PARKLAND COLLEGE

Course Information Form (CIF)

Course Code: MAT 229 (IAI MTH 912)

Course Title: Differential Equations

Department: Mathematics
PCS Code: 1.1 - Baccalaureate/Transfer
CIP Code: 27.0103
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 3-0-3
Credit Hour Distribution:

Lecture: 3	Lab: 0	Clinical: 0	**Total: 3**

General Course Information

Catalog Description

Solution methods for first-order and higher order linear differential equations; systems of linear differential equations; Laplace transforms; numerical methods; elementary power series methods; and applications.

General Course Objectives

Students will develop proficiency with the techniques of matrix algebra and will be able to use several techniques for solving first-order and higher-order differential equations and systems of differential equations. Students will also be able to solve applications using differential equations. Graphing calculator usage is integrated throughout the course.

Minimum Placement Levels

English	Reading	Math
None	None	Credit in MAT 228 with a grade of C or higher

Prerequisites

Credit or concurrent enrollment in MAT 220 with a grade of C or higher

Methods of Evaluation

3 exams, 4-8 quizzes, homework, and a final exam.

Instructional Materials and Additional Supplies

Elementary Differential Equations, 6th Edition, by Edwards and Penney, Prentice Hall. ISBN 0-13-600613-2
Required: TI-89 graphing calculator; $160.

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
First-order Differential Equations	1. Solve separable equations. 2. Solve linear equations and initial value problems. 3. Solve homogeneous equations. 4. Solve Bernoulli equations. 5. Solve exact equations and utilize integrating factors. 6. Apply concepts in applications such as Newton's law of cooling, radioactive decay, and mixture problems. 7. Perform numerical techniques including Euler's method, improved Euler method, and the Runge-Kutta method.	13	0	0
Second-order and Higher-order Linear Differential Equations	1. Solve homogeneous linear differential equations with constant coefficients by solving the characteristic equation, using the superposition principle, and using linear operators. 2. Test the linear independence of a set of functions with a Wronskian. 3. Solve non-homogeneous constant coefficients equations by the method of undetermined coefficients and variation of parameters. 4. Solve Euler-Cauchy equations. 5. Apply second-order differential equations to model simple harmonic motion problems with and without damping, and examine forced oscillations and resonance.	11	0	0
Power Series Solutions About an Ordinary Point	1. Solve homogeneous first- and second-order linear differential equations about an ordinary point using the power series method. 2. Shift the index of summation of a power series and compute the coefficients of the series terms by iteratively applying recurrence relations.	3	0	0
Laplace Transforms	1. Use the Laplace transform. 2. With the aid of a table, find transforms of given functions, find inverse transforms of transformed functions, and solve initial value problems.	4	0	0
Linear Systems of Differential Equations	1. Convert higher-order systems to first-order systems. 2. Solve systems of first-order linear differential equations by the method of elimination and linear operators. 3. Use matrix method for solution of homogeneous linear systems with constant coefficients using eigenvalues and eigenvectors.	7	0	0
Review and Tests	1. Earn at least a 70 percent on each of three hour exams and the final exam.	7	0	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	0	0