The Governor's School for Science and Technology **Calculus I/II**
School Year 2025-2026 **MTH 263/264**
Course Information

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

- Period 1: MTThF 7:10-7:55 AM, W 7:10-7:50 AM
- Period 7: MTThF 1:00-1:45 PM, W 1:10-1:50 PM

Credit Hours: (4 credits per course) Prerequisite(s): MTH 161 and MTH 162 or equivalent with a grade of C or better.

Course Description: This is a two semester basic calculus sequence.
Calculus 1: Presents concepts of limits, derivatives, differentiation of various types of functions and use of differentiation rules, application of differentiation, antiderivatives, integrals and applications of integration. Lecture 4 hours per week. THIS IS AN APPROVED UCGS/PASSPORT COURSE.
Calculus 2: Continues the study of calculus of algebraic and transcendental functions including rectangular, polar, and parametric graphing, indefinite and definite integrals, methods of integration, and power series along with applications. Features instruction for mathematical, physical and engineering science programs. Lecture 4 hours per week. THIS IS AN APPROVED UCGS/PASSPORT COURSE.
Intended Audience: Students intending to pursue an undergraduate degree in engineering, mathematics, statistics, computer science, or physical 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: Calculus Early Transcendentals
Authors: Stewart
Publisher: Cengage
Edition: 7th
Required or Recommended: Require

Course Materials: You do NOT have to purchase the textbook! You'll occasionally need access to computing programs such as DESMOS in this course. A scientific calculator will often suffice.

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 at least 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 calculus.

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.

Required Time-on-Task: This course is very intensive; 5 hours (outside of lecture) per week to study are required for successful completion of this course . Plan your semester so that you have enough time to be successful and time to get help when needed.

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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Test Replacement Policy: At the end of the quarter, students may opt to take the semester assessment to replace their lowest test grade.

Student Learning Outcomes Calculus I

Upon completing the course, the student will be able to:

Limits:

- Differentiate between the limit and the value of a function at a point
- Find the limit of a function by numerical, graphical and analytic methods
- Apply Limit Laws
- Calculate one-sided limit of a function
- Prove the existence of a limit using precise definition of the limit
- Determine the continuity of a function
- Calculate Vertical and Horizontal asymptotes using limits

Derivatives and Differentiation Rules:

- Define Derivatives and Rates of Change
- Compute derivatives of basic functions using the definition of the derivative
- Differentiate polynomial, rational, radical, exponential and logarithmic functions
- Find equation of a tangent line using derivative
- Differentiate trigonometric functions
- Apply product, quotient, chain rules
- Apply implicit differentiation and find derivatives of inverse trigonometric functions
- Apply concept of rates of change to natural and social sciences
- Apply the concept of related rates
- Define hyperbolic functions and their derivatives
- Find linear approximation of a function at a given point

Applications of Differentiation

- Calculate local and absolute maximum and minimum values of a function
- Apply Rolle's Theorem and Mean Value Theorem to study properties of a function
- Find critical points, and intervals of increasing and decreasing values of a function
- Find points of inflection and intervals of different concavities
- Sketch a curve for a given function
- Apply rules of differentiation to solve optimization problems
- Find antiderivatives for basic functions using knowledge of derivatives

Integrals

- Relate areas to definite integrals using sigma notation, Riemann Sums, and limits. [Note: L'Hopital's Rule is in Calc II but may be used for instructional purposes here.]
- Apply Fundamental Theorem of Calculus to find definite integrals and derivatives
- Find indefinite integrals of polynomials and basic trigonometric and exponential function
- Apply Net Change Theorem
- Perform integration using substitution rule
- Find areas between curves
- Find average value of a function

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

Applications of Integration

- Compute Volumes by cross-section
- Compute Volumes by disk-washer
- Compute Volumes by shells
- Compute Work (spring, rope)
- Compute Work (pumping liquids)
- Compute Arc length
- Compute Areas of surfaces of revolution
- Compute Application (center of mass)

Techniques of Integration

- Integrate by parts
- Calculate trigonometric integrals
- Calculate integrals by trigonometric substitution
- Define the indeterminate form and apply L'Hopital's Rule.
- Calculate improper integrals
- Integrate by partial fractions
- Integrate using Tables and Software
- Approximate integrals (Trapezoidal, Simpson) with error estimation.

Infinite Sequences and Series

- Write definition of and understand Sequences
- Write definition of and understand Series (intro)
- Determine convergence by integral test
- Determine convergence by comparison test
- Determine convergence of alternating series
- Determine absolute convergence (ratio, root tests)
- Apply strategies for testing series
- Work with power series
- Represent functions as power series
- Find Taylor, Maclaurin series & polynomials
- Calculate Taylor and Maclaurin series

Parametric Curves and Polar Coordinates

- Represent curves by parametric equations
- Perform calculus with parametric curves
- Use and graph with polar system
- Calculate areas and lengths in polar coordinates
- Define the conic forms in polar form

Differential Equations

- Determine the order of a differential equation
- Understand and create a directional field for an arbitrary first-order differential equation
- Use the Euler or tangent line method to find an approximate solution to a linear differential equation
- Solve Separable differential equations
- Solve initial value problems
- Solve applications of differential equations as applied to Newton's Law of Cooling, population dynamics, mixing problems, and radioactive decay. (1st order)

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.

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.

College Math Expectations

In order for you to be successful in your mathematics courses, the faculty of the mathematics department has developed the following common expectations of all students in mathematics Courses.

1. College mathematics is different than high-school mathematics. College mathematics courses cover at least triple the material in the same time frame as do high school mathematics courses. A certain amount of material has to be covered during each class and over the semester. To maintain this pace, you need to take responsibility for your own learning. This includes, but is not limited to:
    - Having all required materials (e.g. textbook, a calculator required in the course syllabus, software course registration code, an access to a reliable computer with internet available at GSST or at home) the first day of class.
    - Reading the syllabus/Calendar/Assignments documents completely.
    - Logging in on CANVAS at least twice a week to check for Announcements, Assignment updates, and your grades, and checking TNCC email daily.
    - Reading the textbook section to be covered before coming to class, viewing any video lecture if available, listening to the lecture and taking notes, reviewing notes provided on CANVAS for each section.
    - Assign for study at least 5 hours outside of class per week for each week.
    - There is no substitute for continued and ongoing studying and doing homework problems. If you do not do all the assigned homework problems, your chances of success in any math class are very low.
2. It is your responsibility to keep your homework up-to-date and monitor your success. If you are having difficulty with the course material, then you need to take action right away – do not wait until you have lost all hope! There are several options to get assistance:
    - Talk to your instructor during office hours.
    - Form a study group with your classmates - this is the best thing you can do for yourself whether you are struggling or not.
    - Visit Brainfuse online using myVPCC website to access tutors. Tutor information and hours are available at https://guides.vpcc.edu/tutoring
    - No Generative AI Usage Permitted
    - For the duration of this course, the use of Generative AI in assignments is strictly prohibited.
    - Assignments are opportunities for personal growth, critical thinking, and applying your acquired knowledge. Your individual effort and creativity are essential in demonstrating your understanding of the course material. Dependence on AI undermines these objectives and compromises the integrity of the learning process. We appreciate your commitment to academic honesty and dedication to upholding this course's principles by refraining from using Generative AI in your assignments.

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.

For Dual Enrollment Courses: You will have the choice to dual-enroll 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

Fall 2025 Semester (MTH 263)

- Registration begins: Wed 9/17
  - During Advisory block
  - All juniors will meet in A67 to help with account creation and registration
  - Seniors will stay in their science classes to register
- Last Day to Add: Fri 9/26
- Faculty Confirm Rosters Tues 9/30
- Last Day to Drop: Wed 10/8
- Last Day to Withdraw: Tues 11/25 (before Thanksgiving break)
- Grades Due to VPCC: Mon 1/26

Spring 2026 Semester (MTH 264)

- TBD