

COURSE IMPLEMENTATION DATE: January 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 470		3
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS
	Applied Multivariate Statistical Analysis	
COURSE DESCRIPTIVE TITLE		

CALENDAR DESCRIPTION:

This course is the extension of the linear model methods of MATH 302 and MATH 315 to the multivariate situation. The emphasis of the course is on examination of a range of widely-used multivariate statistical techniques, their relationship with familiar univariate methods and the solution to practical problems. Topics include Hotelling's T^2 , the analysis of dispersion, multivariate regression, principal components, factor analysis, canonical correlations, and discriminant analysis. Although theory is discussed, the emphasis is on applications.

PREREQUISITES: **MATH 211, MATH 221, MATH 270, MATH 302, and two additional upper-level courses.**
 (Effective September 2006, the prerequisites will be: MATH 221 and MATH 370)

COREQUISITES:

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

TOTAL HOURS PER TERM: 60	TRAINING DAY-BASED INSTRUCTION
STRUCTURE OF HOURS:	LENGTH OF COURSE: _____
Lectures: 30 Hrs	HOURS PER DAY: _____
Seminar: _____ Hrs	
Laboratory: 30 Hrs	
Field Experience: _____ Hrs	
Student Directed Learning: _____ Hrs	
Other (Specify): _____ Hrs	

MAXIMUM ENROLLMENT:	36
EXPECTED FREQUENCY OF COURSE OFFERINGS:	Every two years.
WILL TRANSFER CREDIT BE REQUESTED? (lower-level courses only)	<input type="checkbox"/> Yes <input type="checkbox"/> No
WILL TRANSFER CREDIT BE REQUESTED? (upper-level requested by department)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

AUTHORIZATION SIGNATURES:

Course Designer(s): _____ Math Curriculum Committee	Chairperson: _____ Gillian Mimmack (<i>Curriculum Committee</i>)
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. develop the basic theory for techniques used in multivariate data analysis.
2. develop the theory for multivariate linear regression, principal components analysis, factor analysis, and canonical correlation analysis.
3. use statistical software to analyze multivariate data using multivariate linear regression, principal components analysis, factor analysis, and canonical correlation analysis.

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 textbook is chosen by a departmental curriculum committee. Recent text used:
Johanson and Wichern. Applied Multivariate Statistical Analysis. Prentice Hall.

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

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

Students 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. Matrix algebra: positive definite matrices, a square-root matrix, random vectors and matrices, matrix inequalities and maximization.
2. Sample geometry and random sampling: geometry of samples, expected values and covariance matrices for populations and for samples, generalized variance.
3. Multivariate normal distributions: multivariate normal densities, sampling from multivariate normal distributions, maximum likelihood estimation, sampling distributions of the sample mean and the sample covariance matrix, assessing the assumption of normality, outliers and cleaning data, transformation to normality.
4. Inference about the mean vector: testing the plausibility of a constant vector as the mean of a multivariate normal population, Hotelling's T^2 and the likelihood ratio test, confidence regions and simultaneous comparisons of components of the mean vector.
5. Multivariate multiple linear regression: least squares estimation, inference for parameters of the model, checking the validity of the model.
6. Principal components analysis: population principal components, summarizing sample variation using principal components, large sample inference.
7. Factor analysis: the orthogonal factor model, factor estimation, factor rotation, factor scores, perspectives and strategy for factor analysis.
8. Canonical correlation analysis: canonical variates and canonical correlations, population canonical correlation and interpretation, sample canonical variates and sample canonical correlation, large sample inference.
9. Classification and clustering methods.