UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Mathematics **IMPLEMENTATION DATE:** Sept. 1995

Revised: _____

Mathematics 381	Mathematical Methods I	3
SUBJECT/NUMBER OF COURSE	**DESCRIPTIVE TITLE**	**UCFV CREDITS**

CALENDAR DESCRIPTION: This course covers a wide range of mathematical techniques: calculus problem - solving devices; Fourier series, Fourier integrals; the gamma, beta, and error functions; Bessel functions, Legendre, Hermite, and Laguerre polynomials, Sturm-Lioville systems; partial differential equations; and calculus of variations.

RATIONALE: This is a cross listing of Phys 381

COURSE PREREQUISITES: Math 211, 212, 213 or 310. Phys 111/112 recommended

COURSE COREQUISITES: None

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

MAXIMUM ENROLMENT: 35

Is transfer credit requested? ▪ **Yes** **9** **No**

[This course already has credit as Phys 381]

AUTHORIZATION SIGNATURES:

Course Designer(s): Tim Cooper

Chairperson: Art Last

Curriculum Committee

Department Head: Susan Milner

Dean: Wayne Welsh

PAC: Approval in Principle

(Date)

PAC: Final Approval: November 2, 1994

(Date)

OUTLN95/01/dd

SYNONYMOUS COURSES:

(a) replaces _____
(course #)

(b) cannot take PHYS 381; ENGR 257 for further credit
(course #)

SUPPLIES/MATERIALS:

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

Advanced Mathematics for Engineers and Scientists, Murray R. Spigel

Integral Equations, L.G. Chambers, International Textbook

Mathematical Physics, E. Butkov, Addison - Wesley

Mathematical Methods of Physics, J. Mathews and R.L. Walker, W.A. Benjamin Inc

OBJECTIVES:

To give students the necessary mathematical skills to tackle the most common problems they will encounter in physics.

METHODS:

Lecture, demonstration, computer simulations.

STUDENT EVALUATION PROCEDURE:

Assignments	25%
Midterm Exam	30%
Final Exam	45%

Mathematics 381 - Mathematical Methods I
NAME & NUMBER OF COURSE

COURSE CONTENT

1. A large orientation assignment will be given covering the first six chapters of the text which covers material students should know from the prerequisites for the course. Followed by review lectures if needed.

Course continues with:

2. Fourier Series

3. Fourier Integrals

4. Special Functions I (Gamma, Beta, Ei, Si, Erf)

5. Special Functions II (Bessel Functions, cylindrical & spherical; Polynomials, Legendre, Hermite & Laguerre)

6. Partial differential equations, separation of variables, Laplace Transform techniques, Sturm-Lioville systems, eigenvalues, eigenfunctions

   Complex variables, contour integrals & Cauchy's theorem, application to evaluation of integrals

   Calculus of Variations (with and without constraint)
   Discussion of minimum action principles in physics

   Integral Equations, Green Functions and Dirac delta-function techniques

   Numerical methods for quadratures and solving integral and differential equations. Richardsonian techniques will be discussed.