the final will have weight 70% in the final grade calculation.

Notes

- As of 2015, a minimum grade of C must be achieved in all required CS courses.
- The grade conversion scale in Section 17.1 of the Academic Regulations, Undergraduate Calendar will be used.
- A student must pass (50%) both the assignment component and the final exam to pass the course.

Midterm and Final Exam Requirements

- Photo ID is required.
- Closed book with allowed "cheat sheet" of 2 hand-written or printed letter-sized pages, no smaller than 10pt font.
- No dictionaries, notes, calculators, cell phones, PDAs, talking slide rulers, or other electronic aids allowed.

Required Texts and Resources

- K.N. King. *C Programming: A Modern Approach.* W.W. Morton & Company, 2008.
- G. Glass and K. Ables. *UNIX for Programmers and Users.* Prentice Hall, 2003.
- The lecture slides will be posted on the course website.
- Additional assistance is available from the Student Learning Centre (2nd floor, Goldberg CS Building).

Additional Recommended Reading

- E. Nemeth, G. Snyder, T.R. Hein, and B. Whaley. *Unix and Linux System Administration Handbook*, 4th edition. Pearson Education, 2010.
- B.W. Kernighan and D.M. Ritchie. *The C Programming Language*, 2nd edition. Prentice Hall, 1988.

Prerequisites

CSCI-1101 or CSCI-1110.

Tentative Schedule of Topics

1. Course introduction
2. Fundamentals of the UNIX operating system
    - History and basic commands and utilities
    - Files and directories
    - Editors, shells, and regular expressions
3. Software development using the C programming language
    - Introduction to C, input and output
    - Operators, expressions, and statements
    - Software development life cycle
    - Arrays, functions, and recursion
4. Program organization and dynamic memory allocation
    - Writing large programs, `make`
    - Pointers and dynamic memory allocation
    - Linked lists and dynamic arrays
5. Shell scripting and version control systems
    - Shell scripting and file manipulation
    - Version control systems

Responsible Computing Policy

Usage of all computing resources in the Faculty of Computer Science must be within the Dalhousie Acceptable Use Policies (`http://its.dal.ca/policies/`) and the Faculty of Computer Science Responsible Computing Policy. (`https://www.cs.dal.ca/downloads/fcs_policy_local.pdf`)

Culture of Respect

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]:

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

3. **Appeal 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 personâĂŹs 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=69&chapterid=3457&loaduseredits=False

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 (The Center for Academic Integrity, Duke University, 1999). 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.
http://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Advising and Access Services Centre is Dalhousie's centre of expertise for student accessibility and accommodation. The advising team works with students who request accommodation as a result of: a

[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.

disability, religious obligation, or any barrier related to any other characteristic protected under Human Rights legislation (NS, NB, PEI, NFLD).
http://www.dal.ca/campus_life/student_services/academic-support/accessibility.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 donâĂŹt follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal mannerâĂŤperhaps through a restorative justice process. If an informal resolution canâĂŹt be reached, or would be inappropriate, procedures exist for formal dispute resolution.
https://www.dal.ca/campus_life/safety-respect/student-rights-and-responsibilities/student-life-policies/code-of-student-conduct.html

Diversity and Inclusion âĂŞ– 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).
http://www.dal.ca/cultureofrespect.html

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel and support. Visit the office in the McCain Building (room 3037) or contact the programs at elders@dal.ca or 902-494-6803 (leave a message).

Learning and Support Resources

General Academic Support — Advising
http://www.dal.ca/campus_life/student_services/academic-support/advising.html

Fair Dealing Guidelines
https://libraries.dal.ca/services/copyright-office/guidelines/fair-dealing-guidelines.html

Dalhousie University Library http://libraries.dal.ca