

UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Mathematics **IMPLEMENTATION DATE:** January 1987

Revised: December 1996

| | | |
|---------------------------------|--------------------------|---------------------|
| <u>Math 212</u> | Calculus IV | 3 |
| SUBJECT/NUMBER OF COURSE | DESCRIPTIVE TITLE | UCFV CREDITS |

CALENDAR DESCRIPTION: The topics of this course are the basic results of vector calculus. They include review of multiple integrals and jacobians, integration in vector fields, line integrals, work, circulation, flux, Green's theorem in a plane, surface area and surface integrals, the del notation, the divergence theorem, Stokes' theorem, conservative fields, and exact differential forms (as time permits).

RATIONALE:

COURSE PREREQUISITES: Math 211 with C or better

COURSE COREQUISITES: None

| | | | | | |
|--|-------------------------|-----------|------------|-------------------------|------------|
| HOURS PER TERM FOR EACH STUDENT | Lecture | 60 | hrs | Student Directed | |
| | Laboratory | | hrs | Learning | hrs |
| | Seminar | | hrs | Other - specify: | |
| | Field Experience | | hrs | | hrs |
| | | | | TOTAL | 60 |

MAXIMUM ENROLMENT: 35

Is transfer credit requested? Yes No

AUTHORIZATION SIGNATURES:

| | |
|--|---|
| Course Designer(s): <u>D. McDowell</u> | Chairperson: <u>N/A</u> Curriculum Committee |
| Department Head: <u>S. Milner</u> | Dean: <u>W. Welsh</u> |
| PAC: Approval in Principle _____ (Date) | PAC: Final Approval: <u>N/A</u> (Date) |

SYNONYMOUS COURSES:

(a) replaces

(course #)

(b) cannot take _____ for further credit

(course #)

SUPPLIES/MATERIALS:

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

Vector Calculus, Marsden & Trombda. Freeman, 2nd Ed.

OBJECTIVES:

To master the concepts and be able to apply them to specific physical problems. These concepts include parametrization of curves and surfaces, differentiation (in various forms) of vectors, integration of various vector forms along paths and surfaces, the theorem of Green, Stokes and Gauss.

METHODS:

Traditional lectures with some problem sessions.

STUDENT EVALUATION PROCEDURE:

| | |
|--------------------|--------|
| 4-6 assignments | 20-30% |
| 3-4 in-class tests | 30-40% |
| 1 final exam | 30-50% |

Math 212**NAME & NUMBER OF COURSE**

COURSE CONTENT

Sequences and Series

- standard results and applications
- proofs of mean value results and some of L'Hopitals theorems on indeterminate forms
- proofs of some properties of sequences and series
- binomial theorem

Vector valued functions]

- parametric curves, paths
- vector fields

Differential vector calculus

- grad, div, cur 1
- applications
- more properties of div, cur 1
- vector identities
- transformations and Jacobians (if not covered in Math 211)

Integral vector calculus

- path/line integrals
- applications
- parametrized surfaces
- surface integrals
- applications

Vector analysis

- theorems of Green, Stokes and Gauss in the plane and in space
- conservative fields
- applications

If time allows, more sophisticated applications and uses in the area of Physics are studied.

If time allows, an introduction to differential forms is included.