

COURSE SYLLABUS



COURSE TITLE: STAT-254: Probability and Statistics for Engineers

CLASS SECTION: X01

TERM: Winter 2023

COURSE CREDITS: 3

DELIVERY METHOD(S): Lecture

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](#).

For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>

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: Susan Kinniburgh

EMAIL: kinniburghs@camosun.bc.ca

OFFICE: LACC 235

HOURS: Mondays 3:30-4:20, Wednesdays 12-1, Thursdays 9:30-10:20, Fridays 12-1

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

This calculus-based introductory statistics course includes counting techniques, introductory probability, Bayes' theorem, measures of central tendency and variation, expected value, discrete and continuous distributions, point and interval estimation, hypothesis testing, correlation and linear regression. Applications to engineering are included throughout the course. Only open to Engineering Bridge students.

PREREQUISITE(S):

Restricted to students in Engineering Bridge

CO-REQUISITE(S):

Not Applicable

EXCLUSION(S):

Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

Upon completion of this course students will be able to:

1. Use probability theory to solve applied problems.
 - a. Calculate probabilities using simple events, counting techniques, and the properties of probability.
 - b. Calculate conditional probabilities.
 - c. Define and identify independent events, mutually exclusive events, and complementary events.
 - d. Calculate probabilities using Bayes' Theorem.

2. Explore probability distributions of discrete and continuous random variables.
 - a. Solve problems involving probability distributions of discrete random variables including binomial, Poisson, hypergeometric, and negative binomial distributions.
 - b. Use integration to calculate the expected value and variance of continuous random variables, including the uniform and exponential distributions.
 - c. Use the Standard Normal Probability Table to solve problems involving the normal distribution.

3. Use descriptive statistical techniques to organize, summarize, and display data in a meaningful way.
 - a. Describe a data set numerically by calculating the mean, median, and sample and population 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.

4. Use inferential statistical techniques to make predictions about populations.
 - a. Discuss issues associated with collecting and interpreting data from sample surveys.
 - b. Describe the sampling distributions of the sample mean and the sample proportion using the Central Limit Theorem.
 - c. For large samples, calculate point estimates and confidence intervals for population means and proportions, and determine appropriate sample sizes.
 - d. Perform large-sample hypothesis tests for population means and differences in means and for population proportions and differences in proportions.
 - e. For small samples, calculate point estimates and t-confidence intervals and perform t-tests for the population mean.
 - f. For small samples, use the chi-square distribution to construct confidence intervals and perform hypothesis testing for the population variance.

5. For a bivariate data set, calculate and interpret the coefficients of correlation and the coefficient of determination, and determine the least squares regression line when appropriate.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

Lecture notes – available on D2L

R Manual – available on D2L

Calculator – must be non-programmable, non-graphing. I recommend the Sharp EL-531 available at the bookstore. If uncertain about the suitability of our calculator, check it with the instructor

Software – some assignments will require use of the statistical software R. It is free to download and instructions will be provided on D2L.

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.

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 1	Course Outline, Categorical and Numerical Data (Ch 1,2)	
Week 2	Numerical summaries (Ch 2), Probability (Ch 3)	
Week 3	Conditional probabilities, independence (Ch 3)	
Week 4	Discrete random variables, binomial and Poisson distribution (Ch 4) TEST 1 (CH 1,2,3)	
Week 5	Continuous random variables, Uniform and Exponential (Ch 5)	
Week 6	Normal Distribution (Ch 5), Central Limit Theorem (Ch 6)	
Week 7	READING BREAK NO CLASSES	
Week 8	Sampling Distribution of Proportions (Ch 6), Point Estimates and Proportion Interval (Ch 7)	
Week 9	Proportion Interval, Mean Interval TEST 2 (CH 4,5,6)	
Week 10	Variance Interval (Ch 7), Hypothesis testing, Proportion Test (Ch 8)	
Week 11	Single proportion, mean, variance tests (Ch 8)	
Week 12	Paired means, Two independent Means (CH 9)	
Week 13	Two proportions (Ch 9), Scatterplots, correlation (Ch 10) TEST 3 – Chapters 7,8	
Week 14	Least Squares regression, Diagnostics, review (Ch 10)	

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). <http://camosun.ca/services/accessible-learning/exams.html>

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Final Exam	40%
Online Assignments (WeBWork)	12%
R Assignments	12%
Term tests	36%
	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](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>

COURSE GUIDELINES & EXPECTATIONS

Attendance: It is important to attend lectures to get the full statistics experience. However, in case you must miss class there will be written notes posted on D2L soon after each lecture. Be sure to keep close watch on your email for notifications such as date changes or assignment availability.

Missing items: If you miss a test or assignment due to mental or physical illness, family emergency, or similar situations it is important you **notify your instructor** via email as soon as possible to discuss alternative arrangements.

Final Exam: Students are advised not to make plans for travel or employment during the final exam period as special arrangements will not be made for examinations that conflict with such plans. Students **must write the final exam in order to pass the course.**

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.