# MATH 213: Calculus III B
## *Fall 2025 (Tentative) Course Syllabus*

**NJIT Academic Integrity Code**: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

## COURSE INFORMATION

**Course Description**: Topics include vectors, curvature, partial derivatives, multiple integrals, line integrals, surface integrals, and Green's, Divergence, and Stokes' theorems. Effective From: Fall 2012.

**Number of Credits**: 4

**Prerequisites**: Math 112 with a grade of C or better or Math 133 with a grade of C or better.

**Course-Section and Instructors:**

| Course-Section | Instructor |
|---|---|
| Math 213-001 | Professor P. Ward |
| Math 213-003 | Professor P. Ward |
| Math 213-005 | Professor P. Petropoulos |
| Math 213-007 | Professor P. Petropoulos |
| Math 213-009 | Professor L. Kondic |
| Math 213-011 | Professor B. Bukiet |

**Office Hours for All Math Instructors**: Office Hours and Emails

**Required Textbook**:

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|---|---|
| **Title** | *Thomas' Calculus: Early Transcendentals* |
| **Author** | Hass, Heil, Bogacki, and Weir |
| **Edition** | 15th |
| **Publisher** | Pearson |
| **ISBN #** | 9780137559893<br>9780137560042 |
| **Notes** | w/ MyMathLab |

**University-wide Withdrawal Date**: The last day to withdraw with a **W** is **Monday, November 10, 2025**. It will be strictly enforced.

## COURSE GOALS

**Course Objectives:**

- Apply previously developed skills learned in Calculus to learn Multivariable Calculus and Vectors.
- Cover Vectors, Partial Derivatives, Multiple Integrals and Vector Fields to prepare students for further study in technological disciplines and more advanced mathematics courses.
- Cover relevant applications in science and engineering to illustrate the utility of learning these topics. Use mathematical software, in problem solving, to allow the solution of more complex problems and provide visualization of the mathematical concepts in three dimensions.

**Course Outcomes:**

- Prepare students for further study in technological disciplines and more advanced mathematics courses.
- Illustrate the utility of learning Multivariable Calculus to solve problems in engineering and the sciences.
- Demonstrate mastery of the topics covered by testing with common exams and common grading.

## POLICIES

**DMS Course Policies**: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

**Grading Policy**: The final grade in this course will be determined as follows:

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|---|---|
| **Homework** | 10% |
| **Quizzes** | 10% |
| **Midterm Exams (3)** | 50% |
| **Final Exam** | 30% |

Your final letter grade will be based on the following tentative curve.

| | | | |
|---|---|---|---|
| **A** | 88 - 100 | **C** | 65 - 71 |
| **B+** | 83 - 87 | **D** | 60 - 64 |
| **B** | 77 - 82 | **F** | 0 - 59 |
| **C+** | 72 - 76 | | |

**Attendance Policy**: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

**Religious Observance**: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

**Homework and Participation Policy:** The homework assignments are online. In order to do the assignments you need to have a student access code. You can get an access code with a new book purchase that is bundled with MyMathLab or by buying the code separately at the campus bookstore. If you buy a new book from another source **make sure it is bundled with MyMathLab.** In addition, your instructor will send you information about MyLab registration and the code needed to register. Also, on the first day of class your course instructor will give you that code (again) needed to access the homework assignments.

**Quiz Policy:** At least one quiz based on the homework problems will be given each week in class. There will be a short quiz every week on the material covered during the previous week. All of the quizzes will be graded. The homework and quizzes are intended to develop your problem-solving skills and to prepare you for the exams. **The HW+Quiz grades are a significant component of your course grade. (30%)**

**How to Get Started with MyMathLab:**

http://m.njit.edu/Undergraduate/UG-Files/MML_Getting_Started.pdf http://m.njit.edu/Undergraduate/UG-Files/Technology_Tips.pdf

**Exams**: There will be three exams during the semester and a cumulative final exam:

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|---|---|
| Common Exam I | October 1, 2025 |
| Common Exam II | October 29, 2025 |
| Common Exam III | December 3, 2025 |
| Final Exam Period | December 14 - December 20, 2025 |

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the Math Department's Examination Policy. This policy will be strictly enforced.

**Makeup Exam Policy**: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the

mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

**Cellular Phones**: All cellular phones and other electronic devices must be switched off during all class times.

**Statement on the use of artificial intelligence:**

This course recognizes that Artificial Intelligence (AI) may be of educational use and may help student understanding of the course material. Such resources as ChatGPT's Study and Learn and Google Gemini's Guided Learning facilities can help students navigate math content. Students are encouraged to explore the use of such resources, as well as the text, other Pearson online resources that come with the text, among so many useful resources. Such resources might be used, for example, to get a different take on the material, to develop practice examples and to provide examples of how the content might apply to realistic problems.

However, while students may employ AI to gain better understanding of the material, students MAY NOT use AI for any work that counts toward their grade in the course -- that is, you MAY NOT use AI for homework, quizzes or exams

If you make use of AI for this course, please let the professor know what you use it for as it may be helpful to other students. Suggestions for relevant educational use of AI to accomplish the goals and objectives of the course beyond what has been mentioned above would be appreciated.

## ADDITIONAL RESOURCES

**Math Tutoring Center**: Located in the Central King Building, Lower Level, Rm. G11 (See: Fall 2025 Hours)

**Accommodation of Disabilities**: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please If you need an accommodation due to a disability please contact the Office of Accessibility Resources and Services at oars@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

https://www.njit.edu/accessibility/

**Important Dates** (See: Fall 2025 Academic Calendar, Registrar)

| Date | Day | Event |
|---|---|---|
| September 1, 2025 | Monday | Labor Day |
| September 2, 2025 | Tuesday | First Day of Classes |
| September 8, 2025 | Monday | Last Day to Add/Drop Classes |
| October 2, 2025 | Thursday | Wellness Day |
| November 10, 2025 | Monday | Last Day to Withdraw |
| November 25, 2025 | Tuesday | Thursday Classes Meet |

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|---|---|---|
| November 26, 2025 | Wednesday | Friday Classes Meet |
| November 27 to November 30, 2025 | Thursday and Sunday | Thanksgiving Recess - Closed |
| December 11, 2025 | Thursday | Last Day of Classes |
| December 12, 2025 | Friday | Reading Day |
| December 13, 2025 | Saturday | Saturday Classes Meet |
| December 14 to December 20, 2025 | Sunday to Saturday | Final Exam Period |

# Course Outline

The placement of Common Exams within the Topic list below is meant to provide a rough estimate of material that will appear on the exam. The precise set of sections to be tested on for each Common Exam will be provided by the course instructor on the Friday preceding the exam.

| Lecture | Section # | Subject Topic | Homework (HW) Assignment |
|---|---|---|---|
| Week 1 | 12.1, 12.2 | *Three-Dimensional Coordinate Systems, Vectors* | *12.1: #1,7,11,13,21,23,29,31,35,47,51,55*<br>*12.2: #1,5,9,13,17,25,37,41,49,53,59* |
| Week 1 | 12.3, 12.4 | *The Dot Product, The Cross Product* | *12.3: #5,9,13,19,22,25,29,35,39,43,47*<br>*12.4: #1,4,9,15,21,23,25,30,39,46,48,57* |
| Week 1 | 12.4, 12.5 | *The Cross Product, Lines and Planes in Space* | *12.5: #1,8,11,15,23,25,29,33,39,47,59,65,69,71* |
| Week 2 | 12.5, 12.6 | *Lines and Planes in Space, Cylinders and Quadric Surfaces* | *12.6: #1,7,11,14,18,21,23,26,27,31,39,45,47* |
| Week 2 | 12.6 | *Cylinders and Quadric Surfaces* | |
| Week 2 | 13.1 | *Curves in Space and their Tangents* | *13.1 #1,5,11,15,21,24,29,31,37,43* |
| Week 3 | 13.2 | *Integrals of Vector Functions; Projectile Motion* | *13.2 #1,7,11,15,19,23,26,29,38* |
| Week 3 | 13.3 | *Arc Length in Space* | *13.3: #1,7,9,11,13,18* |
| Week 3 | 13.4 | *Curvature and Normal Vectors* | *13.4: # 1,5,9,11,14,19,21,25,27* |
| Week 4 | 14.1 | *Functions of Several Variables* | *14.1: #1,4,6,9,13,16,19,25,33,37,40,45,49,55* |
| Week 4 | 14.2, 14.3 | *Limits and Continuity in Higher Dimensions,* | *14.2: #3,7,13,17,21,31,33,35,41,43, 49,61,65,68,71,79* |

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|---|---|---|---|
| | | *Partial Derivatives* | *14.3: #1,3,19,25,35,38,41,44,48,61,63,77,85,94* |
| Week 4 | 14.3 | *Partial Derivatives* | |
| Week 5 | 14.4,<br>14.5 | *The Chain Rule,*<br>*Directional Derivatives and Gradient Vectors* | *14.4: #1,5,7,13,17,27,33,37,45,57*<br>*14.5: #1,5,9,11,15,21,27,31,33,38,43* |
| Week 5 | | *EXAM I* | ***Exam I on Oct. 1, 2025*** |
| Week 5 | 14.5,<br>14.6 | *Directional Derivatives and Gradient Vectors,*<br>*Tangent Planes and Differentials* | *14.6: #1,5,13,17,23,28,31,35,47,59,60,61* |
| Week 6 | 14.7 | *Extreme Values and Saddle Points* | *14.7: #1,3,11,33,35,43,47,49,53,65* |
| Week 6 | 14.8 | *Lagrange Multipliers* | *14.8: #3,9,15,18,29,36,41* |
| Week 6 | 14.8<br>14.9 | *Lagrange Multipliers,*<br>*Taylor's Formula in Two Variables* | *14.9: #1,4,5,6,7,9* |
| Week 7 | 15.1 | *Double and Iterated Integrals over Rectangles* | *15.1: #1,3,10,21,23,30,33,38* |
| Week 7 | 15.2 | *Double Integrals over General Regions* | *15.2: #1,5,9,13,31,34,39,46,59,65,75,78,79,85* |
| Week 7 | 15.3 | *Areas by Double Integrals* | *15.3: #1,5,11,15,17,19,21,26* |
| Week 8 | 15.4 | *Double Integrals in Polar Form* | *15.4: #1,5,9,12,20,25,29,32,33,37,44* |
| Week 8 | 15.5 | *Triple Integrals in Rectangular Coordinates* | *15.5: #5,7,11,19,23,27,33,39,42,48* |
| Week 8 | 15.7 | *Triple Integrals in Cylindrical and Spherical Coordinates* | *15.7: #1,7,21,25,29,33,39,47,53,57,61* |
| Week 9 | 15.7 | *Triple Integrals in Cylindrical and Spherical Coordinates* | |
| Week 9 | | *EXAM II* | ***Exam II on Oct 29, 2025*** |
| Week 9 | 15.8 | *Substitution in Multiple Integrals* | *15.8: #3,7,10,13,19,21* |
| Week 9 | 15.8 | *Substitution in Multiple Integrals* | |
| Week 10 | 16.1 | *Line Integrals* | *16.1: #1,5,9,13,17,25,30,33* |
| Week 10 | 16.1,<br>16.2 | *Line Integrals,*<br>*Vector Fields, Work, Circulation, and Flux* | *16.2: #3,5,9,13,17,21,25,29,32,39,47,53* |

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| Week 10 | 16.2 | *Vector Fields, Work, Circulation, and Flux* | |
| Week 11 | 16.3 | *Path Independence, Potential Functions, and Conservative Fields* | *16.3: #1,3,8,11,17,21,27,33* |
| Week 11 | 16.3 | *Path Independence, Potential Functions, and Conservative Fields* | |
| Week 11 | 16.4 | *Green's Theorem in the Plane* | *16.4: #1,7,11,15,23,25,27,32,36,44* |
| Week 12 | 16.4 | *Green's Theorem in the Plane* | |
| Week 12 | 16.5 | *Surfaces and Area* | *16.5: #1,5,9,13,19,21,29,43,45,47,55* |
| Week 12 | 16.5 | *Surfaces and Area* | |
| Week 13 | 16.6 | *Surface Integrals* | *16.6: #1,4,7,11,15,21,25,31,37,41,47* |
| Week 13 | 16.6 | *Surface Integrals* | |
| Week 14 | 16.7 | *Stokes' Theorem* | *16.7: #1,3,7,11,13,15,21,27,30* |
| | | | *EXAM III on Dec. 3, 2025* |
| Week 14 | 16.7 | *Stokes' Theorem* | |
| Week 14 | 16.8 | *Divergence Theorem* | *116.8: #1,5,8,11,17,23,25,26* |
| Week 15 | 16.8 | *Divergence Theorem* | |
| Week 15 | | *FINAL EXAM, AReview* | |