

# Naperville North High School

## Multivariable Calculus with Linear Algebra



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### Mission

To educate students to be self-directed learners, collaborative workers, complex thinkers, quality producers, and community contributors

### Course Description

This course is intended for those students who have completed Calculus BC. The course extends the ideas and techniques of Calculus to three dimensions. Properties of vectors and graphing in 3-space are studied first, and provide the fundamentals for the remainder of the course. Vector-valued functions and their application to particle motion and curvature are studied in detail. Functions of several variables and related applications are then examined through the use of partial derivatives and multiple integrals. Topics in vector calculus including Green's Theorem, The Divergence Theorem and Stokes Theorem are studied. This course also includes the study of Linear Algebra with topics in geometric vectors and vector space, matrices and linear transformations, inner product space, eigenvalues and eigenvectors, the determinant functions, and formal methods of mathematical proof. A CAS (Computer Algebra System) graphing calculator is required.

### Course Standards

#### Multivariable Calculus

- Geometry of Space
- Vector valued functions
- Functions of several variables
- Multiple Integrals
- Vector Analysis

#### Linear Algebra

- Matrices and Linear Equations
- Geometrical Vectors
- Determinants
- Vector Spaces and Inner Product Spaces
- Eigenvalues and Eigenvectors
- Linear Transformations

### Grading Practices

Grades communicate each student's progress toward mastery of goals/standards for the course.

- No extra credit will be issued.
- Violations of the academic integrity policy will be consequence by administration in collaboration with the DC/teacher.
- Any percentage lower than 50% will be put into the grade book as a 50%, the lowest possible grade on completed work (incomplete or work not turned in will be entered as a grade of 0 in the grade book).
- Missing work will be accepted up to five days after the due date with a penalty of 10% per day past the due date.

### Grading Disbursement

A  $\geq 89.5\%$

B  $\geq 79.5\%$

C  $\geq 69.5\%$

D  $\geq 59.5\%$

F  $< 59.5\%$

Semester Grade:

- Coursework = 85% (Tests and Quizzes = 90%, Group Quizzes 5%, In-Class Activities 5%)

- Final Exam =15%

### **Reassessments:**

The purpose of reassessment is to allow students to demonstrate mastery of course standards in which they remain deficient. Higher reassessment grades will replace the original assessment score, but will not exceed 85%.

- Practice work is not eligible for reassessment.
- Evidence of Learning work may be eligible for reassessment. Refer to the chart below for eligibility:

<input type="checkbox"/> The assessment included multiple opportunities for feedback and improvement in the process for the final product OR formative assessments are aligned to standards, allow students to practice in the same assessment format, and gain feedback for improvement before the summative assessment.	<input type="checkbox"/> There was timely and consistent completion of practice work and formative assessments. <input type="checkbox"/> A one-time performance on an assessment does not reflect the student's level of proficiency leading up to the assessment. <input type="checkbox"/> Summative assessment score is below 85%.
Not eligible for reassessment	Eligible for reassessment if all three statements above are true.

### **Reassessment Parameters:**

- The reassessment opportunity will require designated learning experiences that demonstrate readiness as assigned by the teacher.
- Reassessments MUST be completed within 5 school days of the student receiving feedback unless otherwise determined by the instructor. The reassessment deadline should be communicated in an IC comment.
- The final reassessment score will be capped at 85%

### **Academic Integrity Code:**

District 203 students are challenged to address the academic process enthusiastically, diligently, and most importantly, honestly. It is the responsibility of our students, teachers, and administration to uphold the fundamental academic values of honesty, responsibility, fairness, respect and trust. The integrity of our district's academic programs is built upon these principles.

Academic integrity violations include cheating, plagiarism, self-plagiarism or copy infringement, obtaining or providing an unfair advantage, using a writing service and/or AI in place of original work unless specifically authorized by staff, falsification of documents, unauthorized access to records, and inappropriate collaboration, whether intentional or unintentional. The classroom teacher and administration will collaborate and exercise professional judgment in determining academic integrity violations.

### **Additional Resources for Support**

- Make an appointment with your teacher: before school, after school, or during the school day
- Drop in for Peer Tutor/Math Help before school or during lunch periods through the Literacy Center.
- After-School Tutoring in Learning Commons (check with Student Services for schedule.)

- Online Resources:

- Canvas (notes, practice): <https://naperville.instructure.com>
- Khan Academy Multivariable Calculus: <https://www.khanacademy.org/math/multivariable-calculus>
- Khan Academy Linear Algebra: <https://www.khanacademy.org/math/linear-algebra>

### **D203 AI Belief Statement:**

At Naperville North High School, we strive to build a learner's mindset in all students, developing qualities such as adaptability, communication, critical thinking, and global citizenship. Generative Artificial Intelligence (AI), offers new opportunities to engage with important technology relevant to the future that also raises significant educational considerations. AI tools provide unique ways to engage students in the learning process, hence we encourage our staff to guide students in using AI responsibly. Teachers have the authority to establish guidelines for AI use in their classrooms, setting clear expectations for how AI can be used on learning tasks. Concurrently, we recognize that reliance on AI risks replacing genuine student engagement and original thought, undermining the attributes we aim to cultivate. Striking a balance between leveraging AI tools effectively and maintaining educational standards is crucial to the learning experience of each student.

### **Parents & Guardians/Communication**

Naperville North believes in a collective partnership with parents/guardians which provides students the best opportunities for success.

Some ways parents/guardians can support their student's learning are:

- Encourage your student to speak directly with their teacher about questions or concerns.
- Actively check Infinite Campus for their student's grade.
  - Infinite Campus is a tool to monitor student progress until final course grade is posted.
  - Monthly progress grades are posted and represent the current grade of a student in the course at that moment in time.
- Discuss missing assignments, reiterate due dates, help organize folders, materials, assignment notebooks and review upcoming projects and assessments.
- Teachers make every effort to respond to parent emails and phone calls within 24 hours during the work week.
- The best way to communicate with teachers is through email; however, if you haven't received a response within 48 hours, please resend the email or call their voicemail. Your email may have been filtered.