UNIVERSITY COLLEGE of the FRASER VALLEY

PAC FORM #2

COURSE IMPLEMENTATION DATE: { **}**
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**

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COURSE NAME/NUMBER	**FORMER COURSE NUMBER**	**UCFV CREDITS**

Ordinary Differential Equations
COURSE DESCRIPTIVE TITLE

CALENDAR DESCRIPTION:

Most mathematical models of a physical process are in the form of differential equations. This course provides various techniques and ideas in solving ordinary differential equations with an emphasis on applications. Graphing calculators and Maple are used in this course. Topics include first- and second-order linear differential equations, non-linear equations, series solutions, Laplace transform methods, and linear systems.

PREREQUISITES: Math 112 and one of: Math 152, or Math 221, or Phys 221 (Note: Math 221 or Phys 221 may be taken as a prerequisite or corequisite)

COREQUISITES: Math 211

SYNONYMOUS COURSE(S)

(a) Replaces: _____ (Course #)

(b) Cannot take: _____ (Course #) for further credit

SERVICE COURSE TO:

_____ (Department / Program)

_____ (Department / Program)

TOTAL HOURS PER TERM: 60

STRUCTURE OF HOURS:

Lectures:	55 hrs.
Seminar:	hrs.
Laboratory:	5 hrs.
Field Experience:	hrs.
Student Directed Learning:	hrs.
Other (Specify):	hrs.

Combination of Lecture and Lab Hours: Yes **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 semester

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

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

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

AUTHORIZATION SIGNATURES:

Course designer(s): David Chu

Course reviewed by: (type name in this field)

Department Head: Greg Schlitt

Chairperson: Greg Schlitt **(Curriculum Committee)**

Dean: Jackie Snodgrass

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

PAC Final Approval Date: 2002 12 04

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COURSE NAME / NUMBER

LEARNING OBJECTIVES / GOALS / OUTCOMES / LEARNING OUTCOMES:

The main objectives of this course are (i) to provide various techniques and ideas in solving ordinary differential equations and (ii) to use technology to solve mathematical models in the form of differential equations.

The successful student will be able to:

1. solve first-order linear differential equations by recognizing the equations as separable and/or exact;
2. understand and apply the Existence and Uniqueness Theorem
3. construct and solve first-order difference equations with applications;
4. solve second-order homogeneous linear equations with constant coefficients, find the fundamental solutions, test linear independence and calculate Wronskian;
5. solve second-order nonhomogeneous equations by the method of undetermined coefficients and variation of parameters;
6. derive, solve and interpret vibrational models;
7. find series solutions of second-order linear equations near an ordinary point and a regular point;
8. understand the idea of Laplace transform and apply to different elementary functions, solve differential equations involving step functions and impulse functions
9. solve homogeneous linear systems with constant coefficients;
10. formulate mathematical models and use technology to solve them.

METHODS:

Lectures and demonstration of Maple in a computer lab.

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 text is chosen by a departmental curriculum committee. The suggested texts are as follows:

1. Boyce and DiPrima, Elementary Differential Equations, 7th edition, Wiley
2. Zill, A first Course in Differential Equations with Modeling Applications, 7th edition, Brooks/Cole

SUPPLIES / MATERIALS:

STUDENT EVALUATION:

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

Assignments	15%
Quizzes	15%
Tests	30%
Final Examination	40%

Students must achieve at least 40% on the final exam in order to receive credit for this course.

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COURSE NAME / NUMBER

COURSE CONTENT:

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

Use of graphing calculator and Maple is expected.

1. Direction fields, mathematical models
2. First-order linear and non-linear differential equations, separable equations, autonomous equations, population dynamics, exact equations, integrating factors.
3. The existence and Uniqueness Theorem (without proof).
4. First-order difference equations.
5. Second-order homogeneous linear equations with constant coefficients, linear independence, Wronskian, characteristic equation.
6. Nonhomogeneous equations, method of undetermined co-efficients, variation of parameters, vibrational models.
7. Series solutions near an ordinary point and a regular singular point, Euler equations.
8. Laplace transform, step functions, discontinuous forcing functions, impulse functions.
9. Systems of first-order homogeneous linear equations with constant co-efficients, eigenvalues.