Calculus

Dear Student & Parents,

Welcome to the 2024-2025 school year at the Governor's School for Science and Technology! My name is Mrs. Yee and I will be teaching Calculus this year. I am really excited to see what this year has in store for us. If you ever have any questions or concerns during the year please let me know. My goal is to help your child succeed in school and exceed their goals for this year.

Prerequisites: Math Analysis or PreCalculus

Contact Info:

- Email: deidre.yee@nhrec.org
- Voicemail: (757) 766 – 1100 x 3394
- Schedule:

AM - Monday / Tuesday / Thursday / Friday				
Time	7:10am – 7:55am	8:00am – 8:45am	8:50am – 10:25am	
Class	P1 =	P2 =	P3/P4 = Science	
AM – Wednesday				
Time	7:10am – 7:50am	7:55am – 8:35am	8:40am – 9:40am	9:45am – 10:25am
Class	P1	P2	Science	Advising
PM - Monday / Tuesday / Thursday / Friday				
Time	11:20am – 12:55pm	1:00pm – 1:45pm	1:50pm – 2:35pm	
Class	P5/P6 = Science	P7 =	P8 =	
PM – Wednesday				
Time	11:20am – 12:20pm	12:25pm – 1:05pm	1:10pm – 1:50pm	1:55pm – 2:35pm
Class	Science	Advising	P7	P8

Materials:

- Class Textbook – Calculus, 7th edition by Stewart
  - Digital pages will be available in Canvas
  - Physical textbook available by request
- 3 Subject Spiral Notebook (for notes and classwork)
- 2" 3-ring binder & Tabs (Notes, Assignments, Review Packets, Tests & Quizzes, Projects)
- TI 84+ Graphing Calculator ****If you cannot afford one, please speak with me privately.*

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.

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.

First Semester:

Units & Learning Outcomes

1. Limits and Continuity
    - 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
    - Define Derivatives and Rates of Change
    - Compute derivatives of basic functions using the definition of the derivative
2. Differentiation Rules
    - 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

3. Differentiation Techniques and Applications
    - 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
    - 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
4. Graphical Analysis with Derivatives
    - Find points of inflection and intervals of different concavities
    - Define the indeterminate form and apply L'Hopital's Rule.
    - Sketch a curve for a given function
    - Apply rules of differentiation to solve optimization problems
5. Introduction to Integration
    - Relate areas to definite integrals using sigma notation, Riemann Sums, and limits.
    - 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
6. Applications of Integration
    - Find areas between curves
    - Compute Volumes by cross-section
    - Compute Volumes by disk-washer
    - Compute Volumes by shells
    - Compute Work (spring, rope)
    - Compute Work (pumping liquids)
    - Find average value of a function
7. Techniques of Integration
    - Integrate by parts
    - Calculate trigonometric integrals
    - Calculate integrals by trigonometric substitution
    - Integrate by partial fractions

Second Semester:

Units & Learning Outcomes

8. More Techniques and Applications of Integration
    - Integrate using Tables and Software
    - Approximate integrals (Trapezoidal, Simpson) with error estimation.
    - Calculate improper integrals
    - Compute Arc length
    - Compute Areas of surfaces of revolution
    - Compute Application (center of mass)
9. Infinite 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
10. Power Series
    - Work with power series
    - Represent functions as power series
    - Find Taylor, Maclaurin series & polynomials
    - Calculate Taylor and Maclaurin series
11. 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. (1^{st} order)

12. Curves in Parametric and Polar Form
    - 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

Grades:

- Governor's School:
    - A = 90 - 100
    - B = 80 - 89
    - C = 70 - 79
    - D = 60 - 69
    - F = less than 60
- Calculus:
    - Tests: 45%
    - Quizzes: 30%
    - CW & HW: 10%
    - Labs & Review: 15%

GSST Grading Policy

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

Important Dual Enrollment Dates

Fall 2024 Semester (MTH 263)

- **Friday, September 27, 2024**: Last day to register for college credit
- **Thursday, October 3, 2024**: Last day to drop dual enrollment and class will not appear on the student's college transcript
- **Monday, December 2, 2024**: Last day to drop dual enrollment and class will appear as a "W" on the student's college transcript
- **Friday, January 31, 2025**: Grades posted to SIS

Spring 2025 Semester (MTH 264)

- **Friday 2/7/2025**: Last day to register for college credit
- **Friday 2/14/2025**: Last day to drop dual enrollment and class will not appear on the student's college transcript
- **Wednesday 4/16/2025**: Last day to drop dual enrollment and class will appear as a "W" on the student's college transcript
- **Friday 6/13/2025**: Grades posted to SIS

VPCC Dual Enrollment

Students have the option to sign up for dual enrollment through Virginia Peninsula Community College (VPCC) for college credit using the online program DualEnroll.

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.

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.

Attendance Policies

- Excuses Absences – Doctor's appointments, surgeries, field trips, and vacations are considered excused absences. A note or email from your *parent, teacher, or school* is required. If you will be absent for an extended period of time, please make arrangements with me to get course material early.
- Unexcused Absences – If you are absent without prior knowledge (illness), this is considered an unexcused absence until a note from your parent has been provided. If you are absent for one or two days, please check Edmodo for missed material. If you are absent for more, we can discuss how to get you caught up on Edmodo or when you return.
- Test/Quiz Absences – If you are absent the day a test or quiz is given, you will be expected to take the test/quiz the first day you return, unless you can make other arrangements such as coming to school early or staying later.

Class Expectations

- Cell Phone Policy – students may have their cell phones only if they are being used responsibly. If a student is not taking notes or completing their work during class time, their cell phone will be taken away for the remainder of class and will be returned after the bell rings for the end of class.
- Keep your work – Errors in gradebook entry do occur, so please keep your work in case there are any errors that need to be fixed.
- Skills Review – After most quizzes and/or tests, you will be given a worksheet on PreCalculus skills that you are expected to already know. Look at the assignment page in Canvas for links to helpful videos online for you to watch if you are unsure of how to complete the problems
- Homework assignments are listed in Canvas, will be assigned and collected each class, and will be graded based upon effort. Mostly odd problems will be assigned so that you can check your answers. If an even problem is assigned, the answer will be posted under the assignment on Canvas.
- Unit Project – Each unit will have a "project". This will be passed out the first day of the unit, and is due on test day for the unit.
- Quiz/Test Review – In preparation for assessments, you will receive a quiz or test review packet. You will be expected to have this completed and turned in prior to taking the assessment. Solutions will be posted in Canvas so you can check your answers and compare solution techniques.

Test Replacement Policy

- At the end of the quarter, students may opt to take the semester assessment to replace their lowest test grade.
- If a student performs well on all of their tests, they may opt to replace their lowest quiz grade instead.

AP Practice / Exams

- Mrs. Yee will invite you to an AP Prep "class" in Canvas where all AP prep materials will be at the end of Quarter 3 (Spring Break).
- AB Exam – GSST Calculus will have covered all AP topics, except a select few, come time of the AP exam (Monday, May 12).
- BC Exam – GSST Calculus will have covered most of the AP topics by the time of the AP exam (Monday, May 12). This class does not cover vectors and a few select topics similar to the AB exam.
- During the advisory block in Q3 and before AP exams in Q4, Mrs. Yee will have AP FRQ questions available for practice.

Helpful SmartPhone Apps

Icon	App Name	Purpose
	Power School	Allows you to view your grades for Governor's School classes. If it is needed, the district code is "JPPH"
	Gmail	Sync with your Governor's School email. You can use it communicate with your Governor's School teachers, classmates, and mentors on the go.
	New Horizons Regional Edu Ctrs	Quick and easy access to faculty contacts, grades, events (such as snow days and delays), etc
	Canvas Red = Student Blue = Parent	Allows you to communicate with your Governor's School teachers and classmates on the go. Canvas is also where you can find the class notes, helpful videos, homework assignments, practice quizzes, and flashcards (outside Quizlet)
	Quizlet	Access to teacher made flashcards with various self-quiz options.

Course Collaboration Guidelines on Assignments in Calculus

Students: Please read these guidelines carefully, then sign below and have a parent sign. If you have any questions now or during the year about acceptable assistance, ask your teacher.

Type of Assignment	Is Collaboration Permitted?	What Type of Collaboration is Permitted?
Projects	Varies upon project	Please see project descriptions about collaboration.
Homework	Yes	Students should complete homework assignments independently. They may use resources for guidance (books, parents, classmates, internet), however being told what to write and copying step-by-step work is considered cheating
Reviews	Yes	Should be completed independently with minimal use of resources. Copying your work directly from another student, solution guide or answer key is considered cheating.
Tests/Quizzes	No	

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."

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.

MATH SYLLABUS

Parent & Student Signature Page

Please return this signed sheet to your instructor by 9/6/2024

Please read these guidelines carefully, then sign below and have a parent sign. If you have any questions now or during the year about acceptable assistance, ask your teacher.

Communication between students, teachers, and parents is very important to a successful school year. Students have received a syllabus, which they are expected to review with parents. It was reviewed with your instructor in class and students had an opportunity to ask questions during class.

Parents, please sign below to indicate:

1. I have received and reviewed the complete class syllabus with my student. We understand that classroom rules, including the cell phone policy, will be enforced for both safety and academic success.
2. I have written my questions or concerns in the space provided below so your teacher can address them early. If that space is blank, it indicates I do not have any questions or concerns at this time, but I know to reach your instructor in the future if needed.
3. I have read and discussed the syllabus and class expectations with my student for his/her/their math course. My students know what they mean and the consequences for disciplinary action.

Please check your preferred contact method:

- Email address:
- Cell phone:
- Home phone:

Questions? Concerns? Anything I should know about your student to help him, her, or they have a great year in Math?

Student name (printed)	Student Signature	Date
Parent/Guardian name (printed)	Parent/Guardian Signature	Date
Parent/Guardian name (printed)	Parent/Guardian Signature	Date