CSC385H1 – Microprocessor Systmes

DRAFT: Course syllabus for the Summer 2025 semester

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Contents

1 Course details

Welcome to Microprocessor Systems (CSC385H1)! The course introduces you to the vast world of embedded systems and the "Internet of Things". You will regularly program at a low level on a microcontroller, which requires a fundamental understanding of C programming and how a computer works. But more than that, embedded systems typically interact with the world in some way, and so you will also need an understanding of how to interface with sensors and actuators and how to communicate with other devices.

The course offers you with opportunities to learn synchronously and in-person through lectures and labs. All lectures and labs start at 10 minutes past the hour of the time and location specified on ACORN. The rest of this section gives more information about lectures, labs, and assessment. To learn more about our course policies, see Section 2.

1.1 Communication

All course announcements are posted on Quercus. You are responsible for reading all announcements made by the teaching team in a timely manner. We highly recommend enablin notifications for Quercus announcements.

If you have a question that is only useful to you, or something pertaining to your specific grade, like due date accommodations, please use csc385-2025-05@cs.toronto.edu and ensure that you share your UTORid in the body of your message. We recommend reviewing our course policies (Section 2) before sending an email.

If you have a question related to course content, please use Piazza. As a courtesy to others (and the teaching team), please search to see if your question has already been posted. This is especially true closer to deadlines, where you may find many earlier Piazza answers helpful to you.

Throughout the term, the instructor hosts in-person office hours. The time and location of office hours will vary from week to week. Details will be posted on Quercus.

1.2 Lectures

Your attendance in lectures is recommended, but not mandatory. Lecture recordings will be provided through the OCCS app, provided the lecture room is in working order.

This is not a guarantee, and you should not rely on recordings in case they are not available (e.g., due to technical issues). You may access these

recordings through the "OCCS Student App"; you can find a link to this app on the left panel of the quercus website. Please see Section 2.4.1 for our policy on lecture recordings.

1.3 Lab info

This is a lab-based course, and your attendance in the labs is mandatory (). The lab sessions give you time to explore the functionality and features of a Discovery Board. After the lab session, you complete a lab report assessing your understanding of course concepts. Because labs are active in nature (i.e., you are working on a problem), recordings are not be available (and would likely not be very useful).

Labs are held most Wednesdays from 6-8pm in BA1240, as well as online over Zoom. One TA will be available in Bahen, and one over Zoom. TAs will alternate according to their schedules.

1.4 Office Hours

There will be a series of both instructor, as well as TA office hours before the midterm test and final examination. They will be held virtually on zoom.

1.5 Textbook and references

Embedded systems is an incredibly broad field. Depending on the situation, you will find different texts and references useful. On Quercus, we will include links to important reference documentation. And since we use an Arm processor, you may find the following textbook (available through our library), useful:

Yiu, Joseph. The Definitive Guide to ARM Cortex-M3 and Cortex-M4 Processors. Newnes, 2013.

Parts of the course are, and will be derived from the following reference, but it is not mandatory (available online):

Lee, E. A., & Seshia, S. A. (2016). Introduction to Embedded Systems, Second Edition: A Cyber-Physical Systems Approach. The MIT Press.

1.6 Assesment

You are assessed both on your understanding of embedded systems concepts and their implementation. Assessments include: labs, a project, a midterm, and a final exam. The marking scheme is summarised in Table 1. For our policy on late submissions, please see Section 2.3.1.

Table 1: Primary grade breakdown

Item	Count	Total Weight
Labs	5	25%
Project	1	25%
Midterm	1	20%
Final Examination	1	30%

1.6.1 Labs

There are a total of 5 graded labs (see Table 2) that you complete alone or in pairs by programming a discovery board. After the lab, you complete a lab report and submit your final code to MarkUs before 5:00 PM on the due date.

Table 2: The lab schedule.

Lab	Lab Session(s)	Due on MarkUs	Weight
Lab 1	*<2025-05-14 Wed>*	*<2025-05-23 Fri>*	5%
Lab 1	*<2025-05-21 Wed>*	*<2025-05-23 Fri>*	5%
Lab 2	*<2025-05-28 Wed>*	*<2025-05-30 Fri>*	5%
Lab 3	*<2025-06-04 Wed>*	*<2025-06-06 Fri>*	5%
Lab 4	*<2025-06-11 Wed>*	*<2025-06-13 Fri>*	5%
Lab 5	*<2025-07-02 Wed>*	*<2025-07-04 Fri>*	5%

1.6.2 Project

You complete an open-ended project using the discovery board in groups of 2 to 4 students. But please note that your individual contributions to the project are being assessed. That is, you may not receive the same grade as other members of your group.

Table 3 provides an overview of expected deliverables for your project. Your group begins by submitting a project proposal, which the teaching

team will provide feedback and guidance on. As you progress through the weeks, you demonstrate your progress during the lab session through three milestones. This includes a submission of status reports and code via MarkUs before the lab begins (6:00 PM). Finally, you present your project on August 12th or 13th (we will try to book a time that suits the group members). However, you must submit your slides and all project files by Monday, August 11th by 11:59 PM.

Table 3: The project schedule.

Milestone	Exp. Demo Date	MarkUs Submission	Weight
Proposal	N/A	*<2025-06-27 Fri>*	5%
Milestone 1	*<2025-07-09 Wed>*	*<2025-07-09 Wed>*	3%
Milestone 2	*<2025-07-16 Wed>*	*<2025-07-16 Wed>*	3%
Milestone 3	*<2025-07-30 Wed>*	*<2025-07-30 Wed>*	3%
Presentation	August 12th or 13th	*<2025-08-11 Mon>*	11%

1.6.3 Midterm Examination

A midterm examination will be held during the June examination period, the room and time are still TBD. The location of the midterm, and additional instructions, will be announced on Quercus closer to the date.

1.6.4 Final Examination

A three-hour final examination will be scheduled by the Faculty of Arts and Science during the final assessment period.

2 Course Policies

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. The University of Toronto does not condone discrimination or harassment against any persons or communities. In the rest of this section, we detail our course policies related to academic integrity, accommodations, and intellectual property.

2.1 Academic integrity

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources (for example, the University of Toronto website on Academic Integrity).

All code you submit must be written by yourself. Submitting code you find elsewhere, either via the internet or generated through AI (e.g., ChatGPT, Github Co-pilot) is strictly forbidden. Here are a few guidelines to help you maintain academic integrity:

Any sized snippet of code used from the web (without attribution) is considered an academic offense. In this course, I want to encourage accurate and consistent citation of libraries or the specific and intentional prompting of AI/deep-learning driven coding assistants. As the university continues to acclimate to this new reality, I encourage you to save any high-level prompts, as well as dialogue transcripts you used to generate your code as well noting with in-line comments whenever an IDE-bound autocomplete system (e.g. co-pilot) did more than complete a line or two of code as you otherwise **intended** to write it, thus there will be evidence to point to if the current cheating tools are confused by these consistently changing systems. It will not be sufficient to simply say "copilot did that, not me" in an academic offense interview, if you have no logs or comments indicating specifically where and how.

Specific prompting above means, not simply putting the entire assignment instructions into a tool like ChatGPT, but somehow directing the design of specific functions, refactoring, or code skeletons.

This being said, I strongly do not recommend the use of any AI coding tools for the first several labs. The purpose of these are not to totally stump you, but to start getting you familiar with a new set of tools. As such, it is in your interest to complete these assignments on your own and start feeling comfortable. Without doing so, the rest of the course will be extremely difficult, and you'll end up suffering for it in the long run.

2.2 Grading Errors

If you believe there is a mistake in your grade, you can email us for clarification (csc385-2025-05@cs.toronto.edu) within two weeks of the grade being

released to you. Your email should clearly and concisely describe why you believe your assessment was incorrectly graded. Please note that your inquiry may increase the original grade, leave it as is, or decrease the original grade, depending on the grading error or errors found.

2.3 Accommodations

In this section, we describe accommodations that may be available to you and situationswhere you may request special consideration from us or the university. We also recommend you review the Faculty of Arts and Science policy on student absences, especially if you are experiencing an emergency that impacts multiple courses. In these cases, you should also contact your College Registrar for academic and/or personal advising.

2.3.1 Grace credits

We recognize that unexpected problems sometimes make it difficult to submit a lab or project milestone on time. For this reason, we use grace credits to give you flexibility with these deadlines. Each student will receive 24 grace credits; each grace credit can be used for a four-hour extension.

You can only extend a lab or project milestone deadline up to a maximum of 24 hours (i.e., 6 grace credits). You cannot extend the deadline of the project proposal or final project submission (i.e., code, slide deck). Grace credits serve both the role of allowing you some flexibility in how you plan your time, as well as an automatic cushion for when small things just go wrong. But once your credits have been exhausted, late submissions will not be accepted. If you encounter an emergency (e.g., medical) during the term, please see Section 2.3.4.

2.3.2 Tests and exams

If you require accommodations to write the midterm, these accommodations are handled by Accommodated Testing Services. These types of accommodations include, but are not limited to, additional writing time and/or alternate print formats. If, however, you miss (or will miss) the midterm, please see Section 2.3.4. Please note that accommodations for final exams are handled by your registrar.

2.3.3 Disabilities

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs. Students with diverse learning styles and needs are welcome in this course.

If you have a disability that may require accommodations, please contact the Accessibility Services on the St. George campus office as soon as possible. If you are registered with accessibility services, please let us know by emailing us your Letter of Academic Accommodation (csc385-2024-01@cs.toronto.edu). Alternatively, you may ask the accessibility office to send the letter. When you are in need of special consideration, please follow the process outlined in Section 2.3.4.

2.3.4 Emergencies

Students experiencing illness or other emergencies that prevent them from being able to complete homework on time, attend a lab, or write the midterm, can apply for special consideration. You will be required to affirm that you are abiding by the Code of Behaviour on Academic Matters, in particular, to be aware that it is an offence:

> to engage in any form of cheating, academic dishonesty or misconduct, fraud or misrepresentation not herein otherwise described, in order to obtain academic credit or other academic advantage of any kind

That is, you must be truly experiencing an emergency, and acknowledge that to falsely claim so is an academic offence. Applying does not guarantee that you will be granted special consideration. To apply for special consideration, please see the Syllabus page on the Quercus course website.

Submit your request soon as possible if you find yourself in such a situation. It is easier to resolve situations earlier rather than later. If your emergency will affect your ability to complete coursework for more than a few days, or in multiple courses, we recommend you also talk to your registrar.

2.3.5 Religious observances

The University provides reasonable accommodation of the needs of students who observe religious holy days other than those already accommodated by ordinary scheduling and statutory holidays. Students have a responsibility to alert members of the teaching staff in a timely fashion to upcoming religious observances and anticipated absences. Please reach out to us at least two weeks before the due date to communicate any anticipated absences related to religious observances and to discuss any possible related implications for course work.

2.4 Copyright

Course materials prepared by the instructor are considered by the University to be an instructor's intellectual property covered by the Copyright Act, RSC 1985, c C-42. These materials are made available to you for your personal, and cannot be shared outside of the class or published (made publicly available) in any way. Posting course materials or any recordings you may make to other websites without the express permission of the instructor will constitute copyright infringement. This notice applies to all course materials, including (but not limited to): course notes, lecture slides, lecture recordings, lecture and lab handouts, sample solutions, and assessment handouts, starter files, and solutions.

2.4.1 Lecture recordings

This course, including your participation, may be recorded on video and made available to students in the course for viewing remotely after each session. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. In this course, you are permitted to access web recordigns for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about the recording and use of videos in which you appear, please contact us.

2.4.2 Your course work

Solution code to the course labs may not be shared outside of your working group of 1 or 2. Do not publish solutions publicly online. You may publish your **final project** publicly, but it **may not** reference CSC385, and you may

not share your solution with any CSC385 students, current or future. This policy is to both protect the intellectual property of course staff and to protect you from committing acts of academic dishonesty. For more information on this topic, see the Department of Computer Science website.