

DELAWARE TECHNICAL & COMMUNITY COLLEGE
COLLEGEWIDE COURSE SYLLABUS



Campus:	Terry	
Department:	Mathematics	
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.	
Required Text:	Nagle, K.; Saff, E.; and Snider, A. (2008). <u>Fundamentals of Differential Equations</u> , (7 th ed.). Reading, MA., Addison-Wesley Publishing.	
Materials:	A graphing calculator will be required	
Method of Instruction:	Lecture	
Manuals:	None	
Disclaimer:	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 inhomogeneous 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 Identify ordinary differential equations.
 - 1.2 Determine the order of an ordinary differential equation.
 - 1.3 Determine the linearity of an ordinary differential equation.
 - 1.4 Verify solutions of ordinary differential equations.
- 2. Solve problems involving applications of first and second order ordinary differential equations. (CCC 2,6,7)**
 - 2.1 Solve problems involving integration.
 - 2.2 Solve problems involving separation of variables.
 - 2.3 Solve initial-value problems.
 - 2.4 Investigate direction fields and solution curves.

- 3. Use numerical techniques to solve problems involving ordinary differential equations. (CCC 2,6,7)**
 - 3.1 Use Euler's method to solve ordinary differential equations numerically.
 - 3.2 Use Runge-Kutta method to solve ordinary differential equations numerically.
- 4. Solve problems involving both homogeneous and inhomogeneous ordinary differential equations. (CCC 2,6,7)**
 - 4.1 Investigate the solution to homogeneous ordinary differential equations using:
 - a. linear dependence/independence
 - b. Wronskian
- 5. Use appropriate technology to solve application problems in physics. (CCC,2,6,7)**
 - 5.1 Solve application problems using appropriate technology.
 - 5.2 Investigate modeling applications that involve ordinary differential equations.
 - 5.3 Solve growth and decay problems .
- 6. Solve problems involving ordinary differential equations with constant coefficients. (CCC 2,6,7)**
 - 6.1 Solve problems involving ordinary differential equations using the method of:
 - a. undetermined coefficients
 - b. variation of parameters
 - 6.2 Solve problems in physical applications such as:
 - a. simple harmonic motion
 - b. damped motion
 - c. forced motion
- 7. Solve problems and applications involving systems of ordinary differential equations.(CCC 2,6,7)**
 - 7.1 Solve problems involving differential operators.

- 7.2 Solve systems of ordinary differential equations using:
- eigenvalues and eigenvectors
 - undetermined coefficients
 - variation of parameters
 - numerical methods

EVALUATION CRITERIA

Students will demonstrate proficiency on all Measurable Performance Objectives at least to the 75% level. The final 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.

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