UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1990
REVISED COURSE IMPLEMENTATION DATE: September 2018
COURSE TO BE REVIEWED: (six years after UEC approval) January 2020
Course outline form version: 09/15/14

OFFICIAL UNDERGRADUATE COURSE OUTLINE FORM

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

Course Code and Number: STAT 106	**Number of Credits:** 4 Course credit policy (105)
Course Full Title: Statistics I **Course Short Title (if title exceeds 30 characters):**	
Faculty: Faculty of Science	**Department (or program if no department):** Mathematics and Statistics

Calendar Description:

An introduction to descriptive statistics, sampling, probability, estimation, hypothesis testing, correlation, regression, and analysis of variances, including multiple linear regression and one-way ANOVA. Facility with Grade 12 level algebra is expected, but no calculus is required.

Note: As a general rule, students with Math 11 are expected to take STAT 104, those with Math 12 are expected to take STAT 106, and those with a full year of calculus are expected to take STAT 270/MATH 270. Before registering, students should check the requirements of their program. UFV mathematics degrees require STAT 270. Students with credit for STAT 106 may subsequently take STAT 270 in order to satisfy the requirements for a math degree.

Note: Students with credit for MATH 106 or MATH/STAT 270 cannot take this course for further credit.

Prerequisites (or NONE):	One of the following: (C or better in one of Principles of Mathematics 12, Applications of Mathematics 12, Foundations of Mathematics 12, Pre-calculus 11, MATH 092, MATH 096, MATH 110, MATH 124, or MATH 140) or (C or better in both MATH 094 and MATH 095) or (Pre-calculus 12) or (a score of 17/25 or better on Part B of the MSAT together with a score of 34/50 or better on Parts A and B combined). Note: As of January 2019, prerequisites will change to: One of the following: (C or better in one of Pre-calculus 11, Applications of Mathematics 12, Principles of Mathematics 12, Pre-calculus 12, MATH 092, MATH 096, MATH 110, MATH 124, or MATH 140) or (C or better in both MATH 094 and MATH 095) or (B or better in Foundations of Mathematics 12) or (a score of 17/25 or better on Part B of the MSAT together with a score of 34/50 or better on Parts A and B combined).

Equivalent Courses (cannot be taken for additional credit)

Former course code/number: **MATH 106**

Cross-listed with:

Equivalent course(s): **STAT 104, STAT 270/MATH 270**

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 (if yes, fill in transfer credit form)

Resubmit revised outline for articulation: ☒ Yes ☐ No

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	
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

Maximum enrolment (for information only): 36

Expected frequency of course offerings (every semester, annually, every other year, etc.): Every semester

Department / Program Head or Director: Ian Affleck	**Date approved:**	September 2017
Faculty Council approval	**Date approved:**	September 8, 2017
Campus-Wide Consultation (CWC)	**Date of posting:**	October 13, 2017
Dean/Associate VP: Lucy Lee	**Date approved:**	September 8, 2017
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	October 27, 2017

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. Solve simple problems in probability requiring knowledge of conditional probability and statistical independence;
4. Solve problems regarding binomial and normal probability models; Draw random sample, with and without replacement, from a population and identify the sampling distribution of the sample mean;
5. Construct and interpret confidence intervals for means and proportions;
6. Conduct hypotheses test for means and proportions and interpret p-value;
7. Compare two means and two proportions by constructing confidence intervals and performing test of hypotheses;
8. Use ANOVA method to test equality of several means;
9. Apply Pearson's chi-square statistic to draw inferences in appropriate categorical sampling situations;
10. Apply and interpret simple and multiple linear regression models and the associated Analysis of Variance (ANOVA) tables;
11. Use categorical predictors in multiple linear regression by defining indicator (dummy) variables;
12. Use statistical software (for example Minitab) to produce graphs and perform statistical analysis.

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.

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

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

Typical Text(s) and Resource Materials

The text is chosen by a departmental curriculum committee. Recent text:

	Author (surname, initials)	Title (article, book, journal, etc.)	Current ed.	Publisher	Year
1.	McClave and Sincich	Statistics. 13th edition	☐	Prentice-Hall	
2.			☐		
3.			☐		

Required Additional Supplies and Materials (software, hardware, tools, specialized clothing, etc.)

A scientific calculator with statistical functions is required.

Typical Evaluation Methods and Weighting

Final exam:	40%	Assignments:	10%	Midterm exam:	%	Practicum:	%
Quizzes/tests:	50%	Lab work:	%	Field experience:	%	Shop work:	%
Other:	%	Other:	%	Other:	%	Total:	100%

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

Typical Course Content and Topics

1. Introduction to statistical concepts: types of statistical application, distinguishing between population and sample, types of data, and role of statistics in real world problems.
2. Descriptive statistics.
   Frequency tables, histograms, cumulative frequencies, box plot, bar graph, pie chart, etc.
   Measures of location, e.g. mean, median, mode; and scale, e.g. standard deviation, quantiles, Identifying outliers by box plot.
3. Probability: Two-way tables, Venn and tree diagrams; joint, marginal and conditional probability, Independence and dependence, Bayes' Theorem, counting rules, simple models for discrete random variables, sampling with and without replacement, expectation, mean, variance and standard deviation, the binomial distribution, the normal distribution, standardization, linear transformations, the chi-square probability distribution, random sampling, simulation, especially as applied to limit theorems, e.g. the Central Limit Theorem.
4. Inferential statistics: estimation, confidence intervals and tests of hypothesis.
   These techniques applied to proportions, rates and means for one and two populations, paired t-test.
   Pearson's chi-square statistic applied to a variety of problems, e.g. goodness-of-fit, independence in a two-way table, equality of binomial proportions, comparison of related proportions, comparison of rates.
   The Student 't' and Fisher's 'F' probability distributions.
   Comparison of the means of several populations the one-way ANOVA table
5. Finding relationship between variables: Simple and multiple linear regression, least square estimation of the parameters, estimation and interpretation of the coefficients, confidence intervals and testing hypotheses for coefficients, coefficient of correlation, coefficient of determination, using the regression model for prediction, indicator variables, stepwise regression.