UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE: { May-77 **}**
COURSE REVISED IMPLEMENTATION DATE: { Sep-03 **}**
COURSE TO BE REVIEWED: { Sep-07 **}**
(FOUR (4) 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 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.

PREREQUISITES: Math 112 with C or better, or Math 116 with C+ or better

COREQUISITES:

SYNONYMOUS COURSE(S)

(a) Replaces: _____ (Course #)

(b) Cannot take: Math 152 (Course #) for further credit

SERVICE COURSE TO:

_____ (Department / Program)

_____ (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.

Combination of Lecture and Lab Hours: NO **YES/NO**

TRAINING DAY-BASED INSTRUCTION

LENGTH OF COURSE: N/A

HOURS PER DAY: N/A

MAXIMUM ENROLMENT: **36**

EXPECTED FREQUENCY OF COURSE OFFERING: Fall terms. May be offered in winter or spring term, according to demand and funding

WILL TRANSFER CREDIT BE REQUESTED?: (Lower-level courses only) **YES** X **NO** _____

WILL TRANSFER CREDIT BE REQUESTED?: (Upper-level requested by department) **YES** _____ **NO** _____

TRANSFER CREDIT EXISTS IN BCCAT TRANSFER GUIDE: **YES** X **NO** _____

AUTHORIZATION SIGNATURES:

Course designer(s): Chairperson: Susan Milner

Chairperson: Greg Schlitt

Course reviewed by: (type name in this field)

(Curriculum Committee)

Department Head: Greg Schlitt

Dean: Jackie Snodgrass

PAC Approval in Principle Date: (type date in this field)

PAC Final Approval Date: 2002 12 04

Math 221

COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

Successful students will:

Become proficient with the basic concepts and language of linear algebra, including definitions and major theorems. Basic concepts include linear systems, vector spaces, linear transformations and diagonalization.

Learn to use the appropriate technique in solving systems of linear equations

Be able to explain the algebraic techniques used in major proofs and learn to prove lesser results on their own

Learn to use technological support appropriately

Be able to use their knoweldge of theory and techniques to model and solve problems from various disciplines, and

Develop their ability to communicate their approach to and solution of such problems.

In principle, students will be able to carry out all analyses and calculations both with and without technological support.

In the process of mastering the concepts and techniques of this first course in linear algebra, the student should further develop an appreciation of the power and usefulness of mathematics.

METHODS:

Lectures are interspersed with in-class problem sessions; evaluation includes assignments, term tests and a three-hour comprehensive final exam.

Graphing calculators will be used. In addition, mathematical software will be used.

PRIOR LEARNING ASSESSMENT RECOGNITION (PLAR):

Credit can be awarded for this course through PLAR **YES X** **NO**

METHODS OF OBTAINING PLAR:

Course Challenge

TEXTBOOKS, REFERENCES, MATERIALS:

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

The textbook is chosen by department curriculum committee. Examples might be:

Fraleigh & Beauregard, Linear Algebra, 3rd edition. Addision Wesley, 1995

Lay, Linear Algebra and its Applications, 3rd edition, Addison Wesley, 2002

SUPPLIES / MATERIALS:

A graphing calculator (without a computer algebraic system) will be required

STUDENT EVALUATION:

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

The weighting of the various components may vary from instructor to instructor and from year to year, although there must be at least two term tests, and the comprehensive final exam must be worth from 30% to 50% of the final grade. A student must obtain at least 40% on the final exam to pass the course.

An Example:

Quizzes	10%
Assignments	20%
Term Tests	30%
Final Exam	40%

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

Note: Algebraic proofs of theorems will be included where appropriate, as will applications. The order of topics may vary.

1. Vectors, matrices, and linear systems
   1. vectors in Euclidean spaces; arithmetic, linear combinations, spanning
   2. norm and dot product
   3. matrix algebra, including the inverse of a matirx
   4. systems of linear equations
   5. homogeneous systems, subspaces, bases

2. Dimension, rank, and linear transformations
   1. independence and dimension
   2. rank of matirx
   3. linear transformations of Euclidean spaces

3. Vector spaces
   1. basic concepts of vector spaces (linear independence, span, dimension)
   2. coordinatization
   3. linear transformations of general vector spaces
   4. inner product spaces
   5. determinants

4. Eigenvalues
   1. eigenvalues, eigenvectors, eigenspaces
   2. diagonalisation

5. Orthogonality
   1. projections
   2. the Gram-Schimidt process

6. Change of basis
   1. coordinatization and change of basis
   2. similiarity