

COURSE SYLLABUS



COURSE TITLE: ELEN163 – Digital Logic Fundamentals
TERM: Summer 2023
DELIVERY METHOD(S): Hybrid (Online Lectures, In-person Lab)

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

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: Ibrahim Hazmi
EMAIL: hazmii@camosun.ca
OFFICE: TEC216

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.

COURSE LEARNING OUTCOMES / OBJECTIVES

Explain the Principles of:

- Digital Logic
- Number Systems and Codes
- Logic Gates and Boolean Algebra
- Combinational Logic and Logic Families
- Digital Arithmetic
- MSI Logic Circuits
- Flip-Flop and Sequential Logic
- Counters and Registers

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Access to D2L.

Lab components.

Textbook: **Digital Systems Principles and Applications** by Ronald J. Tocci, Neal S. Widmer and Gregory L. Moss

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

WEEK	ACTIVITY or TOPIC	OTHER NOTES
1	Introduction to Digital Systems a. Analog vs Digital b. Types of Digital Systems	Lab 1 Introduction
2	Describing Combinatorial Logic Systems a. Number Systems: Decimal, Binary, Octal and Hexadecimal b. Number Conversion: DEC \leftrightarrow BIN, DEC \leftrightarrow OCT, DEC \leftrightarrow HEX. b. Number Conversion: BIN \leftrightarrow HEX, BIN \leftrightarrow OCT. c. Binary Arithmetic - Addition, Subtraction and Multiplication	Lab 2
3	Logic Gates, Truth Tables and Boolean Algebra a. Basic Gate Operations - AND, OR, NOT b. NAND, NOR, XOR and XNOR Logic Gates c. Truth Tables, Minterms, Boolean Functions d. IEEE Symbols, Naming Gates and Gate Duality e. Truth Table vs Function Table and Boolean Theorems	Lab 3
4	Logic Families and Signals a. Digital ICs and Logic Families, introducing Digital ICs b. Voltage Levels, Variable Names, Signal Names, and Active Levels c. Providing Logic Levels with Switches d. The Logic Probe , LEDs and Hardware Example	Lab 4
5	Analysis of Combinational Logic Circuits a. Describing Logic Circuits Algebraically b. Evaluating Circuit Outputs d. Sum-of-Products vs Product-of-Sum e. K-Map: Simplification of Combinational Logic Circuits f. Use of Alternate Symbols	Lab 5
6	IC Parameters a. Current Demand b. IC Voltage and Current Parameters c. IC Specifications and Fan-Out d. Fault Finding Combinational Logic Circuits	Term Exam 1
7	Common Circuit Configurations a. Encoders / Decoders b. Multiplexers c. De-Multiplexers d. Data Bussing and Tri-State Logic	Lab 6
8	Digital Arithmetic a. Binary Arithmetic b. 2's Complement c. Binary Adders d. Binary Subtractors e. 4-Bit Variations	Lab 7

WEEK	ACTIVITY or TOPIC	OTHER NOTES
10	Sequential Logic Concepts a. Sequential Logic Definition b. Clock Signals c. One-Shots	Lab 8
11	Flip Flops a. RS Flip-Flop c. D-Type Flip-Flops d. JK Flip-Flops e. Switch Debounce f. Flip-Flop Timing Considerations g. Examples	Lab 9
12	Registers a. Data Registers and Memory b. Register Data Transfer c. Load and Circulate Operations d. IC Registers	Term Exam 2
13	Counters a. Asynchronous Counters b. Frequency Division c. Synchronous Counters d. Cascaded Counters e. Digital Counter Applications f. IC Counters	Lab 10
14	Review for Final	
		Final Exam

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 notice is required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Assignments	10%
Quizzes	10%
Labs	10%
Term Tests	30%
Final Exams	40%
TOTAL	100%

COURSE GUIDELINES & EXPECTATIONS

Students must complete and submit all lab reports by the end of the semester.

Absence from any quiz, term test, or final exam may result in a grade of zero (0%) for that assessment.

Late labs and assignments get discounted at the instructor's discretion (expect a 50% deduction).

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/>.

Support Service	Website
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.