Math 397 - Calculus III – Spring 2017

Course Description: MAT 397 is the third course in a three-semester sequence in Calculus. This sequence is designed for Mathematics, Science and Engineering majors and for those students in other majors who intend to take advanced courses in mathematics. This course covers the concepts of vectors, vector valued functions, functions of several variables, partial derivatives, multiple integration, and vector calculus.

Text: *Essential Calculus: Early Transcendentals*, by James Stewart, 2nd edition, Cengage Publishing. We will cover chapters 10-12 and the first half of chapter 13. Not all subsections will be covered. Your instructor will let you know what topics are being omitted.

Prerequisites: Completion of MAT 296 (Calculus II) with a grade of C- or better.

Liberal Arts Core: Completing MAT 397 with a grade of C or better satisfies the Quantitative Skills requirement of the Liberal Arts Core in the College of Arts and Sciences. It also may simultaneously be used to partially satisfy the Natural Sciences and Mathematics divisional requirement.

Calculators: A calculator may be useful or needed at times for some homework problems. However, **calculators will not be allowed on quizzes or exams.** This includes calculators on cell phones. All electronic devices (other than calculators) should be silenced and put away during class.

Course Format: The course format is two or three lectures (depending on your section) and a recitation each week. New material will be introduced in lecture by your primary instructor. Your recitation instructor will answer questions on the course material and the assigned homework problems. Quizzes will be given during recitation. **Exams may be in either lecture or recitation**. Be sure to check the specific dates for your section of the course.

Class Attendance and Participation: You are expected to attend and participate in class. Strong attendance and participation are good indicators of success in this course. On the other hand, missing class is the most common reason for poor performance. If you miss a class, you are responsible for obtaining notes for that class from a student who attended. It is also your responsibility to find out about any announcements made in class.

Help: Your instructor and recitation instructor will hold regular office hours and will make appointments with students having class conflicts with their scheduled office hours. In addition, the Mathematics Department offers regular Calculus clinics. These will be set up by the second week of the semester and a schedule of the clinics will be posted outside the math office and on the department's website.

Course-related problems: Please inform your instructor of any problems you have with this course. Problems not satisfactorily resolved with your instructor should be brought to the attention of the course supervisor (listed below) without delay.

Course Supervisor: Professor Declan Quinn, Carnegie Room 306A
Phone: (315) 443-1484 email: dpquinn@syr.edu

Homework: Suggested homework assignments are listed below. The specific assignment for your class will be given by your instructor. Some sections may use the online homework system WebAssign. You may also have weekly quizzes during recitation that are based on the homework assignments.

Midterm Exams: There will be three in-class tests. There will be **no make-up quizzes or tests**. A missed quiz or test counts as a zero unless you present a valid excuse from a physician or the Dean's Office. With an acceptable written excuse, your missed exam score will be replaced by your score on the portion of the final examination on that material.

Final Exam: The final examination covers the entire course. It is a two-hour exam and will be given on **Monday, May 8**, 8:00am–2:30pm. The exact time and location of your final examination will be announced in lecture. The final examination will be given at this time and at no other time. **Do not make plans to leave campus before 3:00 pm on Monday, May 8.**

Important Dates:

Financial deadline to drop class	Tuesday, February 7th
Academic drop deadline	Tuesday, March 21st
Withdrawal deadline	Tuesday, April 18th
Final Exam	Monday, May 8th

Grades: Each test counts for 20% of your course grade. The final examination counts for 25%, with the remaining 15% coming from quizzes and/or homework.

You will be given the curve for each of the first two exams when you get the exam back. In any case, the curves will be no higher (but may be lower) than the standard Math Department curve:

A (93-100)	A- (90-92)	B+ (87-89)	B (83-86)	B- (80-82)
C+ (77-79)	C (73-76)	C- (70-72)	D (60-69)	F (0-59)

How to Succeed:

1. It is absolutely essential that you understand how to solve the assigned problems. Quiz and exam questions will be similar to these problems. It is important to be able to use the skills and techniques presented in the course and not simply to be able to solve a specific set of problems.

2. Ask questions in lecture, in recitation and at the clinic about anything that is not completely clear. Don't hesitate to bring questions to your instructors during office hours.

3. Every day, read and study your class notes and the sections in the textbook covered in lecture. Learning mathematics takes time! Read carefully and work through all the examples in complete detail. It can be helpful to try to work through an example on your own before reading the solution.

4. Stay caught up. Calculus concepts build on each other cumulatively and you need to stay on top of the material at every stage. If you are having difficulty, don't expect that the problem will take care of itself and disappear later. Contact your course instructor or your recitation instructor immediately and discuss the problem!

5. Form a study group. Many students benefit from a study group to work through challenging problems and to review for exams. You should attempt the problems ahead of time by yourself and then work through any difficulties with your study partners. Explaining your reasoning to another student can help to clarify your own understanding.

6. You should expect to work hard. Don't get discouraged if you find some of the material very difficult. Be persistent and patient! If you follow the above suggestions, your experience in this course will be a rewarding one.

Learning Goals: The successful student will

- ✓ have a basic knowledge and understanding of the analytic and geometric concepts taught, and some of their classical applications to other sciences such as physics.
- ✓ understand the nature and role of deductive reasoning in mathematics.
- ✓ have the ability to use and understand mathematical notation.
- ✓ have the ability to do hand calculations accurately and appropriately.
- ✓ have the ability to follow proofs and other mathematical discourse.
- ✓ freely translate among geometric descriptions and descriptions in terms of equations, parametric equations, and level sets: for lines and planes, as well as for certain more general curves and surfaces.
- ✓ set up the iterated integrals needed to evaluate multiple integrals over regions in 2 and 3 dimensions.
- ✓ effectively use the vector concept in problem solving
- ✓ determine whether a given applied optimization problem is suitable to be solved using multi-variable calculus. If so, formulate the mathematical problem as one of finding the extreme value of a function of several variables over a subset of two or three-dimensional space, including the boundary. Solve the problem in simple example cases.
- ✓ be able to state multi-variable generalizations of the derivative, the chain rule, the fundamental theorem of calculus, the second derivative test, limits, and continuity, and use then in problem solving when appropriate.

Students with disabilities: If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS), http://disabilityservices.syr.edu, located in Room 309 of 804 University Avenue, or call (315) 443-4498 or TDD: (315) 443-1371 for an appointment to discuss your needs and the process for requesting accommodations. ODS is responsible for coordinating disability-related accommodations and will issue students with documented Disabilities Accommodation Authorization Letters, as appropriate. Since accommodations may require early planning and generally are not provided retroactively, **please contact ODS as soon as possible**.

Religious observances policy: Syracuse University's Religious Observances Policy recognizes the diversity of faiths represented among the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their tradition. Under the policy, students are provided an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance provided they **notify their instructors no later than the end of the second week of classes** for regular session classes and by the submission deadline for flexibly formatted classes. Student deadlines are posted in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

Academic Integrity: Syracuse University's academic integrity policy reflects the high value that we, as a university community, place on honesty in academic work. The policy defines our expectations for academic honesty and holds students accountable for the integrity of all work they submit. Students should understand that it is their responsibility to learn about course-specific expectations, as well as about university-wide academic integrity expectations. The university policy governs appropriate citation and use of sources, the integrity of work submitted in exams and assignments, and the veracity of signatures on attendance sheets and other verification of participation in class activities. The policy also prohibits students from submitting the same written work in more than one class without receiving written authorization in advance from both instructors. The presumptive penalty for a first instance of academic dishonesty by an undergraduate student is course failure, accompanied by a transcript notation indicating that the failure resulted from a violation of academic integrity policy. The presumptive penalty for a first instance of academic dishonesty by a graduate student is suspension or expulsion. SU students are required to read an online summary of the University's academic integrity expectations and provide an electronic signature agreeing to abide by them twice a year during pre-term check-in on MySlice. For more information and the complete policy, see http://academicintegrity.syr.edu.

Suggested Homework

[Be sure to check with your instructor(s) for the specific homework in your section. Not all the material in these sections will be covered. Lecture is the best guide to what you are expected to know.]

Section	Problems
10.1	1 - 4, 7, 9 - 13, 15, 18, 19, 21, 23, 27 - 30, 33, 35
10.2	2 - 4, 5 - 17 odd, 18, 24, 28
10.3	1, 2, 5 - 9, 11, 15, 16, 19, 21, 29, 31, 32, 36, 37, 39, 41*
10.4	1 - 7 odd, 9, 13*, 16, 17, 19, 20, 27 - 33 odd, 34, 37 – 39
10.5	1, 3, 5, 7 - 15, 18, 19, 21 - 32, 33 - 39 odd, 41, 44 - 46, 49
10.6	1 - 7 odd, 11, 13, 17, 19, 21, 24, 26, 29, 30
10.7(1)	1, 3 - 5, 7, 9, 15, 17, 23, 28 – 30
10.7(2)	33 - 43 odd, 46, 47, 49, 50, 59 - 67 odd
10.8	1, 3, 4, 13, 15, 39 – 42
10.9	3 - 11 odd, 22 – 25
11.1	1 - 19 odd, 22 - 24, 27, 31, 47 – 50
11.2	1 - 11 odd, 15, 21 – 25
11.3	1, 7 - 17 odd, 21, 27, 31, 33, 39, 41, 45, 47, 51, 53, 57
11.4	1, 3, 5, 11, 13, 17, 21, 23, 27
11.5	1 - 7 odd, 13 - 19 odd
11.6	1 - 17 odd, 25, 31 - 35 odd
11.7	1 - 13 odd, 35
11.8	1 - 11 odd, 19, 31, 37
12.1	1a, 3a, 9 - 25 odd, 31, 34
12.2	1 - 9 odd, 11 - 14, 15, 17, 21, 27, 29, 37 - 41 odd, 45, 48 (Set up all and integrate a few.)

12.3	1, 4 - 7, 9, 13 - 19 odd, 23, 25 (Set up all and integrate a few.)
12.4	1, 3, 5, 7, 13
12.5	9, 10, 14, 19, 26, 27, 33, 39 (Set up all and integrate a few.)
12.6	1 - 3, 5 - 7, 9, 13 - 25, 29, 30 (Set up all and integrate a few.)
12.7	1, 3, 5 - 7, 9 - 11, 13, 17, 21 - 27 odd, 37 (Set up all and integrate a few.)
12.8	1, 3, 11 - 19 odd, 23, 24
13.1	11 - 14, 15 - 18, 21, 24, 25
13.2	1 - 3, 5, 6, 9, 11, 13, 15, 17 - 19, 21
13.3	3 - 19 odd
13.4	1 - 13 odd, 18

Problems marked with a * are challenge questions. Have fun thinking about them! In some sections you are told to set up integrals and evaluate a few of them. That is because they are time consuming. You should make sure that you can evaluate the integrals, even if you do not finish the details.