UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2 (Page 1)

COURSE IMPLEMENTATION DATE: May 1977
COURSE REVISED IMPLEMENTATION DATE: September 1999
COURSE TO BE REVIEWED: September 2003
(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 AND STATISTICS**

MATH 221		**3**
COURSE NAME/NUMBER	FORMER COURSE NUMBER	UCFV CREDITS

LINEAR ALGEBRA
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

This course in linear algebra offers an introduction to the strength and flexibility of mathematics. Powerful general results are derived, and can then be applied to specific problems in areas such as physics, engineering, commerce, or chemistry. At other times, the process is reversed and particular problems are used to motivate far-reaching results. Topics include linear systems, matrix algebra, vector spaces, linear transformations and diagonalization.

This course is needed by anyone pursuing a mathematics or physics degree; it is useful to anyone who enjoys thinking. Linear Algebra is also recommended to commerce students who are strong in mathematics.

PREREQUISITES: **MATH 112 with C or better, or MATH 116 with C+ or better**
COREQUISITES: **None**

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

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

TOTAL HOURS PER TERM: **60**
STRUCTURE OF HOURS:

Lectures:	**60**	Hrs
Seminar:		Hrs
Laboratory:		Hrs
Field Experience:		Hrs
Student Directed Learning:		Hrs
Other (Specify):		Hrs

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

MAXIMUM ENROLLMENT: **35**
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): D. McDowell
Chairperson: N. Weinberg *(Curriculum Committee)*
Department Head: S. Milner
Dean: W. Welsh
PAC Approval in Principle Date:
PAC Final Approval Date: December 16, 1998

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

To use the appropriate technique in solving systems of linear equations.
To learn the basic definitions of statements of major theorems.
To understand the algebraic techniques used in major proofs and to be able to prove lesser results on their own.
To develop some understanding and appreciation for the techniques used in the usefulness of studying algebraic structures.

METHODS:

Traditional lectures mixed with in-class problem sessions and longer assignments. Students' presentations.

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: Elementary Linear Algebra, 2nd Ed., Shields.
REFERENCES: Introduction to Linear Algebra, Gillett
Introduction to Linear Algebra, Lang

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Midterms	30%
Assignments	30%
Final exam	40%

COURSE CONTENT:

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

NOTE: Algebraic proofs of theorems will be included where appropriate.

I. Systems of Linear Equations, Matrices, and Vector Space:
1. Elimination method
2. Nonhomogeneous systems
3. Existence and uniqueness of solutions for homogeneous systems
4. Vector spaces
5. Matrix equations
6. Independence
7. Bases and coordinates
8. Dimension
9. Rank
10. Dot product
11. Orthogonal and orthonormal sets

II. Matrices, Transformations and Inverses:
1. Linear transformations and their matrices
2. The algebra of matrices and transformation
3. Special products

4. The inverse and its existence, uniqueness, etc.
5. Change of coordinates
6. Determinants

III. Linear Transformations and Their Representations:
1. Matrix of a transformation with respect to a given basis
2. Similar matrices
3. Characteristic vectors
4. Matrices similar to diagonal matrices
5. Symmetric matrices
6. Spectral theorem and some applications

IV. Linear Differential Operations (optional)