UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2 (Page 1)

COURSE IMPLEMENTATION DATE: September 1994
COURSE REVISED IMPLEMENTATION DATE:
COURSE TO BE REVIEWED: September 1998
(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 330		**4**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

DESIGN OF EXPERIMENTS
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

The construction and analysis of standard experimental designs. Emphasis will be on the conduct, assumptions, implications and the rationale of particular designs; not on the finite geometry nor the combinatorics of the designs. Students will use suitable software, e.g. MINTAB, BMDP, when necessary. Students will be expected to design, conduct, analyse and report an experiment illustrating at least one of the major designs discussed during the course.

PREREQUISITES: **MATH 302**
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: J.D. Tunstall
PAC Approval in Principle Date:
PAC Final Approval Date: October 27, 1993

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

The course is designed to enable the students to:

1. Be familiar with the basic statistical designs commonly met in practice and in the literature;

2. Understand the reasoning and importance of the basic experimental maneuvers of randomization, blocking, stratification, and replication;
3. Meet the notion of random effects models for the first time;
4. Consider the effects of measurement errors in the independent variables and the notions of replicability and reliability.

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:]

TEXT: TBA

Basic References:

- Statistics for experimenters. G.E.P. Box, W.G. Hunter, J.S. Hunter (John Wiley & Son 1978)
- The design and analysis of clinical experiments. Joseph L. Fleiss (John Wiley & Son 1986)
- Analysis of repeated measures. M.J. Crowder & D.J. Hand (Chapman and Hall 1990).
- The design of experiments. D.R. Cox. (John Wiley & Sons 1957).

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Project	10%
Assignments	20%
In-class tests	30%
Final Examination	40%

COURSE CONTENT:

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

Linearity: the assumptions of a linear model, linear effects and a linear error. Randomization.

Blocking designs: matched pairs; randomized blocks; Latin Squares; block design, Youden squares.
Blocking versus covariate analysis – discussion.

Factorial designs: 2^M designs. Yates' plussing and minussing; Daniels' method of normal plotting to select contrasts of interest in saturated designs. Fractional factorial (f.f.) designs, confounding and aliasing. How to select a f.f. design; implications of the selection; replication.
Designs of Resolution R.

Plackett & Burman designs.

Response surface methods: use and estimation of local quadratic approximations, search for optimum.

Variance components: variance component models in balanced designs, construction of appropriate models, interpretation of tests, confidence intervals for fixed effects.

Cross-over designs: conditions under which they are appropriate, analysis and interpretation.

Split-plot designs: common repeated measure designs, and corresponding univariate models and analysis.

Error-in-measurement problems: replication and reliability; Cronbach's alpha; the attenuation of slope estimates.