UNIVERSITY COLLEGE OF THE FRASER VALLEY

COURSE INFORMATION

DISCIPLINE/DEPARTMENT: Physics **IMPLEMENTATION DATE**: Fall 1999

Revised: _____

ENGR 255	Ordinary Differential Equations	3
SUBJECT/NUMBER OF COURSE	**DESCRIPTIVE TITLE**	**UCFV CREDITS**

CALENDAR DESCRIPTION: Most mathematical models of a system, whether from engineering, biology, physics, sociology, geography, psychology or economics, are in the form of differential equations.

This course examines some methods of solving certain types of differential equations. Applications are stressed. Topics include first- and second-order linear differential equations, linear systems, non-linear equations, series solutions, and Laplace transform methods.

RATIONALE: We find that many transfer students, in particular civil and chemical engineering students, require a second-year ODEs course for their prospective programs. Hence we have revised our current third-year course so as to make it useful and applicable for as many students as possible.

COURSE PREREQUISITES: MATH 112, or MATH 114 with at least a C+; ENGR 152 unless currently enrolled in MATH 221 or PHYS 221

COURSE COREQUISITES: MATH 211; MATH 221 or PHYS 221 unless the student already has ENGR 152.

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

MAXIMUM ENROLMENT: 35

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

AUTHORIZATION SIGNATURES:

Course Designer(s): B. Garner, L. Rive, G. McGuire

Chairperson: (E. Davis) **Arts Curriculum Committee**
(N. Weinberg) **Science Curriculum Committee**

Department Head: S. Milner

Dean: K. Wayne Welsh

PAC: Approval in Principle November 25, 1998 **(Date)**

PAC: Final Approval: December 16, 1998 **(Date)**

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ENGR 255
NAME & NUMBER OF COURSE

SYNONYMOUS COURSES:

(a) replaces _____
(course #)

(b) cannot take Math 255 for further credit
(course #)

SUPPLIES/MATERIALS:

TEXTBOOKS, REFERENCES, MATERIALS (List reading resources elsewhere)

Boyce & DiPrima, Elementary Differential Equations and Boundary Value Problems.

OBJECTIVES:

This course is designed to introduce students to basic techniques and applications of ordinary differential equations. Students will use graphing calculators and computer algebra software to solve realistic problems. The course sequence will be chosen to facilitate the concurrent teaching of Physics 221.

METHODS:

Lectures and computer labs, with considerable use of graphing calculators and mathematical software such as MAPLE.

STUDENT EVALUATION PROCEDURE:

This will vary somewhat with the instructor, but will typically be as follows:

Assignments and/or projects	20-25%
In-class tests	35-40%
Final examination	40%

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COURSE CONTENT

1.	First-order linear equations, including separable variables, exact equations, integrating factors	(1 week)
2.	Second-order linear equations, including a review of complex numbers and Euler's identity, use of the D-operator, reduction in the order of the differential equation, and variation of the parameters	(3 weeks)
3.	Linear systems of linear equations, including sinusoidal forcing terms	(2 weeks)
4.	Non-linear equations and numerical methods	(2 weeks)
5.	Series solutions and recurrence relations	(1.5 weeks)
6.	Laplace transforms	(2 weeks)