



Differential Equations MTH 267-35 (Fourteen-Week Course)

INSTRUCTOR INFORMATION

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IMPORTANT:

- The recommended browser to use with the current version of Canvas is Mozilla Firefox or Google Chrome. Other browsers are inconsistent in their performance with Canvas. When taking tests or quizzes, use a wired connection.
- Check your VCCS email regularly and respond/keep in touch with your instructor.

COURSE DESCRIPTION

Description: Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with applications, numerical methods, and Laplace Transforms.

Credits: 3
Prerequisite: MTH 264: Calculus II or equivalent with a grade of C or better.
Submissions: 1 per lesson
Assessments: 4 + Introductory Quiz
Proctored Assessments: 1
Online Activities: Required

COURSE MATERIALS

Textbooks: W. Kohler and L. Johnson, Elementary Differential Equations with Boundary Value Problems, 2nd Edition

Software: MyOpenMath Online Homework: <https://www.myopenmath.com/>
[Octave](#) (any version) or other software to carry out numerical calculations.

Calculator: You may use a calculator but you MAY NOT use any of the symbolic abilities your calculator may have. This includes but is not limited to graphing and solving of equations of any type.

Note: NRCC assumes no liability for virus, loss of data, or damage to software or computer when a student downloads software for classes.

The Student's Guide to Online Learning is available at <https://www.nr.edu/online/pdf/studentguide.pdf>.

COURSE INFORMATION

Prepared By: Pablo Chalmeta

Approved By: Mrs. Sarah Tolbert-Hurysz

I. INTRODUCTION

This is an online course designed specifically for students whose learning styles are best served by providing instructional opportunities beyond the traditional classroom setting.

Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with applications, Laplace Transforms and numerical methods.

II. COURSE OUTCOMES

Upon the successful completion of this course, the student will be able to:

- Classify a differential equation as linear or nonlinear.
- Understand and create a directional field for an arbitrary differential equation.
- Determine the order, linearity or nonlinearity, of a differential equation.
- Solve linear first order differential equations.
- Solve Separable differential equations.
- Solve applications of differential equations as applied to Newton's Law of cooling, population dynamics, mixing problems, and radioactive decay.
- Solve applications of differential equations as related to mechanical problems.
- Solve differential equations using Euler's Method.
- Solve second order linear homogeneous differential equations.
- Determine the Fundamental solution set for a linear homogeneous equation.
- Calculate the Wronskian.
- Applications of the Wronskian in differential equations.
- Solve second order linear differential equations with complex roots.
- Solve second order linear differential equations with repeated roots.
- Use the method of Reduction of order.
- Solve nonhomogeneous differential equations using the method of undetermined coefficients.
- Solve nonhomogeneous differential equations using the method of variation of parameters.
- Solve mechanical and electrical vibration problems.
- Solve differential equations involving forced vibrations.
- Solve homogeneous linear differential equations of higher order.
- Solve nonhomogeneous linear differential equations of higher order.
- Use the definition of the Laplace transform to find transforms of simple functions
- Find Laplace transforms of derivatives of functions whose transforms are known
- Find inverse Laplace transforms of various functions.
- Use Laplace transforms to solve ODEs.
- Use the Euler or tangent line method to find an approximate solution to a linear differential equation.
- Determine the errors on numerical procedures.

III. GENERAL EDUCATION STUDENT LEARNING OUTCOMES INCLUDED IN COURSE

General education at NRCC provides the educational foundation necessary to promote intellectual and personal development. Upon completing the associate degree, graduates will demonstrate competency in student learning outcomes in 1) civic engagement, 2) critical thinking, 3) professional readiness, 4) quantitative literacy, 5) scientific literacy, and 6) written communication.

This course includes the following general education student learning outcomes:

- Identify the problem or complex issue and its various parts.
- Seek and evaluate the information needed to fully understand the problem or complex issue.
- Explain numerical information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, words).
- Accurately solve mathematical problems.

IV. COURSE CONTENT

Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with applications, Laplace Transforms and numerical methods.

V. INSTRUCTIONAL PROCEDURES

The primary instruction for the course is done through online videos available through the [MyOpenMath](#) software and the textbook.

I will be holding regular office hours and, online office hours through Zoom. Everyone's schedule is different and regular office hours rarely work for most students. I am happy to meet with you almost any time but you must contact me in advance. You can schedule an appointment through [Calendly](#). The Zoom link will be in Canvas and MyOpenMath.

Students can contact their instructor through a variety of avenues: phone, voice mail, E-mail, mail, face-to-face during office hours, or by appointment.

General announcements for the course will occur on an as-needed basis. Updates to course information will be done through [MyOpenMath](#) and Canvas <https://vccs.instructure.com/>. **MAKE SURE TO TURN ON YOUR NOTIFICATIONS FOR BOTH.** Course documents are always available through the course webpage at <http://www.nr.edu/chalmeta>

VI. GRADING/EVALUATION

Introductory Quiz: The introductory quiz tests your knowledge of course policies and procedures and may be taken anywhere without a proctor. **If you do not complete the introductory quiz in the first week of class you will be withdrawn for non-participation under the Instructor Initiated Withdrawal policy.**

Quizzes: There are quizzes in the MyOpenMath software and will count for 10% of the grade. The quiz questions are very similar to the homework questions but you will not have only 2 attempts to complete them.

Homework: Giving your best effort on homework is the single best thing you can do to help your mathematics. As such, the homework submitted through the MyOpenMath software will count for a significant portion of the grade (15%). The Tutoring Connection on the main campus also has qualified tutors who can work with you on a regular basis.

Tests:

1. There will be three (3) tests administered through the [MyOpenMath](#) homework software.
2. **You must take the tests in a proctored environment such as our testing centers.**
3. You will have 90 minutes to complete the test.
4. You may use a calculator but you **MAY NOT** use any of the symbolic abilities your calculator may have. This includes but is not limited to graphing and solving of equations of any type.
5. There will be no make-up tests. Any missed test will receive the score of "0". See Final Exam below.
6. Tests may be taken early.
7. *The average on all tests will count as 55% of the course grade*

Final Exam. There will be one comprehensive final given during finals week. **The final exam must be taken in a proctored environment such as our testing centers.** The score on the final will replace the lowest test score (including any missed test) if that will improve your final average. *The final will count as at least 20% of the course grade.*

Calculator: A scientific calculator is recommended. If you own a calculator do not buy a new one. If you do not own a calculator don't spend a lot of money on one. I recommend the TI-30X IIS calculator.

The final grade for the course will be determined as follows:

Description		Grading scale	
MyOpenMath Homework	15%	90-100	A
MyOpenMath Quizzes	10%	80-89	B
Three (3) Tests (paper)	55%	70-79	C
Final Exam	20%	60-69	D
		0-59	F

NOTES on grading and tests:

- Keep in mind that you might hit a trouble spot somewhere, so you should MOVE AS FAST AS YOU COMFORTABLY CAN, BUT AS SLOWLY AS YOU NEED, in order to meet the deadlines for the tests. The tests **MUST** be taken on or before the scheduled dates; however, you are encouraged to "work ahead."
- You may not use ANY symbolic features of your calculator during tests.
- I do not curve grades. I do not "give" grades. You earn what you get, so plan to work accordingly.

VII. EMAIL POLICY

If you send me an e-mail, you **MUST** use your VCCS issued email address and include a **descriptive** subject line. Please remember to use complete sentences and follow the rules of grammar. The [Purdue OWL website \(click\)](#) has excellent information about creating a professional email. **READ IT.** I communicate through email to your NRCC issued address. I **WILL NOT** be replying to email that does not conform to these requirements. I do reply to email within 24 hours during the week. Weekends may be longer.

VIII. WITHDRAWAL POLICY

Student Initiated Withdrawal Policy

A student may drop or withdraw from a class without academic penalty during the first 60 percent of a session. For purposes of enrollment reporting, the following procedures apply:

- If a student withdraws from a class prior to the termination of the add/drop period for the session, the student will be removed from the class roll and no grade will be awarded.
- After the add/drop period, but prior to completion of 60 percent of a session, a student who withdraws from a class will be assigned a grade of "W." A grade of "W" implies that the student was making satisfactory progress in the class at the time of withdrawal, that the withdrawal was officially made before the deadline published in the college calendar, or that the student was administratively transferred to a different program.
- After that time, if a student withdraws from a class, a grade of "F" or "U" will be assigned. Exceptions to this policy may be made under documented mitigating circumstances if the student was passing the course at the last date of attendance.

A retroactive grade of "W" may be awarded only if the student would have been eligible under the previously stated policy to receive a "W" on the last date of class attendance. The last date of attendance for an online course will be the last date that work was submitted.

Late withdrawal appeals will be reviewed and a decision made by the Coordinator of Admissions and Records.

No-Show Policy

A student must either attend face-to-face courses or demonstrate participation in online courses by the last date to drop for a refund. A student who does not meet this deadline will be reported to the Admissions and Records Office and will be withdrawn as a no-show student. No refund will be applicable, and the student will not be allowed to attend/ participate in the class or submit assignments. Failure to attend or participate in a course will adversely impact a student's financial aid award.

Instructor Initiated Withdrawal

A student who adds a class or registers after the first day of class is counted absent from all class meetings missed. Each instructor is responsible for keeping a record of student attendance (face-to-face classes) or performance/participation (online classes) in each class throughout the semester.

When a student's absences equal twice the number of weekly meetings of a class (equivalent amount of time for summer session), the student may be dropped for unsatisfactory attendance in the class by the instructor.

Since attendance is not a valid measurement for online, a student may be withdrawn due to non-performance. A student should refer to his/her online course plan for the instructor's policy.

When an instructor withdraws a student for unsatisfactory attendance (face-to-face class) or non-performance (online), the last date of attendance/participation will be documented. A grade of "W" will be recorded during the first sixty percent (60%) period of a course. A student withdrawn after the sixty percent (60%) period will receive a grade of "F" or "U" except under documented mitigating circumstances when a letter of appeal has been submitted by the student. A copy of this documentation must be placed in the student's academic file.

The student will be notified of the withdrawal by the Admissions and Records Office. An appeal of reinstatement into the class may be approved only by the instructor and dean.

IX. CHEATING/PLAGIARISM POLICY

A grade of "F" will be awarded for the semester to any student caught cheating. This includes plagiarism, which is defined as "To present another's words or ideas as one's own or without attribution" (American Heritage Dictionary, 2019). Remember that plagiarism includes using words or ideas from Internet sites, as well as copying from print sources.

X. DIVERSITY STATEMENT

The NRCC community values the pluralistic nature of our society. We recognize diversity that includes, but is not limited to, race, ethnicity, religion, culture, social class, economic status, age, gender, sexual orientation, personal identity and physical or mental capability. We respect the variety of ideas, experiences and practices that such diversity entails. We commit to ensuring equal opportunity and sustaining a climate of civility for all who work or study at NRCC, or who otherwise participate in the life of the college.

XI. DISABILITY STATEMENT

If you are a student with a disability and in need of accommodations for this course, please contact the Center for Disability Services (CDS) for assistance. CDS is located within the Advising Center in Rooker Hall. For more information about disabilities services, see [Center for Disability Services Policies and Procedures](#).