

# COURSE SYLLABUS



**COURSE TITLE:** MATH-156: Math and Stats for Computing

**CLASS SECTION:** X01

**TERM:** Winter 2024

**COURSE CREDITS:** 3

**DELIVERY METHOD(S):** FACE-TO-FACE

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](#).

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## INSTRUCTOR DETAILS

**NAME:** Leah Howard

**EMAIL:** HowardL@camosun.ca

**OFFICE:** CBA 151, Interurban

**HOURS:** Mon and Fri 11:30-12:20; Tues and Thurs 11:30-1:20

**WEBSITE:** [www.leahhoward.com](http://www.leahhoward.com)

*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.*

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## CALENDAR DESCRIPTION

Restricted to students in Information and Computer Systems or Interactive Media Developer. Students will learn mathematical and statistical concepts relevant to introductory computer programming for development of programming and data interpretation skills. Students will study binary numbers, logic, Boolean algebra, sequences and series, and asymptotic (Big-O) notation, counting techniques, introductory probability, descriptive statistics, and confidence intervals.

### PREREQUISITE(S):

One of:

C in Math 12 ; C+ in Pre-calculus 11; C in MATH 097; C in MATH 107; C in MATH 115; C in MATH 139; C+ in MATH 073; C+ in MATH 077

### CO-REQUISITE(S):

Not Applicable

### EXCLUSION(S):

Not Applicable

## COURSE LEARNING OUTCOMES / OBJECTIVES

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Upon successful completion of this course a student will be able to:

1. Show fluency with the numbering systems commonly used in computer science.
  - a. Count using binary, octal, and hexadecimal bases.
  - b. Convert decimal numbers to and from binary, octal, and hexadecimal bases.
  - c. Convert real numbers between binary, octal, and hexadecimal bases.
  
2. Use correct terminology, notation, and symbolic processes in logic and Boolean algebra to facilitate proper programming skills and logical thinking.
  - a. Use truth tables to define the logical connectives “and”, “or”, and “not.”
  - b. Complete truth tables and use the laws of logic to simplify logical and Boolean expressions and prove equivalence.
  - c. Use the conditional and related logical forms to translate English expressions into logical symbols and analyze conditional and biconditional propositions.
  
3. Use sequences and series to solve applied problems used in programming.
  - a. Solve problems involving general and recursive forms for sequences, including the arithmetic and geometric cases.
  - b. Evaluate sums for arithmetic and geometric series.
  
4. Use asymptotic (Big-O) notation to describe the response of various types of computer algorithms to changes in input size.
  - a. Sketch graphs of linear, polynomial, exponential and logarithmic functions.
  - b. Rank computer algorithms for efficiency based on their Big-O complexity.
  
5. Use probability theory to solve applied problems.
  - a. Use counting techniques to solve applied problems.
  - b. Calculate probabilities using simple events, counting techniques, and the properties of probability.
  - c. Perform calculations involving the Normal distribution.
  
6. Organize, summarize, display, and interpret data in a meaningful way using descriptive statistical techniques.
  - a. Describe a data set numerically by way of the mean, median, and standard deviation.
  - b. Interpret histograms and other graphical displays of data sets.
  - c. Make predictions about the distribution of a data set using the Empirical Rule and Tchebyshev's Theorem.
  
7. Use inferential statistical techniques to make predictions about populations.
  - a. Discuss issues associated with collecting and interpreting data from sample surveys.
  - b. For large samples, calculate and interpret confidence intervals for population means.
  - c. Determine appropriate sample sizes.
  
8. Identify and articulate issues regarding the use and misuse of statistics in society, to gain an awareness of proper uses of statistics in the workplace.

## REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

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A scientific calculator (non-programmable, non-graphing).

Suggested Homework Problems and Answers are on the course website.

An optional textbook is on the course website.

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

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

- 1.1 Decimal and Octal
- 1.2 Binary and Hexadecimal
- 1.3 Converting Non-Integer Numbers to Decimal
- 1.4 Converting from Decimal
- 1.5 Converting between Binary, Octal and Hexadecimal

- 2.1 Intro to Logic
- 2.2 Venn Diagrams
- 2.3 Logical Equivalence
- 2.4 Boolean Expressions and Gate Representations
- 2.5 Laws of Logic
- 2.6 More Laws of Logic
- 2.7 The Conditional
- 2.8 The Biconditional

- 3.1 Sequences and Series
- 3.2 Arithmetic Sequences and Series
- 3.3 Geometric Sequences and Series

- 4.1 Rates of Growth and Big O Notation
- 4.2 Factorial and Exponential Growth
- 4.3 Logarithmic Growth

- 5.1 Variables and Data
- 5.2 Describing Data with Graphs
- 5.3 Histograms
- 5.4 Misleading Graphs

- 6.1 Mean and Median
- 6.2 Measures of Spread
- 6.3 Tchebysheff and Empirical Rules
- 6.4 Measures of Relative Standing

- 7.1 Sampling Plans
- 7.2 Observational and Experimental Studies
- 7.3 Misleading Statistics

8.1 Counting Techniques  
 8.2 Classical Probability  
 8.3 Discrete Random Variables

9.1 Continuous Random Variables  
 9.2-9.4 The Normal Distribution  
 9.5 The Central Limit Theorem

10.1 Estimating with Confidence  
 10.2 Large-Sample Confidence Intervals for the Mean

SEE LAST PAGE FOR SCHEDULE

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 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
FOUR TESTS (50 minutes each) Your lowest test mark will be dropped. Your three highest test marks will be worth 19 % each.  Tentative Test Coverage: Test 1 Weeks 1-3, Test 2 Weeks 4-5, Test 3 Weeks 6 and 8-9, Test 4 Weeks 10-12	57 % total
Weekly Open-Book Quizzes (10 minutes each) End of class on Tuesdays, starting in Week 2. Covers material from the previous week. Your two lowest quiz marks will be dropped.	8 % total
FINAL EXAM Three hours long. Covers the entire course. Exam period is April 15-23.	35 %
<b>TOTAL</b>	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](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

**If you miss a test for any reason then that test will be considered your dropped test.  
 If you miss more than one test then the first missed test will be dropped and the weighting of the other missed tests will be shifted to the final exam.**

## COURSE GUIDELINES & EXPECTATIONS

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Do the suggested homework problems after we finish each section.

If you have questions: Ask me before class, after class, email me, or drop by office hours.

## SCHOOL OR DEPARTMENTAL INFORMATION

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Free math help is available in the Math Lab, TEC 142.

## STUDENT RESPONSIBILITY

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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

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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	<a href="http://camosun.ca/advising">http://camosun.ca/advising</a>
Accessible Learning	<a href="http://camosun.ca/accessible-learning">http://camosun.ca/accessible-learning</a>
Counselling	<a href="http://camosun.ca/counselling">http://camosun.ca/counselling</a>
Career Services	<a href="http://camosun.ca/coop">http://camosun.ca/coop</a>
Financial Aid and Awards	<a href="http://camosun.ca/financialaid">http://camosun.ca/financialaid</a>
Help Centres (Math/English/Science)	<a href="http://camosun.ca/help-centres">http://camosun.ca/help-centres</a>
Indigenous Student Support	<a href="http://camosun.ca/indigenous">http://camosun.ca/indigenous</a>
International Student Support	<a href="http://camosun.ca/international/">http://camosun.ca/international/</a>
Learning Skills	<a href="http://camosun.ca/learningskills">http://camosun.ca/learningskills</a>
Library	<a href="http://camosun.ca/services/library/">http://camosun.ca/services/library/</a>

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Office of Student Support	<a href="http://camosun.ca/oss">http://camosun.ca/oss</a>
Ombudsperson	<a href="http://camosun.ca/ombuds">http://camosun.ca/ombuds</a>
Registration	<a href="http://camosun.ca/registration">http://camosun.ca/registration</a>
Technology Support	<a href="http://camosun.ca/its">http://camosun.ca/its</a>
Writing Centre	<a href="http://camosun.ca/writing-centre">http://camosun.ca/writing-centre</a>

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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

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### 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](http://camosun.ca/sexual-violence). To contact the Office of Student Support: [oss@camosun.ca](mailto: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.

Math 156 Schedule, Winter 2024

WEEK	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Jan 8-12	Intro	1.1	1.1	1.2, 1.3
Jan 15-19	1.4	1.4	1.5	1.5, 2.1
Jan 22-26	2.1	2.2	2.2	2.3
Jan 29-Feb 2	2.4	2.5	<b>Test 1</b>	2.5, 2.6
Feb 5-9	2.7	2.8	3.1	3.1, 3.2
Feb 12-16	3.2	3.3	<b>Test 2</b>	3.3, 4.1
Feb 19-23	Reading Week	Reading Week	Reading Week	Reading Week
Feb 26-Mar 1	4.2	4.3	5.1	5.1, 5.2
Mar 4-8	5.3	5.4	6.1	6.1, 6.2
Mar 11-15	6.2	6.3	<b>Test 3</b>	6.3, 6.4
Mar 18-22	7.1	7.2	7.3	8.1
Mar 25-29	8.2	8.2	8.3	9.1, 9.2-9.4
Apr 1-5	Holiday	9.2-9.4	<b>Test 4</b>	9.5, 10.1
Apr 8-12	10.2	10.2	Exam Review	Exam Review

Weekly Open-Book Quiz will be at the end of class on Tuesdays, starting in Week 2.