MATH 281: DIFFERENTIAL EQUATIONS

1. Course Information

Subject
MATH - Mathematics

Course Number
281

School
Science, Technology, Engineering, Mathematics

Course Title
Differential Equations

2. Hours

Semester Hours
4

Lecture
4

Lab
0

Practicum
0

3. Catalog Description

For display in the online catalog
This course includes the following topics: modeling and solving first-order differential equations and higher-order differential equations, both linear and non-linear, solution of differential equations by power series and Laplace transforms, matrices and determinants, Fourier series, and an introduction to partial differential equations.

4. Requisites

Prerequisites
Math 266

Corequisites
None

5. Course Type

Course Fee Code
1

Course Type for Perkins Reporting
non-vocational (not approved for Perkins funding)

6. Justification

Describe the need for this course
This is a required course at most colleges and universities for mathematics and engineering majors.

7. General Education

Will the college submit this course to the statewide General Education Coordinating Committee for approval as a course, which satisfies a general education requirement?
Yes

General Education Category
Mathematics

General Education Status
Approved

8. Consistency with the Vision and Mission Statements, the Academic Master Plan, and the strategic initiatives of the College

Please describe how this course is consistent with Ocean County College's current Vision Statement, Mission Statement, Academic Master Plan, and the strategic initiatives of the College:

	Add item
1	Demonstrating the college's commitment to offer comprehensive educational programs that develop intentional learners of all ages. (Mission Statement)
2	Seeking to ensure that students will thrive in an increasingly diverse and complex world. (Vision Statement)
3	Preparing students for successful transfer to other educational institutions and/or for entrance into the workforce. (Academic Master Plan)
4	Seeking to empower students through the mastery of intellectual and Practical Skills. (Academic Master Plan)

9. Related Courses at Other Institutions

Comparable Courses at NJ Community Colleges

Institution
Brookdale CC

Course Title
Elementary Differential Equations

Course Number
Math 274

Number of Credits
4

Institution
Mercer County CC

Course Title
Differential Equations

Course Number
Math 252

Number of Credits
4

Institution
Middlesex County College

Course Title
Differential Equations

Course Number
Mat 234

Number of Credits
4

Transferability of Course

Georgian Court University

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
MA218, Differential Equations, 3 credits	Major	

Kean University

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
MATH3455, Differential Equations, 3 credits	Major	

Monmouth University

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
MA311, Differential Equations, 3 credits	Major	

Rowan University

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
MATH01231, Ordinary Differential Equations, 3 credits	Major	

Rutgers - New Brunswick, Mason Gross School of the Arts

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
01640EC, 4 credits	Elective	

Stockton University

Course Code, Title, and Credits	Transfer Catagory	If non-transferable; select status
Math free elective, 3 credits	Elective	

10. Course Learning Outcomes

Learning Outcomes

	Students who successfully complete this course will be able to:
CLO1	Apply appropriate techniques for approximating the solution to an initial-value problem for an ordinary differential equation, including the use of a power series.
CLO2	Apply appropriate techniques for solving ordinary differential equations of varying order, including those equations developed from real-world models.
CLO3	Utilize appropriate computer software, such as WinPlot, in the visualization of the solutions to an ordinary differential equation.
CLO4	Apply integral transforms, such as the Laplace and Fourier transforms, to the solving process of an ordinary or partial differential equation.
CLO5	Apply matrix methods to solving a system of linear differential equations.
CLO6	Solve problems related to the one-dimensional heat equation using separation of variables for an initial-boundary-value problem for a partial differential equation.

11. Topical Outline

(include as many themes/skills as needed)

	Major Themes/ Skills	Assignments (Recommended but not limited to)	Assessments (Recommended but not limited to)	Course Learning Outcome(s)
TO1	Differential equations of first-order	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO1, CLO2, CLO3
TO2	Applications of first-order differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO2

TO3	Homogeneous linear differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO2
TO4	Nonhomogeneous linear differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO2
TO5	Inverse differential operators	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO2
TO6	Laplace transforms	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO4
TO7	Power series solutions of differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO1
TO8	General applications of differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO2
TO9	Fourier series and simple Fourier analysis	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO4
TO10	Introduction to partial differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO6
TO11	Systems of linear differential equations	Lecture, Computer Lab Activities	Homework, Quizzes, Exams	CLO5

12. Methods of Instruction

In the structuring of this course, what major methods of instruction will be utilized?
Lecture, Class Discussion, Group Discussion, Computer Applications, Graphing calculator applications.

13. General Education Goals Addressed by this Course (this section is to fulfill state requirements)

Information

_____

Quantitative Knowledge and Skills
Yes

Related Course Learning Outcome
ALL

Related Outline Component
ALL

Assessment of General Education Goal (Recommended but not limited to)
Course Exams

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14. Needs

Instructional Materials (text etc.):
An appropriate textbook, as selected by the department

Technology Needs:
Computer software, such as Derive, Converge, and WinPlot

15. Grade Determinants

The final grade in the course will be the cumulative grade based on the following letter grades or their numerical equivalents for the course assignments and examinations

A: Excellent

B+: Very Good

B: Good

C+: Above Average

C: Average

D: Below Average

F: Failure

I: Incomplete

R: Audit

For more detailed information on the Ocean County College grading system, please see Policy #5154.

16. Board Approval

History of Board approval dates
Board of Trustees Approval Date: May 31, 2018
Board of Trustees Approval Date: September 22, 2022