NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

# MATH 309: Mathematical Analysis for Technology
## *Summer 2020 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**: Emphasis on partial derivatives; vector calculus, and multiple integrals.

**Number of Credits**: 4

**Prerequisites**: MATH 112 with a grade of C or better, or MATH 133 with a grade of C or better or MATH 238 with a grade of C or better.

**Course-Section and Instructors**

| Course-Section | Instructor |
|---|---|
| Math 309-450 | Professor S. Alptekin |

**Office Hours for All Math Instructors**: Summer 2020 Office Hours and Emails

**Required Textbook**:

| | |
|---|---|
| **Title** | *Calculus: Concepts and Contexts* |
| **Author** | Stewart |
| **Edition** | 4th |
| **Publisher** | Cengage |
| **ISBN #** | 978-0495557425 |

**Withdrawal Date**: Please see the Summer 2020 Academic Calendar for the last day to withdraw based on the summer session you are registered for.

## COURSE GOALS

**Course Learning Outcomes**: Students will be able to obtain the same outcomes as they are in the campus. There will be variety online methods of instruction. Canvas will be used as the main tool to make announcements, posting online quizzes, grades and other purposes. WebEx meeting application will be used to do virtual online lectures. There will also be

- Video clips and recorded sessions of the class.
- Publisher materials will be available for the instructor and students
- Student feedback will be considered for adjusting online instruction

**Course Requirements:** Online students must have system requirements, required software, and technology competency, and are required to take proctored exams, presenting the instructor with a valid photo ID. Students must complete an experiential learning activity that connects course content to career applications. This activity may be a content specific assignment or practical skill that is applied within a course assignment. This assignment supports the general education learning outcomes of scientific/critical thinking and quantitative reasoning; oral and written communication; and information literacy/technological competency.

**Location:** https://njit.webex.com/mw3300/mywebex/cmr/cmr.do?siteurl=njit&AT=meet&username=alptekinnjit.edu

**Methods of Learning:**

- Online lectures
- Additional Problem Solving Sessions
- Worksheets

## SUGGESTIONS FOR STUDENTS

Our suggestion is the following. In the days prior to your regularly scheduled class time,

- Please read the section of your text book that will be covered. In addition, we will provide an 1-page summary of important ideas, concepts and examples to try.
- Below we have listed some suggested videos that cover the topics related to the subject material for Chapter 15. Please view them prior to class. They are NOT completely aligned with our text book, but are meant to give you a general demonstration. Sometimes the notation used by the instructor is different than what you may be used to.
- During your regularly scheduled class time, your instructor will be on-line, either in Webex, Zoom or Google Hangouts (instructor will announce). The purpose of this on-line interaction is for you to get a chance to ask questions directly to your professor, listen to anything asked by a classmate, and finally to hear directly from your professor regarding coursework. Focus on
- Asking questions from the book that all of your classmates also have access to.

**Most Important**- The most important way for you to continue learning is to really embrace reading the book, working through the examples in each section and doing problems at the end of each section. Answers to odd problems are in the back of the book. Minimize the time you spend watching videos in favor of working off-line. It's ok and in fact encouraged to work on-line with small groups of friends in problem solving sessions; but again, use examples from the book.

## 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** | 10% |
| **Quizzes** | 10% |
| **Midterm Exam I** | 25% |
| **Midterm Exam II** | 25% |
| **Final Exam** | 30% |

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

| | | | |
|---|---|---|---|
| **A** | 90 - 100 | **C** | 65 - 74 |
| **B+** | 85 - 89 | **D** | 55 - 64 |
| **B** | 80 - 84 | **F** | 0 - 54 |
| **C+** | 75 - 79 | | |

**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 an expectation of the course. All homework assignments are online using WebAssign. The online assignments can be completed at www.webassign.net. You need to have a student access code. Access codes are included with new book that is bundled with WebAssign; codes can be purchased separately from the bookstore or online. WebAssign gives you free access for two weeks after the start of class. In addition, on the first day of class your course instructor will give an additional code "Class key" needed to enroll to WebAssign.

**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. Quizzes will sometimes be assigned through webassign and students will be expected to complete the quiz online. There are no make-up quizzes; average will be calculated after dropping the lowest two scores.

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

| | |
|---|---|
| Midterm Exam I | June 17, 2020 |
| Midterm Exam II | July 15, 2020 |
| Final Exam | August 3, 2020 |

**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.

## ADDITIONAL RESOURCES

**Math Tutoring Center**: Located in the Central King Building, Room G11, See: (Summer 2020 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. 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:

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

**Important Dates** (See: Summer 2020 Academic Calendar, Registrar)

| Date | Event |
|---|---|
| May 18, 2020 | First Day of Classes |
| May 18, 2020 | Last Day to Add/Drop Classes for **FIRST, MIDDLE, AND FULL** |
| May 25, 2020 | University Closed for Memorial Day |
| June 22, 2020 | Last Day of **FIRST SUMMER SESSION** |
| June 29, 2020 | First Day of **FTF AND SECOND SUMMER SESSION** |
| July 4, 2020 | University Closed for Independence Day |
| July 13, 2020 | Last Day of **MIDDLE SUMMER SESSION** |
| August 3, 2020 | Last Day of **FULL AND SECOND SUMMER SESSIONS** |
| August 12, 2020 | Last Day of **FTF SUMMER SESSIONS** |

# Course Outline

| Lecture | Section | Topics | Homework Assignments |
|---|---|---|---|
| 1 | 9.1 | Three Dimensional Coordinates | 7,8,10,11,12 |
| 2 | 9.2 | Vectors | 7,11,13,15,16,17,19,24 |
| 3 | 9.3,4 | The Dot and Cross Product | 9.3.1,3,4,10,15,16,29, 9.4.7,8,19,20 |
| 4 | 9.5 | Equations of Lines | 2,3,19 |
| 5 | 1.7 | Parametric Curves | 5,22,31 |
| 6 | 10.1 | Vector Functions | 1,2,4,5,15 |
| 7 | 10.2 | Derivatives/Integral of Vectors | 9,11,12,15,33,34,35 |
| 8 | 6.1 | Parametric Integrals | 34,34SA |
| 9 | 3.4 | Tangents to Parametric Curves | 33,79 |
| 10 | 6.4 | Arc Length | 1,7,16 |
| 11 | 10.3 | Arc Length and Curvature | 1,3,17,23,25 |
| 12 | 9.5 | Equations of Planes | 14,23 |
| 13 | 11.1 | Functions of Several Variables | 5,12,15,16,18,19 |
| 14 | 9.7 | Cylindrical & Spherical Coordinates | 3,25 |
| 15 | 11.3 | Partial Derivatives | 15,16,17,18,21,39,51,54 |
| 16 | 11.4 | Tangent Planes | 2,3,5 |
| 17 | 11.5 | The Chain Rule | 2,3,5,7,9,21,22 |
| 18 | 11.7 | Max and Min Values | 7,9,11,39,42 |
| 19 | 12.1 | Double Integrals | 1,11,12 |
| 20 | 12.2 | Iterated Integrals | 3,4,5,15 |
| 21 | 12.3 | Double Integrals over General Regions | 1,5,6,7,8,17,47,50 |
| 22 | 12.4 | Double Integrals in Polar Coordinates | 15 |

| | | | |
|---|---|---|---|
| 23 | 12.7 | Triple Integrals | 3,6,11,13 |
| 24 | 12.8 | Triple Integrals in Cylindrical and Spherical Coordinates | 7,9,10,35 |
| 25 | 13.1 | Vector Fields | 11,21,33 |
| 26 | 13.2 | Line Integrals | L15.2.8,14,30,60 |
| 27 | 13.3 | Fundamental Theorem of Line Integral | 3,12,13,14,17 |
| 28 | 13.4 | Green's Theorem | 1,4,5,6 |
| | | **REVIEW FOR FINAL EXAMINATION** | |

*Updated by Professor S. Alptekin - 4/30/2020*
*Department of Mathematical Sciences Course Syllabus, Summer 2020*