UNIVERSITY OF THE FRASER VALLEY

ORIGINAL COURSE IMPLEMENTATION DATE: September 1990
REVISED COURSE IMPLEMENTATION DATE: September 2021
COURSE TO BE REVIEWED: (six years after UEC approval) October 2026
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:** 4Course 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 Mathematics 11 are prepared to take STAT 104, those with Mathematics 12 are prepared to take STAT 106, and those with a full year of calculus are prepared to take STAT 270/MATH 270. Before registering, students should check the requirements of their program. The UFV Mathematics major program requires STAT 270, while the Mathematics minor program requires STAT 106 or STAT 270.

Note: Some degree and diploma credentials may allow only one of STAT 104 or STAT 106 to count as credit towards meeting program requirements.

Prerequisites (or NONE):	One of the following: (C or better in one of Pre-calculus 11, Statistics 12, Calculus 12, 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 MATH 125 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).
Corequisites (if applicable, or NONE):	NONE

Equivalent Courses (cannot be taken for additional credit)

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

Cross-listed with:

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 (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	
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, every other year, etc.): Every semester

Department / Program Head or Director: Ian Affleck	**Date approved:**	January 2021
Faculty Council approval	**Date approved:**	January 22, 2021
Dean/Associate VP: Lucy Lee	**Date approved:**	January 22, 2021
Campus-Wide Consultation (CWC)	**Date of posting:**	February 19, 2021
Undergraduate Education Committee (UEC) approval	**Date of meeting:**	February 26, 2021

Learning Outcomes

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

1. Differentiate between the population and the sample; display variety of sampling methods targeting a population with minimal bias, for example, simple random sampling, stratified random sampling, cluster sampling, etc.
2. Construct frequency tables and use numerical and graphical methods to explore qualitative and quantitative data.
3. Obtain measures of location, dispersion, and relative standing, and interpret.
4. Solve simple problems in probability requiring knowledge of conditional probability and statistical independence.
5. Solve problems regarding binomial and normal probability models; identify the sampling distribution of the sample mean and sample proportion.
6. Construct and interpret confidence intervals for a population mean and a population proportion.
7. Conduct hypothesis test for a population mean and a population proportion and interpret p-value.
8. Compare two population means and two population proportions by constructing confidence intervals and performing test of hypothesis.
9. Use the Analysis of Variance (ANOVA) method to test equality of three or more population means.
10. Apply Pearson's chi-square statistic to draw inferences in appropriate categorical sampling situations.
11. Display and interpret simple and multiple linear regression models and the associated ANOVA tables.
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, mutually exclusive events, independence events, Bayes' Theorem, counting rules, etc.
4. Random variables: the expected value, variance and standard deviation of a general discrete random variable; illustrate that certain random events can be described by discrete (Binomial) or continuous (Uniform and Normal) distribution models and apply each to find probabilities.
5. Sampling distribution: apply the Central Limit Theorem to both the sample mean and sample proportion and determine how likely they are to fall within a given range of values.
6. Inferential statistics: estimation, confidence intervals and tests of hypothesis.
   The Z-test and Student's t-test applied to proportions and means for one and two populations.
   Pearson's chi-square statistic applied to goodness-of-fit test in a one-way table and independence test in a two-way table.
   F-test in one-way ANOVA applied to comparison of the means of several populations.
7. Finding relationship between variables: Simple and multiple linear regression, least square estimation and interpretation of the coefficients, confidence intervals and testing hypothesis for coefficients, coefficient of correlation, coefficient of determination, using the regression model for estimation, prediction and stepwise regression.