The Governor's School for Science and Technology **Differential Equations**
School Year 2025-2026 **MATH 267**

Course Information

Meeting Time: This course is delivered face-to-face and meets at the Governor's School. Meeting times are listed below.

- Period 2: MTThF 8:00-8:45 AM, W 7:50-8:30 AM
- Period 8: MTThF 1:50-2:35 PM, W 1:55-2:35 PM

Credit Hours: (1 high school credit, 3 college credits) Students are required to have a graphing calculator for this course. The TI-83 or TI-83 Plus is recommended.
Prerequisite(s): MTH 263 and MTH 264 or equivalent with a grade of C or better.

Course Description: Introduces ordinary differential equations. Includes first order differential equations, second and higher order ordinary differential equations with applications and numerical methods.
The general purpose is to give the student a solid grasp of the methods of solving and applying differential equations and to prepare the student for further coursework in mathematics, engineering, computer science and the sciences.

Instructor Information
Name: Jessica Notestine
Email: jessica.notestine@nhrec.org
Office Hours: 2:35-3:00 PM
Office Location: A82 or via Zoom

Text(s) and Materials
Title: Differential Equations with Boundary-Value Problems
Authors: Dennis G. Zill, Warren S. Wright
Publisher: Brooks/Cole Cengage Learning
Edition: Eighth
Required or Recommended: Required

Course Materials: You do NOT have to purchase the textbook! You'll occasionally need a calculator in this course. I recommend a graphing calculator, but a scientific calculator will suffice. We will NOT use calculators on exams.

Course Attendance Policy: Since this is a face-to-face class, attendance is measured in the traditional way: by attending class. Regular attendance is expected.

Calendar of Course Activities: A calendar of course activities is available through Canvas. Note that the calendar is a living document and is subject to change as the class progresses.

Instructor Email Response Policy: Email from students will be returned by the instructor within 24 hours during weekdays and within 48 hours on weekends.

Communication Policies: Students are encouraged to communicate with their instructors via Canvas. When communicating outside of Canvas by email, students must use their GSST e-mail account when contacting their instructor or interacting with classmates. When communicating with instructors outside of Canvas, students should include the course and section number in text of the message. Students are responsible for checking their Canvas inbox and their GSST/VCCS e-mail account regularly, daily at a minimum.

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Course Policies

- Homework assignments will be assigned regularly. Check your course calendar.
- Quizzes will be paper and pencil based. There will be a minimum of 1 quiz per unit.
- There will be three tests per quarter (only two in the fourth quarter). There will be no retests. Students are NOT allowed to use calculators on exams.
- Labs are designed to provide hands-on activities and explorations of applications of differential equations.

Grading/Evaluation Policy: Your final course grade is determined as the weighted average of the following:

Category	**Weight**
Homework	10%
Lab	15%
Quizzes	30%
Tests	45%

The following grade average scale will be used to determine your final grade:

Percent	90-100%	80-89%	70-79%	60-69%	Below 60%
Letter Grade	A	B	C	D	F

Semester Grade = Quarter 1 (50%) + Quarter 2 (50%)

Year Grade = Semester 1 (50%) + Semester 2 (50%)

Grade Change Appeals Process

Late Work Policy: All assignments are to be turned in on time. Homework that is late loses 10% per day. Late assignments outside of the homework category will be handled by the instructor's discretion.

Make-Up/Missed Test Policy: Students are expected to take tests in class, on the specified date (exceptions made for students with accommodation letters). If there are mitigating circumstances, contact me BEFORE the test if possible and provide documentation. In general, no make-up tests will be given (an exception may be made if the circumstances warrant it and you notify me before or on the test date, and you are able to take the test within two days of the scheduled date). No make-up test will be given to any student who does not show up on the test date and has not contacted the instructor. With the instructor permission make-ups be given after the tests have been returned.

GSST Policies: Students should refer to the Student Handbook for the full list and explanation of GSST policies related to students.

Accessibility Accommodations: GSST operates in compliance with the Americans with Disabilities Act.

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Student Learning Outcomes: Upon completing the course, the student will be able to:

- First Order Differential Equations
  - Classify a differential equation as linear or nonlinear.
  - Understand and create a directional field for an arbitrary first-order differential equation.
  - Determine the order, linearity or nonlinearity, of a differential equation.
  - Solve first order linear differential equations.
  - Solve separable differential equations.
  - Solve initial value problems.
  - Solve exact differential equations.
  - Use substitution to solve differential equations.
- Numerical Approximations
  - Use the Euler or tangent line method to find an approximate solution to a linear differential equation.
- Higher Order Differential Equations
  - Solve second order homogeneous linear differential equations with constant coefficients including those with complex roots and real roots.
  - Determine the Fundamental solution set for a linear homogeneous equation.
  - Calculate the Wronskian.
  - 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.
- Applications of Differential Equations, Springs-Mass-Damper, Electrical Circuits, Mixing Problems
  - Solve applications of differential equations as applied to Newton's Law of cooling, population dynamics, mixing problems, and radioactive decay. (1st order)
  - Solve springs-mass-damper, electrical circuits, and/or mixing problems (2nd order)
  - Solve application problems involving external inputs (nonhomogeneous problems).
- Series Solutions of Linear Equations
  - Derive a power series solution to a first-order linear differential equation.
  - Use power series to write a series solutions for a second order differential equation.
- Laplace Transforms
  - 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.
- Systems of Linear First-Order DEs
  - Solve systems of linear equations by elimination.
  - Solve systems of linear equations utilizing the Laplace transform.
  - Utilize eigenvalues and eigenvectors to solve linear systems of first-order DEs.

Academic Honesty: All students are required to take responsibility for upholding everyone's honesty in the classroom. All students will sign a copy of the GSST Honor Pledge during the first week of school.

The Pledge: "I pledge to support the Governor's School for Science and Technology (GSST) Code for Academic Work. I will refrain from any dishonesty or deception, such as cheating or plagiarizing, which are honor code violations, on any and all academic work. I am further aware that as a member of the academic community, I should report any suspected violations to an instructor."

No form of cheating, copying, or plagiarizing will be tolerated. Homework and class assignments are independent work and should not be copied from any source, including AI sources, such as ChatGPT. Students may share lab data collected by members of their group, however lab reports and all other written assignments are to be done independently unless the assignment clearly states that it is group work. The level of collaboration allowed between students will be indicated on each assignment. In addition, students will read and sign the Appropriate Collaboration form to clarify types of assistance that are encouraged vs. not tolerated in this course.

In the case of copying, there will be **no determination of who copied from whom; all students involved will receive no credit for the assignment and the students involved may be referred to the GSST administration for disciplinary action. Detection of AI generated responses will result in no credit for the assignment and a parent conference will be scheduled**. Regarding tests and quizzes, if students share information during an assessment or look at notes, internet sources, or other materials during the assessment, all students involved will receive no credit for the assessment and the students will be referred to the school's administration for disciplinary action.

To avoid plagiarism, all research sources must be cited properly to give the author(s) credit. In addition, **such information will be summarized or paraphrased, never just copied from its source.**

The goal of the Governor's School is not only to help students to gain acceptance to top colleges and access learning and career opportunities, but to thrive and excel once they have gained that entry. To this end, we take the academic integrity of each of our students very seriously.

Technology Policy: Students in all modalities (face-to-face, hybrid, and online) will need access to a desktop or laptop computer and an internet connection suitable for using Canvas and other online resources necessary for success in their courses. Students who experience unexpected outages or other technology issues should contact their instructor as soon as possible. If email is unavailable, students should use other communication methods, such as the instructor's phone number.

Inclement Weather Policy: In the event of inclement weather, the GSST provides delay and cancellation information to local radio and television stations. If a student is still experiencing difficulties in transmission of Canvas assignments due to power or other outages, they should contact the instructor as soon as it is safe to do so via email, or call the instructor by phone, to resolve questions and concerns in a timely manner.

For Dual Enrollment Courses: You will have the choice to dual-enroll at VPCC for this course. The decision to dual-enroll in a course requires careful consideration. You have options, as you can see from the DE module on Faculty Advising Canvas course. You may wish to contact your top choice colleges to ask what the impact of taking a dual-enrollment course might be for your goals, particularly if you do not perform to your expectations in the course. Please be aware that you are generating a permanent college transcript with all the courses for which you are dual-enrolled. You can also use the dual-enrollment student guide from Transfer Virginia to help you determine the potential impact.

If you choose to dual-enroll, you must monitor your course grade. If you find you are not earning grades you want to have on your permanent college transcript, you may consider dropping the dual-enrollment portion prior to the Add/Drop date for the term of the course, or to withdraw from the dual-enrollment portion prior to the Withdrawal date. If you choose to withdraw from dual enrollment for the class, you will still earn high school credit and can plan to be well-prepared for the class in college. Dropping will have no record on your transcript, while withdrawal will leave a note on your college transcript indicating you withdrew, but no grade will be recorded on your college transcript. You can request a decline or withdrawal form from me or from Mrs. Yee.

No matter what you choose to do, I will respect your wishes. I want to work with you to support your learning, but I cannot learn the information for you; you will have to invest effort in the course in order to succeed. This may require you to learn new learning strategies that you haven't used in the past. I will do my utmost to support your personal learning in the class and encourage you to pursue your goals.

Students must keep in mind that enrollment in a college class, including dual-enrollment while in high school, entails consequences that can be significant and permanent including, but not limited to, the following:

- Final course grades on college transcripts become a permanent part of a student's college record.
- Graduate-level education programs may consider DE grades equally with traditional college courses in calculating GPA for admission (E.g. graduate, medical, veterinary schools).
- Grades of D and F and course withdrawals can negatively affect scholarship and financial aid requests.
- Once the withdrawal date has passed, students cannot withdraw from a class, except in extraordinary circumstances such as a medical emergency.

Important Dual Enrollment Dates

Spring 2026 Semester

- TBA