COURSE SYLLABUS

COURSE TITLE:	MENG 283 – Control Systems
CLASS SECTION:	01ABC
TERM:	2022F
COURSE CREDITS:	3
DELIVERY METHOD(S):	Lecture, Lab

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̱SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.
Learn more about Camosun's Territorial Acknowledgement.

The COVID-19 pandemic has presented many challenges, and Camosun College is committed to helping you safely complete your education. Following guidelines from the Provincial Health Officer, WorkSafe BC, and the B.C. Government to ensure the health and wellbeing of students and employees, Camosun College is providing you with every possible protection to keep you safe. Our measures include COVID Training for students and employees, health checks, infection control protocols including sanitization of spaces, PPE and ensuring physical distancing. For details on these precautions please follow this link: http://camosun.ca/covid19/faq/covid-faqs-students.html. However, if you're at all uncomfortable being on campus, please share your concerns with your Instructor. If needed, alternatives will be discussed.

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME:	Imtehaze Heerah, BEng. (Hons), MASc.
EMAIL:	heerah@camosun.ca
OFFICE:	TEC 117
HOURS:	Mondays: 9.30 am – 11.20 am
	Tuesdays: 1.30 pm – 2.20 pm
	Also, by appointment

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

Students will be introduced to the terminology, concepts, principles, procedures and computations used by engineers and technologists to analyze, select, specify, design and maintain a variety of control systems. Laboratories and assignments will consider computer, electronic, mechanical, and electro-mechanical elements and be used to construct working microcontroller-based control systems. As well, students will gain

experience using purchased industrial control modules. Computer software will be used to model and simulate the control systems. PID control modes will be detailed.

PREREQUISITE(S): MENG 181, ECET 149, MATH 193
CO-REQUISITE(S): None
EXCLUSION(S): None

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon successful completion of this course, the student should be able to:

1. Understand various fundamental types of control systems and describe how they work using block diagrams and transfer functions
2. Apply analog and digital principles to control system operation and design
3. Mathematically analyze control systems
4. Program a microcontroller to control both discrete and continuous processes
5. Understand how various types of industrial controllers operate

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

No textbook is required for this course. All necessary material will be provided in class notes and handouts on the course website.

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are **subject to change** with reasonable advance notice, as deemed appropriate by the instructor.

Lectures: M (8.30 – 9.20 am) in TEC 174, Tu (12.30 – 1.20 pm) in TEC 173
Labs (TEC 135): Grp A: Th (8.30 – 11.30 am); Grp B: M (2.30 – 5.20 pm); Grp C: Tu (9.30 am – 12.20 pm)

WEEK	DATE RANGE	ACTIVITY or TOPIC	Labs
1	Sep 06 – 09	Introduction to Control Systems	Lab Overview
2	Sep 12 – 16	Control Systems Operation Process Control Example I: Simple House Heating System	Lab 1
3	Sep 19 – 23	Process Control Example I: Simple House Heating System – Statement List Process Control Example II: Hydraulic Hoist	Lab 2
4	Sep 26 – 30	Introduction to Block Diagrams & Transfer Functions	Lab 3
5	Oct 03 – 07	Component Gain Key parts of a Process Control Block Diagram	Lab 4
6	Oct 10 – 14	**Monday Oct 10 – Thanksgiving Day (No Labs)** Block Diagram Examples (Process Control Systems)	No Labs this week
7	Oct 17 – 21	Block Diagram Simplification & Transfer Function	Lab block for Assignment 2

WEEK	DATE RANGE	ACTIVITY or TOPIC	Labs
8	Oct 24 – 28	Control System Response Criteria for Good Control Control Systems Classification	Lab 5
9	Oct 31 – Nov 04	Digital Fundamentals & Applications in Control Timing diagrams, Combinational Logic Diagram & Truth Tables	Lab 6
10	Nov 07 – 11	System Modeling and Analysis (Water Level Control System) **Term test 1**	Lab block for Assignment 3 (Maze Robot)
11	Nov 14 – 18	Development of a Simulation Spreadsheet	Lab 7
12	Nov 21 – 25	**Term test 2**	Lab 8
13	Nov 28 – Dec 02	Mass + Spring System Mass + Spring + Damper System	Final Project
14	Dec 05 – 09	Control of Continuous Processes PID (Proportional, Integral & Derivative) Controllers	Final Project
Exam Period	Dec 12 - 20	**No Final Exam for MENG 283**	

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced noticed is required. Deadlines scan be reviewed on the CAL exams page. http://camosun.ca/services/accessible-learning/exams.html

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Labs	20%
Assignments	20%
Term Test 1	10%
Term Test 2	25%
Final Project	25%
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the Grade Review and Appeals policy for more information. http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf

COURSE GUIDELINES & EXPECTATIONS

Course Material Access

- All lab handouts, course handouts and assignments will be posted on my website: https://imtehazeheerah.opened.ca/
- D2L will be used for weekly course updates and submission of lab reports and assignments.
- Students are required to refer to the course website and D2L on a regular basis for updates, course deliverables and deadlines.

Lecture Attendance

- Students are expected to attend all classes and be on time.
- Students are responsible to acquire all information given during a class missed, including notes, hand-outs, changed exam dates etc.

Lab requirements

- Students are responsible to acquire the labs kits as per the instructions on D2L.
- Lab kits need to be brought to the lab on a weekly basis.

Due Dates and Late Assignments

- Assignments & Lab reports are typically due 1 week after being assigned, unless otherwise specified.
- Once the assignments have been marked and a sample solution posted, no late submission will be accepted.
- All assignments & lab reports will need to be submitted on D2L in the appropriate folders.
- All assignments & lab reports are to be submitted prior to working on the final project.

Exam Procedures

- All exams must be written at the scheduled times with the exception of students requiring an accommodation by the Centre for Accessible Learning (CAL).
- The course schedule above shows tentative exam blocks (subject to change with reasonable advance notice).
- The use of cell phones is not allowed during any test/exam.

Study Habits

- Students should plan for approximately a 5 hr out-of-class workload for this course, every week.
- Do not hesitate to reach out to the instructor, if you need any assistance with the course. Make sure you take advantage of the office hours as well.

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit http://camosun.ca/students/.

Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc.). If you have a disability, the Centre for Accessible Learning (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started: http://camosun.ca/services/accessible-learning/

Academic Integrity

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit http://camosun.ca/learn/fees/#deadlines.

Grading Policy

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf for further details about grading.

Grade Review and Appeals

Please visit http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the "Attendance" section under "Registration Policies and Procedures" (http://camosun.ca/learn/calendar/current/procedures.html) and the Grading Policy at http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized

Violence and Misconduct Policy: http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-3703841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.