UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1994
REVISED COURSE IMPLEMENTATION DATE: September 2015
COURSE TO BE REVIEWED: (six years after UEC approval) May 2020
Course outline form version: 11/22/13

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

Note: The University reserves the right to amend course outlines as needed without notice.

Course Code and Number: STAT 270 **Number of Credits:** 4

Course Full Title: Introduction to Probability and Statistics
Course Short Title: Intro to Probability and Stats

Faculty: Faculty of Science | **Department (or program if no department):** Mathematics and Statistics

Calendar Description:

An introduction to the theory and practice of statistics for engineering and science students who have experience with calculus. Topics include descriptive statistics, probability, random variables, bionomial, hypergeometric, Poisson, uniform, normal and exponential distributions, sampling distributions, confidence intervals and hypothesis tests for means and proportions, Pearson's Chi-squared test, correlation, and linear regression.

Note: This course is offered as STAT 270 and MATH 270. Students may only take one of these for credit.

Note: Students with credit for STAT 104 or STAT 106 may subsequently take STAT 270/MATH 270, but students with credit for STAT 270/MATH 270 may not subsequently take STAT 104 or STAT 106.

Prerequisites (or NONE): One of the following: MATH 112, MATH 118, or a B or better in MATH 141.

Corequisites (if applicable, or NONE):

Equivalent Courses (cannot be taken for additional credit)
Former course code/number: **MATH 270**
Cross-listed with: **MATH 270**
Equivalent course(s):
Note: Equivalent course(s) should be included in the calendar description by way of a note that students with credit for the equivalent course(s) cannot take this course for further credit.

Transfer Credit
Transfer credit already exists: ☒ Yes ☐ No
Transfer credit requested (OReg to submit to BCCAT):
☐ Yes ☒ No (Note: If yes, fill in transfer credit form)
Resubmit revised outline for articulation: ☐ Yes ☒ No
To find out how this course transfers, see **bctransferguide.ca**.

Total Hours: 60
Typical structure of instructional hours:

Lecture hours	40
Seminars/tutorials/workshops	
Laboratory hours	20
Field experience hours	
Experiential (practicum, internship, etc.)	
Online learning activities	
Other contact hours:	
Total	**60**

Special Topics
Will the course be offered with different topics?
☐ Yes ☒ No
If yes,
Different lettered courses may be taken for credit:
☐ No ☐ Yes, repeat(s) ☐ Yes, no limit

Note: The specific topic will be recorded when offered.

Maximum enrolment (for information only): 36

Expected frequency of course offerings
(every semester, annually, etc.): Annually

Course Designer(s): Stats Committee

Department / Program Head or Director:	Cynthia Loten	**Date approved:**	November 24, 2014
Campus-Wide Consultation (CWC)		**Date of posting:**	February 13, 2015
Faculty Council approval		**Date approved:**	January 9, 2015
Dean/Associate VP:	Lucy Lee	**Date approved:**	December 19, 2015
Undergraduate Education Committee (UEC) approval		**Date of meeting:**	March 27, 2015

Learning Outcomes

Upon successful completion of this course, students will be able to:

1. Construct frequency tables and use numerical and graphical methods to explore qualitative and quantitative data;
2. Obtain measures of location, dispersion, and relative standing, and interpret;
3. Derive, manipulate and apply fundamental formulae and use in probability;
4. Calculate and use measures of location and spread for a variety of discrete and continuous random variables;
5. Identify binomial, hypergeometric, Poisson, uniform, normal and exponential random variables.
6. Solve problems by calculating binomial, hypergeometric, Poisson, uniform, normal or exponential probabilities as appropriate;
7. Identify probability models for two random variables and calculate covariance, correlation and conditional means;
8. Identify a simple random sample and use the Central Limit Theorem ~~for sampling distributions~~;
9. Construct and interpret confidence intervals for means and proportions;
10. Conduct hypotheses tests for means and proportions and interpret p-value;
11. Compare two means by constructing confidence intervals and performing test of hypotheses;
12. Use ANOVA method to test equality of several means;
13. Build simple linear regression models, use them for estimation, and perform relevant inferential procedures;
14. Use statistical software to find an initial multiple linear regression model using quantitative explanatory variables, and use the fitted model to produce estimates of the response.
15. Apply Pearson's Chi-squared test to draw inferences in appropriate categorical sampling situations.

Prior Learning Assessment and Recognition (PLAR)

☒ Yes ☐ No, PLAR cannot be awarded for this course because

Typical Instructional Methods (guest lecturers, presentations, online instruction, field trips, etc.; may vary at department's discretion)

Lectures, mixed with sessions in the computer lab. Note that statistical packages such as Minitab are used in the computer lab.

NOTE: The following sections may vary by instructor. Please see course syllabus available from the instructor.

Typical Text(s) and Resource Materials (if more space is required, download supplemental Texts and Resource Materials form)

	Author Surname, Initials	Title (article, book, journal, etc.)	Current Edition	Publisher	Year Published
1.	Devore, J	Probability and Statistics for Engineering and the Sciences	☒	Brooks/Cole	2009
2.	DeGroot and Schervish	Probability and Statistics	☒	Pearson/Prentice Hall	2005

Required Additional Supplies and Materials (Eg. Software, hardware, tools, specialized clothing)

A graphing calculator is required .

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	10%	Midterm exams:	30%	Practicum:	%
Quizzes/tests:	20%	Lab work:	%	Field experience:	%	Total:	100%

Details (if necessary): Students must acheive at least 40% on the final exam in order to receive credit for this course.

Grading system: Letter Grades: ☒ Credit/No Credit: ☐ Labs to be scheduled independent of lecture hours: Yes ☐ No ☒

Typical Course Content and Topics

- Descriptive statistics for samples and finite populations: frequency tables, histograms and other graphical representations, mean median, variance, standard deviation, and percentiles. Means and standard deviations of functions of variables.
- Probability: events, axioms, counting rules, conditional probability, independence, Bayes Theorem.
- Discrete distributions: probability mass functions mean, variance, binomial, hypergeometric and Poisson random variables. Continuous distributions: probability density functions, mean, variance, normal and exponential random variables. Joint probability distributions, covariance and correlation in terms of expectation, conditional mean, mean and variance of a linear combination of variables.
- Statistics and their distributions: the Central Limit Theorem.
- Confidence intervals and tests of hypotheses. These techniques applied to one and two populations.
- Comparison of the means of several populations the one-way ANOVA table.
  Chi-squared tests for independence
- The simple linear regression model, least squares estimation of the parameters, estimation and interpretation of the coefficients, confidence intervals and test of hypotheses for coefficients. Coefficient of correlation, coefficient of determination. Introduction to multiple linear regression using statistical software.