

NORTHWESTERN CONNECTICUT COMMUNITY COLLEGE

COURSE SYLLABUS

Course Title: Differential Equations

Course #: MAT 286

An introductory course in differential equations. Solution methods for differential equations including selected first order equations, nth-order equations, and systems of linear equations using matrix techniques, Laplace transforms, and numerical methods. Series techniques for selected linear differential equations including Bessel's equation will be considered. Computer software and/or graphing calculators will be integrated as appropriate throughout the course. Recommended for science and engineering students.

Prerequisite: C or better in Calculus III (MAT 268) or permission of the instructor.

Goals: It is the goals of the course to:

1. Solve linear first-order differential equations.
2. Solve linear second-order differential equations.
3. Solve higher-order differential equations constant coefficients.
4. Solve initial value problems using the Laplace Transform.
5. Solve application problems.

Outcomes: At the end of the course, a student should be able to:

1. Draw direction fields.
2. Use Euler's approximation method to numerically solve first-order equations.
3. Solve the following types of first-order differential equations: separable, linear, and exact.
4. Design and solve application problems involving heating and cooling, Newtonian mechanics, and electrical circuits.
5. Determine the general solution to homogeneous linear equations.
6. Solve auxiliary equations with complex roots.
7. Use the method of undetermined coefficients to solve nonhomogeneous equations.
8. Solve second-order equations using variation of parameters.
9. Describe free and forced mechanical vibrations using second-order differential equations.
10. Determine the general solution to homogeneous linear equations.
11. Solve auxiliary equations with complex roots.
12. Use the method of undetermined coefficients to solve nonhomogeneous equations.
13. Solve second-order equations using variation of parameters.
14. Describe free and forced mechanical vibrations using second-order differential equations.
15. Determine the general solution to second-order differential equation about an ordinary point.
16. Determine the general solution to second-order differential equation about a singular point.
17. Determine the Laplace Transform of a function.
18. Determine conditions for existence of the Laplace Transform.
19. Use the properties of the Laplace Transform to derive new transforms.
20. Determine the inverse Laplace Transform including the use of the method of partial fractions.
21. Solve initial value problems using Laplace Transforms.
22. Solve higher-order linear equations with constant coefficients.
23. Use the annihilator method and the method of undetermined coefficients to solve higher-order equations.

College Policies

Plagiarism: Plagiarism and Academic Dishonesty are not tolerated at Northwestern Connecticut Community College. Violators of this policy will be subject to sanctions ranging from failure of the assignment (receiving a zero), failing the course, being removed/expelled from the program and/or the College. Please refer to your “Student Handbook” under “Policy on Student Rights,” the Section entitled “Student Discipline,” or the College catalog for additional information.

Americans with Disabilities Act (ADA): The College will make reasonable accommodations for persons with documented learning, physical, or psychiatric disabilities. Students should notify Dr. Christine Woodcock, the Counselor for Students with Disabilities. She is located at Green Woods Hall, in the Center for Student Development. Her phone number is 860-738-6318 and her email is cwoodcock@nwcc.edu.

School Cancellations: If snowy or icy driving conditions cause the postponement or cancellation of classes, announcements will be made on local radio and television stations and posted on the College’s website at www.nwcc.edu. Students may also call the College directly at **(860) 738-6464** to hear a recorded message concerning any inclement weather closings. Students are urged to exercise their own judgment if road conditions in their localities are hazardous.

Use of Electronic Devices: Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.

Sexual Assault and Intimate Partner Violence Resource Team: NCCC is committed to creating a community that is safe and supportive of people of all gender and sexual identities. This pertains to the entire campus community, whether on ground or virtual, students, faculty, or staff.

Sexual assault and intimate partner violence is an affront to our national conscience, and one we cannot ignore. It is our hope that no one within our campus community will become a victim of these crimes. However, if it occurs, NCCC has created the SART Team - Sexual Assault and Intimate Partner Violence Resource Team - to meet the victim’s needs.

SART is a campus and community based team that is fully trained to provide trauma-informed compassionate service and referrals for comprehensive care. The team works in partnership with The Susan B. Anthony Project to extend services 24 hours a day, 7 days a week throughout the year.

The NCCC team members are:

Ruth Gonzalez, Ph.D.	860-738-6315	Green Woods Hall Room 207
Susan Berg	860-738-6342	Green Woods Hall Room 223
Kathleen Chapman	860-738-6344	Green Woods Hall Room 110
Michael Emanuel	860-738-6389	Founders Hall Annex Room 308
Seth Kershner	860-738-6481	Library
Jane O’Grady	860-738-6393	Founders Hall Annex Room 212
Robin Orlomski	860-738-6416	Business Office Room 201
Patricia Bouffard, Ex-Officio	860-738-6319	Founders Hall Room 103
Savannah Schmitt		Student Representative
Jacob Wujcik		Student Representative

At NCCC we care about our students, staff and faculty and their well-being. It is our intention to facilitate the resources needed to help achieve both physical and emotional health.