Course Outline

COMP 4900A for Fall 2022
Real-time Operating Systems

Course Information
Instructor: Ahmad Traboulsi
Contact: ahmadtraboulsi@cunet.carleton.ca
Classroom: Room location is posted on the public class schedule
Lectures: Tuesdays & Thursdays (online – [Asynchronous delivery](#))

Teaching Assistants
A list of teaching assistants and their contact/office hours information will be posted once the course starts.

Course Calendar Description
This course covers the basics of Real-Time Operating Systems (RTOS). The course focuses on the primary principles of RTOS. Topics include RTOS architecture, inter process communication, determinism, real-time scheduling, interrupt latency, fast context switching, time and space partitioning in hard real-time environments.
Lectures: 1.25 hours twice a week.

Prerequisites
COMP 3000 or equivalent

Topics Covered

Week	Dates	Topics
1, 2 & 3	Sep. 8, 13, 15, 20	• Real-time Operating Systems Overview • Compiling and Debugging Basics (QNX Neutrino) • RTOS Architecture • Processes & Threads
3, 4, 5 & 6	Sep. 22, 27, 28 Oct 4, 6, 11, 13, 18, 20	• Project requirements document and topics • Mutual Exclusion • Scheduling • Inter-process communication
Fall Break (Oct. 25 -27)	
8	Nov. 1, 3	• Project Proposal Presentations • Time and Tick
9	Nov. 8, 10	• Memory usage and management
10	Nov. 15 & 17	• Intro to h/w programming
11 & 12	Nov. 22, 24, 29, Dec 1, 6	• Resource Manager • Multiprocessor systems
13	Dec. 8	Project Demo
	Dec. 9	Project Report

Textbooks and Other Resources

Real-time Operating Systems Book 1 – The theory (Jim Cooling)

QNX Guides (7.1)
https://www.qnx.com/developers/docs/7.1/#com.qnx.doc.qnxsdp.nav/topic/bookset.html

Assessment Scheme

Component	Weight	Due Date
Exercises	40	TBD
Project proposal presentation	5	**Nov. 1**
Project demo	5	**Dec 8**
Project report	50	**Dec 9**

There will be 8 to 10 assignments. Total assignments will be worth 40 of your total mark. For any discrepancies or questions, first contact the TA.
Assignments should be submitted as a typed pdf or word file.

Class Schedule

Asynchronous delivery
Office hours: By Appointment only

Undergraduate Academic Advisor

The Undergraduate Advisor for the School of Computer Science is available in Room 5302C HP; by telephone at 520-2600, ext. 4364; or by email at undergraduate_advisor@scs.carleton.ca. The undergraduate advisor can assist with information about prerequisites and preclusions, course substitutions/equivalencies, understanding your academic audit and the remaining requirements for graduation. The undergraduate advisor will also refer students to appropriate resources such as the Science Student Success Centre, Learning Support Services and Writing Tutorial Services.

SCS Computer Laboratory

SCS students can access one of the designated labs for your course. The lab schedule can be found at: https://carleton.ca/scs/tech-support/computer-laboratories/. All SCS computer lab and technical support information can be found at: https://carleton.ca/scs/technical-support/. Technical support is available in room HP5161 Monday to Friday from 9:00 until 17:00 or by emailing support@scs.carleton.ca.

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University Policies

For information about Carleton's academic year, including registration and withdrawal dates, see [Carleton's Academic Calendar.](#)

Pregnancy Obligation. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit [Religious/Spiritual Observances | Equity and Inclusive Communities (carleton.ca)](#)

Religious Obligation. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit [Equity Services](#).

Academic Accommodations for Students with Disabilities If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. For more details, visit the [Paul Menton Centre website.](#)

Survivors of Sexual Violence. As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: https://carleton.ca/sexual-violence-support/

Accommodation for Student Activities. Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see the policy.

Student Academic Integrity Policy. Every student should be familiar with the Carleton University student academic integrity policy. A student found in violation of academic integrity standards may be awarded penalties which range from a reprimand to receiving a grade of F in the course or even being expelled from the program or University. Examples of punishable offences include: plagiarism and unauthorized co-operation or collaboration. Information on this policy may be found here.

Plagiarism. As defined by Senate, "plagiarism is presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own". Such reported offences will be reviewed by the office of the Dean of Science.

Unauthorized Co-operation or Collaboration. Senate policy states that "to ensure fairness and equity in assessment of term work, students shall not co-operate or collaborate in the completion of an academic assignment, in whole or in part, when the instructor has indicated that the assignment is to be completed on an individual basis". Please refer to the course outline statement or the instructor concerning this issue.

Special Information

It is important to remember that COVID is still present in Ottawa. The situation can change at any time and the risks of new variants and outbreaks are very real. There are number of actions you can take to lower your risk and the risk you pose to those around you including being vaccinated, wearing a mask, staying home when you're sick, washing your hands and maintaining proper respiratory and cough etiquette.

Feeling sick? Remaining vigilant and not attending work or school when sick or with symptoms is critically important. If you feel ill or exhibit COVID-19 symptoms do not come to class or campus. If you feel ill or exhibit symptoms while on campus or in class, please leave campus immediately. In all situations, you must follow Carleton's symptom reporting protocols.

Masks: Carleton has paused the COVID-19 Mask policy, but continues to strongly recommend

masking when indoors, particularly if physical distancing cannot be maintained. It may become necessary to quickly reinstate the mask requirement if pandemic circumstances were to change.

Vaccines: While proof of vaccination is no longer required as of May 1 to attend campus or inperson activity, it may become necessary for the University to bring back proof of vaccination requirements on short notice if the situation and public health advice changes. Students are strongly encouraged to get a full course of vaccination, including booster doses as soon as they are eligible, and submit their booster dose information in cuScreen as soon as possible. Please note that Carleton cannot guarantee that it will be able to offer virtual or hybrid learning options for those who are unable to attend the campus.

All members of the Carleton community are required to follow requirements and guidelines
regarding health and safety which may change from time to time. For the most recent
information about Carleton's COVID-19 website and review the Frequently Asked Questions
(FAQs). Should you have additional questions after reviewing, please contact convidinfo@carleton.ca