

DELAWARE TECHNICAL & COMMUNITY COLLEGE
COLLEGEWIDE COURSE SYLLABUS

Campus:	Collegewide	
Department:	Mathematics/Physics Department	
Course Number and Title:	MAT 291 – Ordinary Differential Equations	
Instructor Name:	Telephone:	E-mail:
Prerequisites:	MAT 282	
Corequisites:	None	
Course Hours and Credits:	4:1:4	
Course Description:	The study of solutions of ordinary differential equations of first and second order using qualitative, numeric and analytic approaches. Mathematical modeling of real life phenomena will be studied.	
Materials:	The Mathematics/Physics Department recommends the use of a TI-83+ Graphic Calculator. Lecture demonstrations and instruction will include the use of the TI-83+. Calculators with QWERTY keyboards are inappropriate for this course and will not be permitted in test situations.	
Method of Instruction:	Lecture	
Manuals:	None	

CORE COURSE PERFORMANCE OBJECTIVES

The student will be able to:

1. Identify, determine order and linearity of ordinary differential equations (CCC 2, 6, 7)
2. Solve problems involving applications of first and second order ordinary differential equations (CCC 2, 6, 7)
3. Use numerical techniques to solve problems involving ordinary differential equations (CCC 2, 6, 7)
4. Solve problems involving both homogeneous and nonhomogeneous ordinary differential equations (CCC 2, 6, 7)
5. Use appropriate technology to solve application problems in physics (CCC,2,6,7)
6. Solve problems involving ordinary differential equations with constant coefficients (CCC 2, 6, 7)
7. Solve problems and applications involving systems of ordinary differential equations.(CCC 2, 6, 7)

MEASURABLE PERFORMANCE OBJECTIVES

- 1. Identify, determine order and linearity of ordinary differential equations (CCC 2, 6, 7)**
 - 1.1 Determine the order of a differential equation.
 - 1.2 Determine if a given function is a solution of a given differential equation.
 - 1.3 Write differential equations in standard form.
- 2. Solve problems involving applications of first and second order ordinary differential equations (CCC 2, 6, 7)**
 - 2.1 Solve differential equations using separation of variables.
 - 2.2 Solve initial-value differential equations.
 - 2.3 Solve exact differential equations using integrating factors.
 - 2.4 Solve growth and decay problems.
 - 2.5 Use matrix methods to solve differential equations.
- 3. Use numerical techniques to solve problems involving ordinary differential equations (CCC 2, 6, 7)**
 - 3.1 Solve systems of differential equations using numerical methods.
 - 3.2 Use Euler's Method to solve differential equations.
 - 3.3 Use the Runge-Kutta Method to solve differential equations.

4. **Solve problems involving both homogeneous and nonhomogeneous ordinary differential equations (CCC 2, 6, 7)**
 - 4.1 Determine if a given differential equation is homogeneous or nonhomogeneous.
 - 4.2 Use the Wronskian to determine whether a given set of functions is linearly independent or linearly dependent.

5. **Use appropriate technology to solve application problems in physics (CCC,2, 6, 7)**
 - 5.1 Use a CAS to solve falling body problems.
 - 5.2 Use a CAS to solve temperature problems.

6. **Solve problems involving ordinary differential equations with constant coefficients (CCC 2, 6, 7)**
 - 6.1 Find the general solution of a linear homogeneous equation.
 - 6.2 Find the general solution of a linear nonhomogeneous equation.

7. **Solve problems and applications involving systems of ordinary differential equations.(CCC 2, 6, 7)**
 - 7.1 Solve mechanical and electrical problems with first-order linear systems.
 - 7.2 Solve predator-prey interaction problems.

EVALUATION CRITERIA

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The grade will be determined using the College Grading System:

92 - 100	A
83 - 91	B
75 - 82	C
0 - 74	R

Students should refer to the Student Handbook for information on Academic Standing Policy, Academic Honesty Policy, Students Rights and Responsibilities and other policies relevant to their academic progress.