UNIVERSITY COLLEGE of the FRASER VALLEY

COURSE IMPLEMENTATION DATE: May 1994
COURSE REVISED IMPLEMENTATION DATE: September 2006
COURSE TO BE REVIEWED: January 2009
(Four years after implementation date) (MONTH YEAR)

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: **Science, Health & Human Services / Mathematics & Statistics**

MATH 402		**3**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

Generalized Linear Models and Survival Analysis
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

The course covers the application of the methods of the linear model analysis developed in MATH 302, MATH 315, and MATH 330 to non-normal data. This includes analysis of contingency tables using log-linear models, analysis of incidence data using Poisson models, analysis of binomial data using various link functions such as logit and probit, analysis of case-control data using logistic models, analysis of matched case-control data using logistic models, analysis of matched case-control data using conditional logistic regression, and analysis of survival data by adjusting for covariates or using Cox's proportional hazard model.

PREREQUISITES: **MATH 270, MATH 302**
Effective September 2006, the prerequisites will be: MATH 302 or MATH 315, and MATH 370

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: **60**
STRUCTURE OF HOURS:

Lectures:	**30**	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: **36**
EXPECTED FREQUENCY OF COURSE OFFERINGS: **Every three to five years**

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: Gillian Mimmack *(Curriculum Committee)*
Department Head: Gillian Mimmack
Dean: Jacalyn Snodgrass
PAC Approval in Principle Date:
PAC Final Approval Date: December 10, 2004

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

The successful student will:
1. be able to demonstrate how to extend the methods of the univariate linear models to a large variety of models based on the exponential family.
2. be conversant with commonly-used applications of the generalized linear model and be able to apply them to data sets using statistical software.
3. be acquainted with the notions underlying the published analyses of incidence and survival data.

METHODS:

Lectures, class discussion, use of statistical software in computing labs.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

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

METHODS OF OBTAINING PLAR:

Course challenge. Please check online at http://www.ucfv.ca/math/challenge.htm for the departmental challenge policy.

TEXTBOOKS, REFERENCES, MATERIALS:

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

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

McCullagh, P. and Nelder, J.A. Generalized Linear Models. 2nd edition. Chapman and Hall.
Dobson, A.J. An Introduction to Generalized Linear Models. 2nd edition. Chapman and Hall.
Kalbfleisch, J.D. and Prentice, R.L. The Statistical Analysis of Failure Time Data. John Wiley.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Assignments and Projects	30%
Term Tests	30%
Final Exam	40%

A student must obtain 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. Principles of statistical modelling.
2. Exponential families of distributions and their properties.
3. Generalized linear models.
4. Maximum likelihood estimation and the Newton-Raphson method.
5. Score statistics and properties.
6. Log-likelihood ratio statistics, deviance, and goodness-of-fit test statistics.
7. Normal linear models as special cases of generalized linear models, multiple linear regression, ANOVA models, and ANCOVA models.
8. Analysis of binomial (binary) data, logistic regression, probit and complementary log-log models.
9. Analysis of nominal and ordinal data, nominal logistic regression, and ordinal logistic regression.
10. Analysis of count data, Poisson regression, and log-linear models.
11. Analysis of survival data, parametric modelling, semi-parametric modelling, and empirical survivor functions.