MATH 112 : Calculus
Spring 2025 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: Topics include integration, applications of integration, series, exponential and logarithmic functions, transcendental functions, polar coordinates, and conic sections.

Number of Credits: 4

Prerequisites: MATH 111 with a grade of C or better or MATH 132 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 112-002	Professor N. Tsipenyuk
Math 112-004	Professor N. Tsipenyuk
Math 112-006	Professor J. H. Ro
Math 112-008	Professor J. H. Ro
Math 112-010	Professor G. Bekhit
Math 112-012	Professor G. Bekhit
Math 112-014	Professor Y. Young
Math 112-016	Professor P. Bose
Math 112-018	Professor D. Schmidt
Math 112-020	Professor R. Dandan

Math 112-022	Professor J. Zaleski
Math 112-024	Professor J. Zaleski
Math 112-026	Professor A. Flax
Math 112-028	Professor A. Flax
Math 112-030	Professor D. Schmidt
Math 112-032	Professor S. Mahmood
Math 112-034	Professor T. Sherman
Math 112-036	Professor T. Sherman
Math 112-038	Professor S. Mahmood
Math 112-102	Professor H. Behzadpour

Office Hours for All Math Instructors: Spring 2025 Office Hours and Emails

Required Textbook:

Title	*Thomas' Calculus: Early Transcendentals*
Author	Hass, Heil, and Weir
Edition	15th
Publisher	Pearson
ISBN #	9780137559893 9780137560042

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 7, 2025**. It will be strictly enforced.

STUDENT RESPONSIBILITIES

- Read and understand the syllabus.
- Adhere to all policies and procedures
- Report conflicts and/or special circumstances in a timely manner
- Report any instances of violations of Academic Integrity to your Instructor
- Communicate directly with your Instructor on ALL course-related matters, including material,

procedures, policies and exams. **NOTE: Do not attempt to contact other instructors or the course Coordinator - you will not get a response. All course information will be communicated to you directly by your instructor.**

- Effectively manage time and devote sufficient time to succeeding in this course
- Keep track of your grades
- Make use of all resources available to help you learn
- Be respectful of peers and your instructor
- Accept responsibility for your grades – requests for extra credit opportunities will be denied

COURSE GOALS

Course Objectives

- Students should (a) develop greater depth of understanding of integration and its importance in scientific and engineering applications, (b) learn about series, including their convergence properties and their use in representing functions, (c) gain experience in the use of approximation in studying mathematical and scientific problems and the importance of mathematically understanding and evaluating the accuracy of approximations, (d) learn new ways of mathematically representing curves and how to use calculus in these settings, and (e) learn alternative coordinate systems which are natural for many problems and learn how calculus can be applied in these systems.
- Students should gain an appreciation for the importance of calculus in scientific, engineering, computer, and other applications.
- Students should gain experience in the use of technology to facilitate visualization and problem solving.

Course Outcomes

- Students have improved logical thinking and problem-solving skills.
- Students have a greater understanding of the importance of calculus in science and technology.
- Students are prepared for further study in mathematics as well as science, engineering, computing, and other areas.

Course Assessment: The assessment of objectives is achieved through homeworks, quizzes, and common examinations with 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:

Quizzes and Homework	17%
Common Midterm 1	17%
Common Midterm 2	17%
Common Midterm 3	17%
Final Exam	32%

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

A	88 - 100	**C**	66 - 71
B+	83 - 87	**D**	60 - 65
B	77 - 82	**F**	0 - 59
C+	72 - 76		

THE FINAL GRADE DISTRIBUTION WILL BE DETERMINED BY COURSE INSTRUCTORS IN A MEETING TO BE HELD AFTER THE FINAL EXAM.

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. Each class is a learning experience that cannot be replicated through simply "getting the notes."

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: Homework is a requirement for this class. Online homework will be completed with MyMathLab, which comes with a new copy of the textbook. Access to it can also be purchased directly from the website.

Generative AI: This course expects students to work without artificial intelligence (AI) assistance in order to better develop their skills in this content area. AI usage is not permitted throughout this course under any circumstance. Violation of the policy will result in a grade of zero on any impacted assignment(s) and will be reported to the dean of students for supplemental discipline.

Quizzes: Quizzes will be given approximately once a week throughout the semester. They will be based on the lecture, homework and the in-class discussions.

Exams: There will be three common midterm exams held during the semester and one comprehensive common final exam. Common Midterm Exams will be held on the following days:

Midterm Exam 1	February 12, 2025
Midterm Exam 2	March 12, 2025
Midterm Exam 3	April 16, 2025
Final Exam Period	May 10 - May 16, 2025

The time of the midterm exams is **4:15pm - 5:40 PM** for daytime students and **6:00 - 7:25 PM** for evening students. 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: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

http://math.njit.edu/students/policies_exam.php

Mandatory Tutoring Policy: Based upon academic performance indicating a significant gap in understanding of the course material, students may receive a notice of being assigned to mandatory tutoring to assist in filling the gap. A student will have 2 points deducted from the course average for each instance in which the required tutoring is not completed by the stated deadline.

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

ADDITIONAL RESOURCES

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

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

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: Spring 2025 Academic Calendar, Registrar)

Date	Day	Event
January 21, 2025	Tuesday	First Day of Classes
January 27, 2025	Monday	Last Day to Add/Drop Classes
March 16, 2025	Sunday	Spring Recess Begins
March 22, 2025	Saturday	Spring Recess Ends
April 3, 2025	Thursday	Wellness day
April 7, 2025	Monday	Last Day to Withdraw
April 18, 2025	Friday	Good Friday - No Classes
April 20, 2025	Sunday	Easter Sunday - No Classes Scheduled

May 6, 2025	Tuesday	Thursday Classes Meet
May 7, 2025	Wednesday	Friday Classes Meet
May 7, 2025	Wednesday	Last Day of Classes
May 8, 2025	Thursday	Reading Day 1
May 9, 2025	Friday	Reading Day 2
May 10 - May 16, 2025	Friday to Thursday	Final Exam Period

Course Outline

Lecture	Sections	Topic	Assignment in MyMathLab
1	6.1	Volumes Using Cross Sections	1,5,9,17,19,23,30,33,37
2	6.1	Volumes Using Cross Sections	41,45,47,49,51,53,55
3	6.2	Volumes Using Cylindrical Shells	3,5,9,11,17,19,21,25,29,33
4	6.3	Arc Length	1,2,3,4,5,7,15,27
5	6.4	Areas of Surfaces of Revolution	9,13,15,17,19,21,24
6	6.5	Work	1,5,7,8,9,11,15,17,19,20
7	7.3	Hyperbolic Functions	2,7,9,15,17,21,23,43,45,47,49,53,55,57,81
8	8.1/8.2	Using Basic Integration Formulas; start Integration by Parts	Section 5.5: 11,21,25,29,37,55 Section 8.1: 3,5,9,10,13,15,27,33,36,38
9	8.2/8.3	Finish Integration by Parts; start Trigonometric Integrals	Section 8.2: 3,5,11,13,23,27,29,33,35,39,45,47,59
10		**REVIEW FOR EXAM #1**	
11	8.3/8.4	Finish Trigonometric Integrals; start Trigonometric Substitution	Section 8.3: 11,17,19,21,27,31,35,37,38,39,45,65,71
12	8.4	Trigonometric Substitution	1,5,7,11,17,19,23,29,35,37,43,57
13	8.5	Integration of Rational Functions by Partial Fractions	3,7,9,13,14,16,17,19
14	8.5	Integration of Rational Functions by Partial Fractions	23,25,27,29,33,35,39,41,45,71
15	8.7	Numerical Integration	3,7,13,17,21
16	8.8	Improper Integrals	1,4,6,7,9,11,13,17,21,23,31,33

17	8.8	Improper Integrals	39,43,45,51,55,57,59,63,65,71,73
18	10.1	Sequences	3,7,9,15,17,21,23,35,39,41,45,49,53,55
19	10.1/10.2	Finish Sequences; start Infinite Series	Section 10.1: 57,65,69,71,79,89,91,97,99,109
20	10.2	Infinite Series	3,5,7,13,29,33,35,41,45,47,57,59,63,65,69,77,79,98
21	10.3	Integral Test	3,6,9,13,15,21,27,29,31,33,35,37,55,57
22		**REVIEW FOR EXAM #2**	
23	10.4	Comparison Tests	1,5,18,19,21,23,25
24	10.4	Finish Comparison Tests; start Ratio and Root Tests	Section 10.4: 28,31,32,34,37,39,41,47,51,58
SPRING BREAK MARCH 16 – MARCH 23			
25	10.5	Ratio and Root Tests	5,7,9,18,19,21,29,31,35,42,57,59,61,70
26	10.6	Alternating Series, Absolute vs. Conditional Convergence	5,7,9,10,11,13,15,19,21,23,25
27	10.6	Alternating Series, Absolute vs. Conditional Convergence	27,34,35,37,39,41,44,47,51,53,63,71,73
28	10.7	Power Series	3,5,9,11,15,19,23,27
29	10.7	Power Series	31,37,39,43,45,53,54
30	10.8	Taylor and Maclaurin Series	3,5,8,9,11,15,18,25,31,33,37
31	10.9	Convergence of Taylor Series	1,9,10,13,15,21,22
32	10.9/ 10.10	Finish Convergence of Taylor Series; start Binomial Series	Section 10.9: 31,39,41,43,45,47,53
33		**REVIEW FOR EXAM #3**	
34	10.10	Binomial Series and Applications of Taylor Series	1,3,5,13,23,25,29,31,35,39,45,49,55,61
35	11.1	Parametrizations of Plane Curves	1,3,5,7,9,16
36	11.1/11.2	Finish Parametrization of Plane Curves; start Calculus with Parametric Curves	Section 11.1 29,31,35,37,43,49
37	11.2	Calculus with Parametric Curves	7,9,12,13,15,21,26,28,29,31,33,35
38	11.3	Polar Coordinates	1,5,7,13,17,23,27,32,37,47,51,59,60,61
39	11.4	Graphing in Polar Coordinates	1,7,9,13,17,19,29,31

40	11.5	Areas and Lengths in Polar Coordinates	1,7,11,15,17
41	11.5	Areas and Lengths in Polar Coordinates	21,23,27,28
42		**Review for Final**	