UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2 (Page 1)

COURSE IMPLEMENTATION DATE: September 1994
COURSE REVISED IMPLEMENTATION DATE: January 1995
COURSE TO BE REVIEWED: January 1999
(Four years after implementation date) (MONTH YEAR format)

OFFICIAL 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 and the material will vary - see course syllabus available from instructor

FACULTY/DEPARTMENT: **MATHEMATICS**

MATH 270		**4**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

INTRO. PROBABILITY & STATISTICS
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

An introduction to probability and statistics using calculus. Students who are comfortable with calculus (e.g. Math 112 or Math 114) are encouraged to take Math 270 as their introduction to statistics. This is the only introductory course in statistics which enables the students to become familiar with the appropriate arguments and formulas for continuous random variables; and so it is the appropriate course for mathematics, engineering and science students.

PREREQUISITES: **Math 112 or Math 114**
COREQUISITES:

SYNONYMOUS COURSE(S)
(a) Replaces: _____ *(Course #)*
(b) Cannot take: _____ *(Course #)* for further credit.

SERVICE COURSE TO:
_____ *(Department/Program)*
_____ *(Department/Program)*

TOTAL HOURS PER TERM: **75**
STRUCTURE OF HOURS:

Lectures:	**45**	Hrs
Seminar:		Hrs
Laboratory:	**30**	Hrs
Field Experience:		Hrs
Student Directed Learning:		Hrs
Other (Specify):		Hrs

TRAINING DAY-BASED INSTRUCTION
LENGTH OF COURSE: _____
HOURS PER DAY: _____

MAXIMUM ENROLLMENT: _____
EXPECTED FREQUENCY OF COURSE OFFERINGS: _____

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

AUTHORIZATION SIGNATURES:

Course Designer(s): _____ Math Curriculum Committee
Chairperson: _____ *(Curriculum Committee)*
Department Head: _____ Barry Garner
Dean: _____
PAC Approval in Principle Date:
PAC Final Approval Date: November 2, 1994

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

This course is designed to give students:
1. The basic mathematical notions and formulas pertaining to probability and statistics;
2. The essential initial data reduction stages to examine variation;
3. A first look at the rules and applications of probability;
4. An introduction to the most widely accepted and least controversial of the inference methods, that based on the likelihood.

METHODS:

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR (Please check :) ☐ Yes ☐ No

METHODS OF OBTAINING PLAR:

TEXTBOOKS, REFERENCES, MATERIALS:

[Textbook selection varies by instructor. An example of texts for this course might be:]

J.G. Kalbfleisch, Introduction to probability and statistics. Springer-Verlag.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Assignments	20%
In-class tests	40%
Final Examination	40%

COURSE CONTENT:

[Course content varies by instructor. An example of course content might be:]
Descriptive Statistics: the notion of frequency, frequency tables (f.t.), cumulative f.t., histogram, unequal class intervals, c.f. diagram, mode, modal class, median, quartiles, inter-quartile range, box plots, percentiles, percentile ranks, mean, variance, standard deviation (SD), application to grouped data, coding, standardization, use of standard normal tables. Bivariate frequency tables, conditional sample mean and SD, sample correlation, regression.

Probability: basic notions by way of finite populations, attributes and proportions, Venn diagrams, two-way tables, probability trees, addition, multiplication, independence. Applications; attribute sampling with and without replacement.

Random variables (r.vs.): probability mass, distribution and survivor functions, expectations, means, variances, SD, moments, moment generating function, quantiles. Binomial, Poisson and hypergeometric distributions.
Joint distributions: moments, covariance, correlations; multinomial distribution. Conditional r.vs., expectations. Independent Poissons conditioned on sum are multinomial. Continuous r.vs., exponential waiting time, probability distribution function, the normal distribution.

Further random variable topics: mean and variance of linear combination of r.vs. Sums of squares of standard normal variables: the chi-square distribution, mean, variance and normal approximations. Change of variable for single variable, approximate means and standard deviations. Simple random sampling, discussion and illustration of the Central Limit theorem.

Inference: the likelihood, maximum likelihood estimator (m.l.e.), discussion of the asymptotic normal distribution of the m.l.e., applications to binomial and Poisson, confidence intervals, significance tests, the P-value.

Maximum likelihood for simple normal models: with constant variance is least squares. Simple linear regression. Comparison of mean of two populations. Partitioning of the normal exponent sum of squares, estimation of the variance, the Student 't' distribution.

Compariative experiements: randomization, inference about the difference of means for paired and unpaired binary and normal observations.