UNIVERSITY OF THE FRASER VALLEY

OFFICIAL UNDERGRADUATE COURSE OUTLINE (page 1)

COURSE IMPLEMENTATION DATE:	September 1990
COURSE REVISED IMPLEMENTATION DATE:	January 2014
COURSE TO BE REVIEWED:	January 2020
(six years after UEC approval)	*(month, year)*

OFFICIAL UNDERGRADUATE COURSE OUTLINE INFORMATION

Students are advised to keep course outlines in personal files for future use.

Shaded headings are subject to change at the discretion of the department – see course syllabus available from instructor

STAT 106	Mathematics and Statistics	4
COURSE NAME/NUMBER	FACULTY/DEPARTMENT	UFV CREDITS

Statistics I
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:
This course is an introduction to descriptive statistics, sampling, probability, estimation, hypothesis testing, correlation, regression, and analysis of variances. This course is similar to STAT 104, but includes multiple linear regression, one-way ANOVA, and a more detailed discussion of probability results. 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. While STAT 106 is not equivalent to STAT 270, students with credit for STAT 270 are not allowed to take STAT 106. Those with credit for STAT 106 may subsequently take STAT 270 in order to satisfy the requirements for a math degree. Students with credit for MATH 106 cannot take this course for further credit.

PREREQUISITES: 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 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).

COREQUISITES: None

SYNONYMOUS COURSE(S):
(a) Replaces: **MATH 106**
(b) Cross-listed with:
(c) Cannot take: **STAT 104, STAT 270/MATH 270** for further credit.

SERVICE COURSE TO: *(department/program)*
Business Administration, Biology, Chemistry, CIS, Psychology, Geography, Sociology, Sociology/Anthropology

TOTAL HOURS PER TERM: **60**

STRUCTURE OF HOURS:

Lectures:	**45**	Hrs
Seminar:		Hrs
Laboratory:	**15**	Hrs
Field experience:		Hrs
Student directed learning:		Hrs
Other (specify):		Hrs

TRAINING DAY-BASED INSTRUCTION:
Length of course:
Hours per day:

OTHER:
Maximum enrolment: **36**
Expected frequency of course offerings:
(every semester, annually, every other year, etc.)

WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only) ☒ Yes ☐ No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: ☒ Yes ☐ No

Course designer(s):	**Stats Committee**		
Department Head:	**Cynthia Loten**	Date approved:	**April 29, 2013**
Campus-Wide Consultation (CWC)		Date of meeting:	**n/a**
Curriculum Committee chair:	**David Fenske**	Date approved:	**June 21, 2013**
Dean/Associate VP:	**Lucy Lee**	Date approved:	**June 21, 2013**
Undergraduate Education Committee (UEC) approval		Date of meeting:	**September 27, 2013**

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.

METHODS: *(Guest lecturers, presentations, online instruction, field trips, etc.)*

Lectures, mixed with sessions in the computer lab.

METHODS OF OBTAINING PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

☐ Examination(s) ☐ Portfolio assessment ☐ Interview(s)

☒ Other (specify): Course Challenge; see PLAR policy (94) at http://ufv.ca/secretariat/policies/

☐ PLAR cannot be awarded for this course for the following reason(s):

TEXTBOOKS, REFERENCES, MATERIALS: *[Textbook selection varies by instructor. Examples for this course might be:]*

The text is chosen by a departmental curriculum committee. Recent text:
McClave and Sincich. Statistics. 12th edition. Prentice-Hall.

SUPPLIES / MATERIALS: A scientific calculator with statistical functions is required.

STUDENT EVALUATION: *[An example of student evaluation for this course might be:]*

Assignments and quizzes	20-30%
Mid-term examinations (2)	30-40%
Final examination	40-45%

Students must achieve at least 40% on the final exam in order to receive credit for this course.

COURSE CONTENT: *[Course content varies by instructor. An example of course content might be:]*

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