

Naugatuck Valley Community College
STEM Division
Science, Technology, Engineering and Mathematics

Common Course Syllabus
Differential Equations MAT*H285

COURSE TITLE: Differential Equations, MAT*H285

COURSE DESCRIPTION: Study of ordinary differential equations. Equations studied include the following: first-order linear, separable equations; exact equations; homogeneous linear equations of first or higher order with constant coefficients; auxiliary equations with complex roots; and non-homogeneous equations. Solutions of initial value problems with associated applications are studied. Techniques used include linear differential operators, the method of undetermined coefficients, variation of parameters, and Laplace transforms.

NUMBER OF CREDITS: 3 credit hours

PREREQUISITE: Grade of "C" or better in MAT* H268 (Calculus III: Multivariable).

CALCULATOR: TI-84 (Plus) or TI-83 (Plus) Graphing Calculator is required.

COURSE OBJECTIVES:

1. Develop the ability to solve equations involving derivatives and their associated functions.
2. Acquire an understanding of the use of direction fields and numerical methods in the solution of differential equations.
3. Use differential equations to solve real world problems that have been formulated as mathematical models.
4. Acquire the ability to use the Laplace Transform in the solution of differential equations.

LEARNING OUTCOMES: At the end of this course the student will be able to do the following:

- A. First-order Differential Equations —
 1. Draw direction fields.
 2. Use Euler's approximation method to numerically solve first-order equations.
 3. Solve separable first-order differential equations.
 4. Solve linear first-order differential equations.
 5. Solve exact first-order differential equations.
 6. Design and solve application problems involving heating and cooling, Newtonian mechanics, and electrical circuits.
 7. Apply the methods of Taylor and Runge-Kutta to the solution of equations.
- B. Linear Second-order Differential Equations —
 1. Determine the general solution to homogeneous linear equations.
 2. Solve auxiliary equations with complex roots.
 3. Use the method of undetermined coefficients to solve nonhomogeneous equations.
 4. Solve second-order equations using variation of parameters.
 5. Describe free and forced mechanical vibrations using second-order equations.
- C. Theory of Higher-order Linear Differential Equations —
 1. Solve higher-order linear equations with constant coefficients.
 2. Use the annihilator method and the method of undetermined coefficients to solve higher-order equations.

D. The Laplace Transform —

1. Determine the Laplace Transform of a function.
2. Determine the conditions for existence of the Laplace Transform.
3. Use the properties of the Laplace Transform to derive new transforms.
4. Determine the inverse Laplace Transform including the use of the method of partial fractional decomposition.
5. Solve initial value problems using Laplace Transforms.

GRADING SYSTEM: For the purpose of computing numerical credit point averages, grades are evaluated as follows for each semester hour of credit. Grades on exams, papers, and quizzes, will be based on this grading system.

Numeric Grade	Acceptable Letter Grade Range to be used by the instructor	Description
90 –100	A– to A	Excellent
80 – 89	B–, B, B+	Above Average
70 – 79	C–, C, C+	Average
60 – 69	D–, D, D+	Below Average
Below 60	F	Failing

CLASS CANCELLATION PROCEDURE: *If the instructor is late, the class is expected to wait 15 minutes before leaving or until informed of a cancellation by a college official. Information on weather related closings/late openings concerning Naugatuck Valley Community College can be obtained through local radio and television stations, or via the college website (<http://www.nvcc.comnet.edu>). NOTE: An alternative assignment may be given if classes are canceled due to weather.*

ACADEMIC HONESTY STATEMENT: *At NVCC we expect the highest standards of academic honesty. Academic dishonesty is prohibited in accordance with the Board of Trustee's Proscribed Conduct Policy in Section 5.2.1 of the BOT Policy Manual. This policy prohibits cheating on examinations, unauthorized collaboration on assignments, unauthorized access to examinations or course materials, plagiarism, and other proscribed activities. Plagiarism is defined as the use of another's idea(s) or phrase(s) and representing that/those idea(s) as your own, either intentionally or unintentionally. Anyone who is caught cheating on exams, plagiarizing another's work or published material will fail the course regardless of progress made in the course.*

CHILDREN ON CAMPUS: *With permission of the instructor only – Children must be attended at all times by a responsible adult. The student must notify the instructor or supervisor prior to the beginning of the class or activity that a child is present. Instructors and/or supervisors are authorized to ask the student or program participants to leave should the presence of a child be disruptive.*

CELL PHONE/PAGER USE POLICY: *Students are hereby notified that cellular phones and beepers are allowed in class only if they are turned off or turned to a silent mode. Under no circumstances are telephones to be answered in class. Students who ignore this policy may be asked to leave class. When there are extenuating circumstances that require that a student be available by phone or beeper, the student should speak to the instructor prior to class, so that together they can arrive at an agreement concerning the device.*

STUDENTS WITH SPECIAL NEEDS: *Students who may require accommodations on the basis of a learning disability are encouraged to contact the Coordinator of Learning Disabilities. Students who may require accommodations on the basis of all other disabilities should contact the Coordinator of Disability Services. After providing documentation and completing the disability disclosure process, students are then encouraged to meet with their instructor(s) to discuss the accommodations approved by the appropriate Coordinator and to complete the Accommodations Agreement form. Accommodations are not retroactive, students are therefore encouraged to meet with their instructor(s) at the beginning of each semester. Instructors, in conjunction with appropriate college personnel, will provide assistance and/or accommodations only to those students who have completed the disability disclosure and accommodations process.*