

MATH 112: Calculus II

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 techniques of integration, approximation, sequences, series, parametric equations, and polar coordinates. Applications include motion, volumes, surface areas, arc lengths, and work. Effective From: Fall 2014.

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 D. Horntrop
Math 112-004	Professor R. Brown
Math 112-006	Professor R. Brown
Math 112-008	Professor J. Hunter
Math 112-010	Professor J. Hunter
Math 112-012	Professor J. Porus
Math 112-014	Professor J. Zaleski
Math 112-016	Professor J. Zaleski
Math 112-018	Professor J. Sodhi
Math 112-020	Professor D. Shirokoff
Math 112-022	Professor R. Kelly

Math 112-024	Professor L. Simon
Math 112-102	Professor J. Ratnaswamy

Required Textbook:

Title	<i>Thomas' Calculus: Early Transcendentals</i>
Author	Thomas
Edition	13th
Publisher	Pearson
ISBN #	978-0321981677
Notes	w/ MyMathLab

University-wide Withdrawal Date: Please note that the last day to withdraw with a W is **March 30, 2015**. It will be strictly enforced.

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:

Homework, Quizzes, and Matlab	15%
Common Midterm Exam I	15%
Common Midterm Exam II	20%
Common Midterm Exam III	20%
Final Exam	30%

Your final letter grade will be based on the following tentative curve. **NOTE:** This course needs to be passed with a grade of C or better in order to proceed to subsequent courses such as Math 211, Math 213, or Math 222.

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. Day sections of Math 112 meet four times a week; there are three lectures and one recitation hour. Recitation classes provide an additional opportunity for you to seek help with homework and concepts taught in class.

Homework Policy: Calculus is learned by solving problems. In Math 112, there are two kinds of homework assignments: 1) assignments which are written out by hand and turned in, and 2) assignments which are completed online. The homework assignments are listed on the syllabus; the * superscript denotes those problems which constitute the hand-in assignments while the remaining problems constitute the online assignments.

The online assignments can be completed at WWW.MYMATHLAB.COM or WWW.COURSECOMPASS.COM. In order access the online assignments you need to have a student access code. Access codes are included with new book that is bundled with MyMathLab; codes can be purchased separately from the textbook at the campus bookstore or online at the course website. If you buy a new book from another source **make sure it is bundled with MyMathLab**. In addition, on the first day of class your course instructor will give you an additional code needed to access the online assignments. **NOTE: Homework Assignments are DUE frequently (at least weekly) at the dates and times specified online and by your instructor.**

How to Get Started with MyMathLab:

- [Getting Started](#)
- [Technology Tips](#)

MATLAB Assignments: MATLAB is a mathematical software program that is used throughout the

science and engineering curricula. Two MATLAB assignments will be given during the semester; tutors are available to help students having difficulties in accordance with a posted [schedule](#).

Quiz Policy: Quizzes are given in class on a frequent basis (at least weekly). All of the quizzes will be graded. The homework and quizzes are intended to develop your problem-solving skills and to help you prepare for the exams.

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

Common Midterm Exam I	February 11, 2015
Common Midterm Exam II	March 11, 2015
Common Midterm Exam III	April 22, 2015
Final Exam	May 8 - 14, 2015

The time of the midterm exams is 4:15 - 5:40PM for daytime students and 5:45 - 7:10PM 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.

Please note that electronic devices (such as calculators, cell phones, CD players, etc.) are not allowed during any exam.

Makeup Exam Policy: There will be NO MAKE-UP EXAMS during the semester. In the event the Final Exam is not taken, under rare circumstances where the student has a legitimate reason for missing the final exam, a makeup exam will be administered by the math department. In any case the student must notify the Math Department Office and the Instructor that the exam will be missed and present written verifiable proof of the reason for missing the exam, e.g., a doctors note, police report, court notice, etc., clearly stating the date AND time of the mitigating problem.

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.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in Cullimore, Room 214 (See: [Spring 2015 Hours](#))

Important Dates (See: [Spring 2015 Academic Calendar](#), Registrar)

Date	Day	Event
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January 20, 2015	T	First Day of Classes
January 26, 2015	M	End of Add/Drop Period
March 15 - 22, 2015	S - S	Spring Recess
March 30, 2015	M	Last Day to Withdraw
April 3, 2015	F	Good Friday - University Closed
May 5, 2015	T	Last Day of Classes
May 6 & 7, 2015	W & R	Reading Days
May 8 - 14, 2015	F - R	Final Exam Period

Course Outline

Week + Dates	Section # + Topic	Lecture # + HW Assignment			
1 1/20- 1/23	6.1: Volumes Using Cross-Sections	1	p.373:	5,9,10*,15,17,21,28,31,35,36*	
	6.1: Volumes Using Cross-Sections (cont.)	2	p.373:	39,43,45,47,49,51,52*,53,57	
	6.2: Volumes Using Cylindrical Shells	3	p.381:	3,5,9,11,17,19,21,25,29,33,42*,47*,48*	
2 1/26- 1/30	6.3: Arc Length	4	p.388:	1,2,3,4,5,7,13,25,26*	
	6.4: Areas of Surfaces of Revolution	5	p.393:	9,13,15,17,19,21,24,32*	
	6.5: Work	6	p.400:	3,5,6,7,8*,9,13,15,17,18,19*	
3 2/2- 2/6	7.3: Hyperbolic Functions	7	p.445:	1,7,9,15,17,21,23,43,45,47,49,53,55,57,80*,81	
	8.1, 8.2: Using Basic Integration Formulas Integration by Parts	8	p.460:	3,5,9,10,13,15,27,33,34*,36,38,43*	
	8.2, 8.3: Integration by Parts (cont.) Trigonometric Integrals	9	p.467:	3,5,11,13,23,27,28*,29,33,35,37,38*,39,45,46*,47,53*,55	
4 2/9- 2/13	»	REVIEW FOR EXAM I ~ FEBRUARY	10	»	STUDY FOR EXAM I

		11,2015				
COMMON EXAM 1: WEDNESDAY, FEBRUARY 11, 2015						
	8.3, 8.4:	Trigonometric Integrals Trigonometric Substitution	11	p.474:	7,9,11,17,19,21,27,31,35, 37,38,39,45,63*, 64*,65,68*, 71	
	»	GO OVER EXAM 1				
	8.4:	Trigonometric Substitution	12	p.479:	1,5,7,11,12*,17,19,20*,23,29,35,37,39,41,43,44*, 53,57*	
5 2/16- 2/20	8.5:	Integration of Rational Functions by Partial Fractions	13	p.487:	3,7,9,11,14,16,17,18*,19	
	8.5:	Integration of Rational Functions by Partial Fractions (cont.)	14	p.487:	23,25,27,29,30*,31*,33,35,38*,39,41,45,55	
	»	MATLAB 1		»	DUE ON 3/4/15	
	8.7:	Numerical Integration	15	p.501:	3,7,13,17,21,28	
6 2/23- 2/27	8.8:	Improper Integrals	16	p.513:	1,4,6,7,9,11,13,16*,17,21,23,25,28*,31	
	8.8:	Improper Integrals (cont.)	17	p.513:	35,39,41,47,53,54*,55,59, 61,63,64*,67, 69,71*	
	10.1:	Sequences	18	p.581:	3,7,9,15,17,21,23,25,31, 35,37,41,45,48*	
7 3/2- 3/6	10.1, 10.2:	Sequences (cont.) and Infinite Series	19	p.581:	53,61,65,67,69,70*,74*, 79,80*,81,87,89,99	
	10.2:	Infinite Series	20	p.591:	3,5,7,13,25,29,31,37,41, 43,53,55,59,61, 63*,64*,65,69, 71 AND MATLAB 1 IS DUE	
	10.3:	The Integral Test	21	p.598:	3,6,9,11,13,19,20*,23, 25,27,29,33,34*,35,36*,49,51	
8 3/9- 3/13	»	REVIEW FOR EXAM II ~ 3/11/2015	22	»	STUDY FOR EXAM II	
	COMMON EXAM 2: WEDNESDAY, MARCH 11, 2015					
	10.4:	Comparison Tests	23	p.603:	1,4*,5,18,19,21,23,25	
	»	GO OVER EXAM 2				
10.4, 10.5:	Comparison Tests The Ratio and Root Tests	24	p.603:	28,31,32,34,36*,37,39, 40*,41,43,46*,47, 51,56		
3/15 - 3/22, SPRING BREAK, NO CLASSES SCHEDULED						

9 3/23- 3/27	10.5:	The Ratio and Root Tests (cont.)	25	p.609:	5,7,9,18,19,21,29,31,35,38*,42,55,56*,57,58*,59,66
	10.6:	Alternating Series, Absolute and Conditional Convergence	26	p.615:	5,7,9,10,11,12*,13,15, 19,21,23,24*,25
	10.6:	Alternating Series, Absolute and Conditional Convergence (cont.)	27	p.615:	27,30*,34,35,37,39,41,42*,44,47,50*,51,53
10 3/30- 4/2	10.7:	Power Series	28	p.624:	3,5,9,11,15,19,21,22*, 23,24*,27
	• March 30,2015 (M): LAST DAY TO WITHDRAW FROM THIS COURSE				
	10.7:	Power Series (cont.)	29	p.624:	31,32*,37,41,43,45,53,54, 55*
	• April 3,2015 (F): Good Friday,no classes scheduled.				
11 4/6- 4/10	10.8:	Taylor and Maclaurin Series	30	p.630:	3,5,8,9,11,15,18,23,29, 31,34*,35
	»	MATLAB 2		»	DUE ON 4/17/15
	10.9:	Convergence of Taylor Series	31	p.637:	1,9,10,11,13,16*,19,20, 25,26*
	10.9, 10.10:	Convergence of Taylor Series (cont.) and The Binomial Series and Applications of Taylor Series	32	p.637:	29,31*,35,36*,37,39,41, 43,48*,49
12 4/13- 4/17	10.10:	The Binomial Series and Applications of Taylor Series (cont.)	33	p.645:	1,3,5,13,23,25,26*,29, 31,35,39,40*,45,49,55,61
	11.1:	Parametrizations of Plane Curves	34	p.659:	1,3,5,7,9,12*,16
	11.1, 11.2:	Parametrizations of Plane Curves (cont.) and Calculus with Parametric Curves	35	p.659:	19,21,25,27,31,32*,33,39,40* AND MATLAB 2 IS DUE
13 4/20- 4/24	»	REVIEW FOR EXAM III ~ 4/22/15	36	»	STUDY FOR EXAM III
	COMMON EXAM 3: WEDNESDAY, APRIL 22, 2015				
	11.2:	Calculus with Parametric	37	p.669:	7,9,12,13,15,14*,21,26, 28,29,31,33,35,47*

		Curves (cont.)			
	»	GO OVER EXAM 3			
	11.3:	Polar Coordinates	38	p.674:	1,5,7,13,17,23,27,32,37, 38*,42*,47,51,59,60,61
14 4/27- 5/1	11.4:	Graphing in Polar Coordinates	39	p.678:	1,7,9,13,17,18*,19,25,27
	11.5:	Areas and Lengths in Polar Coordinates	40	p.682:	1,7,10*,11,13,15,17
	11.5:	Areas and Lengths in Polar Coordinates (cont.)	41	p.682:	21,23,24*,27,28
15 5/4- 5/5	»	REVIEW FOR FINAL EXAM	42	»	STUDY FOR FINAL EXAM
	•May 5,2015 (T): Classes follow a Friday schedule.				
FINALS	FINAL EXAM WEEK: MAY 8-14,2015				