

MATH 112: Calculus II

Spring 2019 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 S. M. A. Khan |
| Math 112-004 | Professor J. Zaleski |
| Math 112-006 | Professor P. Ward |
| Math 112-010 | Professor S. M. A. Khan |
| Math 112-012 | Professor J. Zaleski |
| Math 112-014 | Professor D. Schmidt |
| Math 112-016 | Professor R. Kelly |
| Math 112-018 | Professor P. Rana Concepcion |
| Math 112-020 | Professor E. Dupay |
| Math 112-022 | Professor P. Rana Concepcion |
| Math 112-024 | Professor J. Porus |
| Math 112-026 | Professor J. H. Ro |
| Math 112-030 | Professor P. Ward |
| Math 112-032 | Professor R. Kelly |
| Math 112-102 | Professor A. Noor |
| Math 112-104 | Professor H. Behzadpour |

Office Hours for All Math Instructors: [Spring 2019 Office Hours and Emails](#)

Required Textbook:

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|-----------|--|
| Title | <i>Thomas' Calculus: Early Transcendentals</i> |
| Author | Hass, Heil, and Weir |
| Edition | 14th |
| Publisher | Pearson |
| ISBN # | 978-0134768496 |

University-wide Withdrawal Date: The last day to withdraw with a W is **Monday, April 8, 2019**. 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:

| | |
|-------------------------|-----|
| Quizzes, HW, and MATLAB | 16% |
| Common Midterm Exam I | 18% |
| Common Midterm Exam II | 18% |
| Common Midterm Exam III | 18% |
| Final Exam | 30% |

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 | | |

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. Students are expected to attend class. Each class is a learning experience that cannot be replicated through simply "getting the notes."

Homework Policy: 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.

Quiz Policy: Quizzes will be given approximately once a week throughout the semester. They will be based on the lecture, homework and the in-class discussions. There will be 8-12 assessments given throughout the semester.

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

| | |
|-------------------------|-------------------|
| Common Midterm Exam I | February 13, 2019 |
| Common Midterm Exam II | March 13, 2019 |
| Common Midterm Exam III | April 24, 2019 |
| Final Exam Period | May 10 - 16, 2019 |

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

Missed Exam Policy: If one common exam is missed with an excused absence from the Dean of Students, then the final exam score will count in the place of the missed exam.

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 and put away during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: **Spring 2019 Hours**)

Accommodation of Disabilities: Disability Support Services (DSS) 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 contact Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Disability Support 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 Disability Support Services (DSS) website at:

- <http://www5.njit.edu/studentsuccess/disability-support-services/>

Important Dates (See: [Spring 2019 Academic Calendar](#), Registrar)

| Date | Day | Event |
|---------------------|---------|--|
| January 22, 2019 | T | First Day of Classes |
| February 1, 2019 | F | Last Day to Add/Drop Classes |
| March 17 - 24, 2019 | Su - Su | Spring Recess - No Classes, NJIT Open |
| April 8, 2019 | M | Last Day to Withdraw |
| April 19, 2019 | F | Good Friday - No Classes, NJIT Closed |
| May 7, 2019 | T | Friday Classes Meet/ Last Day of Classes |
| May 8 & 9, 2019 | W & R | Reading Days |
| May 10 - 16, 2019 | F - R | Final Exam Period |

Course Outline

| Lecture | Section | Topic | Assignment in MyMathLab | Assignment to Hand-in |
|---------|----------|--|---|---|
| 1 | 5.6 | Review of Integration, u/du substitution | Section 5.4 #s: 1, 23, 31 Section 5.5 #s: 18, 19, 21, 25, 33, 43, 47, 59 Section 5.6 #s: 27, 29, 39, 53 | |
| 2 | 6.1 | Volumes Using Cross Sections | 5, 9, 17, 19, 23, 30, 33, 37 | Section 6.1 #s: 8,10,17,21,25 (for 17,21 & 25 clearly show a sketch of the revolved figure) |
| 3 | 6.1 | Continue Volumes Using Cross Sections | 41, 42, 43, 45, 47, 49, 51, 53, 55, 59 | Section 6.1 #: 64ab |
| 4 | 6.2 | Volumes Using Cylindrical Shells | 3, 5, 9, 11, 17, 19, 21, 25, 29, 33, 48 | |
| 5 | 6.3 | Arc Length | 1, 2, 3, 4, 5, 7, 15, 27 | |
| 6 | 6.4 | Areas of Surfaces of Revolution | 9, 13, 15, 17, 19, 21, 24 | |
| 7 | 6.5 | Work | 3, 5, 6, 7, 8, 9, 11 | |
| 8 | 6.5 | Work | 16, 17, 18, 19, 20 | Section 6.5 #s: 4,10,21 |
| 9 | 7.3, 8.1 | Basic Integration Formulas (derive derivatives and integrals for $\sinh(x)$, $\cosh(x)$ from 7.3) | Section 8.1 #s: 5, 9, 10, 15, 27, 33, 37 Section 7.3 #s: 6, 7, 9, 13, 17, 43 | |
| 10 | | REVIEW FOR EXAM #1 | | |

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|---|-----------|---|--|---|
| 11 | 8.2 | Integration by Parts | 1, 3, 6, 8, 13, 15, 22, 23, 35, 37, 39, 45, 55 | |
| 12 | 8.3 | Trigonometric Integrals | 7, 9, 11, 13, 17, 19, 27, 31, 35, 37, 39, 45, 64, 65, 67 | |
| 13 | 8.4 | Trigonometric Substitution | 5, 7, 11, 17, 19, 23, 29, 35, 41, 43, 57 | Section 8.4 #s: 1,12,20,44,49,57 |
| 14 | 8.4/8.5 | Continue Trig Substitution & Start Integration by Partial Fractions | Section 8.4: Continue above assignment Section 8.5: 3, 7, 11, 14, 16, 17, 20 | |
| 15 | 8.5 | Integration of Rational Functions by Partial Fractions | 25, 29, 33, 35, 37, 41 | Section 8.5 #s: 9,18,30,39 |
| 16 | 8.7 | Numerical Integration | 3, 7, 13, 17, 21, 28 | |
| MATLAB #1 ASSIGNED: DUE MARCH 25TH | | | | |
| 17 | 8.8 | Improper Integrals | 1, 4, 6, 7, 9, 11, 13, 17, 21, 23, 25, 31 | |
| 18 | 8.8 | Improper Integrals | 39, 43, 45, 51, 57, 59, 63, 65, 67, 71, 73 | |
| 19 | 10.1 | Sequences | 3, 7, 9, 17, 21, 23, 25, 35, 39, 41, 45, 49, 53, 55, 57, 65, 69, 71, 79, 89, 91, 97, 99, 109 | |
| 20 | 10.2 | Infinite Series | 5, 7, 13, 33, 35, 41, 45, 47, 57, 59, 61, 63, 67, 71, 77, 79, 94, 95, 98, 99 | |
| 21 | 10.2/10.3 | Continue Infinite Series & Start Integral Test | Continue above assignment | |
| 22 | | REVIEW FOR EXAM #2 | | |
| 23 | 10.3/10.4 | Finish Integral Test & start Comparison Tests | No online homework | Section 10.3 #s: 3, 6, 9, 11, 13, 14, 15, 19, 20, 23, 25, 27, 35, 36, 48 |
| 24 | 10.4 | Comparison Tests | No online homework | Section 10.4 #s: 1, 4, 5, 12, 18, 19, 21, 23, 28, 31, 33, 34, 36, 37, 38, 41, 45, 47, 56 MATLAB #1 IS DUE |
| 25 | 10.5 | Root and Ratio Tests | No online homework | Section 10.5 #s: 2, 7, 9, 18, 19, 20, 34, 37, 43, 45 |
| 26 | 10.6 | Alternating Series, Absolute vs. Conditional Convergence | No online homework | Section 10.6 #s: 5, 7, 9, 10, 11, 12, 13, 15, 19, 20, 21, 23, 24, 25 |
| 27 | 10.6 | Alternating Series, Absolute vs. Conditional Convergence | No online homework | Section 10.6 #s: 27, 31, 33, 34, 35, 37, 39, 41, 44, 50, 51, 53, 57, 64 |
| 28 | | FLEX DAY: USE ON SERIES CONVERGENCE, POWER SERIES OR TAYLOR SERIES AS NEEDED | | |
| 29 | 10.7 | Power Series | 3, 5, 9, 11, 15, 19, 21, 23, 27 | |
| 30 | 10.7 | Power Series | Continue above assignment | Section 10.7 #s: 22, 24, 31, 32, 39 |
| 31 | 10.8 | Taylor and McLaurin Series | 3, 5, 8, 9, 11, 15, 18, 23, 29, 31, 35 | |

| MATLAB #2 ASSIGNED: DUE APRIL 26TH | | | | |
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| 32 | 10.9 | Convergence of Taylor Series | 1, 9, 10, 13, 17, 19, 22, 25 | |
| 33 | 10.9 | Convergence of Taylor Series | 31, 33, 39, 41, 43, 45, 47, 52, 53 | |
| 34 | 10.1 | Applications of Taylor Series | 23, 25, 29, 31, 35, 39, 45, 49, 55, 61 | |
| 35 | 11.1/11.2 | Parametrization of Plane Curves & Start Calculus with Parametric Curves | Section 11.1 #s: 1, 3, 5, 7, 9, 16, 19, 39, 31, 33, 35, 37, 41, 49 | |
| 36 | | REVIEW EXAM #3 | | |
| 37 | 11.2 | Calculus with Parametric Curves | 7, 9, 12, 13, 15, 21, 26, 28, 29, 35 | MATLAB #2 IS DUE |
| 38 | 11.3 | Polar Coordinates | 1, 5, 7, 13, 17, 23, 27, 32, 37, 47, 51, 59, 61, 63 | |
| 39 | 11.4 | Graphing in Polar Coordinates | No online homework | 1, 2, 3, 4, 5, 6, 19 (graph only), 20 (graph only), 21, 23, 25 |
| 40 | 11.5 | Areas and Lengths in Polar Coordinates | 1, 5, 7, 11, 12, 13, 15, 17 | |
| 41 | 11.5 | Areas and Lengths in Polar Coordinates | 21, 23, 25, 27, 28 | |
| 42 | | CATCH UP AND REVIEW | | |
| | | FINAL EXAM | | |

*Updated by Professor D. Blackmore - 1/15/2019
Department of Mathematical Sciences Course Syllabus, Spring 2019*
