

MAT 397: Calculus III

M002 — Summer 2017

Instructor Information

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Office Hours: MW 1:00–2:00 pm
Course Supervisor: Dr. Dan Zacharia

Class Information

Dates: July 3 – August 10
Time: MTWTh 2:00 – 4:25 pm
Classroom: Carnegie 100

Office hours will occur immediately during the hour before lecture on Monday and Wednesdays. Additional individual meetings to discuss course material or any other concerns can be scheduled by contacting me. You can always feel free to stop by my office at any time to see if I am there. If I am free, I will be more than willing to discuss anything you might have for me.

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 analytic geometry and vectors, functions of more than one variable, multiple integrals, partial differentiation, and physical applications.

Prerequisites

A grade of C– or better in MAT 296 is required to take MAT 397. Students who entered with a C or less in MAT 296 are unlikely to be successful in MAT 397.

Course Materials

Textbook: Stewart, James. *Essential Calculus: Early Transcendentals*. Belmont, CA: Thomson Higher Education, 2007.

Calculator: A calculator is not required for this course. No computational device will be allowed on any exam (including the final exam) unless otherwise instructed. Using or having available any calculator or other computing device during any exam (unless otherwise instructed) is a violation of the Academic Integrity Policy.

Mathematica: Mathematica is *not* required for the course. However, demonstrations of how to use this software will occur in the course as well as how to use free software, such as WolframAlpha, to solve course materials (as well as far more advanced problems, including in Industry) will also be demonstrated. Note that a copy for students is typically \$150 and for individuals is \$310. If you

would like a copy of your own to use, you can download the software for *free* through Syracuse University at <https://its.syr.edu/licenses/Mathematica.html>

Course Philosophy

The emphasis in this course is on learning mathematical concepts through solving problems. You learn Mathematics by doing mathematics. Often, problems are best solved in a cooperative learning situation. Mathematics is not a passive activity! Hence, you will sometimes work in groups, offering the following advantages:

- Group problem solving allows for broader, deeper, and more insightful problems.
- Students are exposed to a variety of thinking and problem-solving styles. This interaction can inspire additional insights into problems and concepts.
- Students can motivate one another to excel and to accept more challenging problems. Furthermore, motivation to persevere with a problem can be increased.
- Students learn to depend on themselves and each other (rather than on the instructor) for problem solutions.
- Conceptual understanding is deeper and longer lasting when ideas are shared and discussed.
- Students learn to communicate Mathematics more effectively.

Learning Outcome Goals

- (i) To develop a matured perspective on how to approach mathematical problems and concepts.
- (ii) To improve your ability to engage in mathematical thinking, reasoning, communication, and problem solving.
- (iii) To learn how to take abstract questions, make them concrete, and use mathematics to analyze and answer these questions.
- (iv) To properly utilize technology to explore, supplement, or answer mathematical questions.
- (v) To encourage you to become a reflective mathematics student.
- (vi) To learn to [self] assess mathematical problems, solutions, and concepts.

Grading

The course grade is determined by the following components:

Exam 1	25%
Exam 2	25%
Exam 3 (Final)	30%
Homework	20%

Grade Scale

The grade scale is the standard Mathematics Department grading scale and is as follows:

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

Attendance & Participation

This is a Summer session course so that each class is equivalent to roughly two Fall semester classes. It is then essential to your success in this course that you attend each lecture and participate in the discussions. Therefore, you are expected to attend each lecture and to show up on time. Should you need to miss a class for any reason, you are to contact the instructor in a timely manner. Reasons for missing lecture must be documentable and presented if requested. You are responsible for any material covered during the lecture as well as any work assigned during the lecture. More than two unexcused absences from lectures could result in receiving an F in the course. Furthermore, excessive lateness will also count as an absence. If you are dismissed from lecture due to problems during the lecture, e.g. disruptive behavior or unauthorized cell phone use, then this dismissal will be recorded as an absence.

One of the most crucial aspects of this course is problem solving. Much of lecture will be dedicated to individual or group problem solving. However, the problems addressed in lecture will not be enough to properly master the material. Therefore, you should be dedicating a significant amount of time outside of lectures working through the problems provided. The best way to do so is to form a study group with others in your class. Working together on a regular schedule helps to motivate yourself to regularly address the material and helps you think through material by explaining it to others or helps you by having others help you work through problems you would have otherwise not been able to complete.

However, do not forget that Calculus is *not* simply about solving problems; Calculus is about concepts. There is not enough time to master every problem type you could be presented. Be sure to spend time when problem solving to study the underlying concept in the problem. For each concept learned in class, you should understand the logical reasoning involved and how it might be applied in various scenarios. Moreover, you should have a geometric picture attached to each concept. The material covered in the course is intricately and deeply linked to geometrical concepts – as the projects will explore. Knowing this and having a deep understanding of it makes the problems easier, your mastery of the material greater, and lengthens your recall time for the material.

Projects

There will be 6 projects throughout the semester. Each project will be worth 5% of your course grade. A project will be due roughly each week of class and will be related to the material covered that week or the previous week. The purpose of each project is to either to apply the mathematics learned to a real world problem or use the material to solve a more advanced mathematical problem. The projects will test your mastery of the material and push your mathematical thinking. Accordingly, the projects will be more difficult than class material and possibly even exam material. Therefore, you should start the projects as soon as possible.

You may work with others on the projects. However, the work you submit must be your own. If you work with others, you must indicate where in your work. Similarly, any sources you use to help you with the project must be cited where they are used. Any source, whether online, another individual, et. cetera, can only be used to help you work through the problem and may not be used to explicitly solve the problem. To do so will be considered a violation of the Syracuse University Academic Integrity Policy. If you are unsure of whether a source can be used in the problem, consult with the instructor.

Projects should be written up neatly on blank sheets of paper or typeset using a program such as LaTeX. The title of the project and the project author should appear in larger font on the front sheet. Projects should be written to be understandable by any person taking a course equivalent to Calculus III. Therefore, the write up should be clear, concise, and neatly presented. Any mathematics should be clearly explained and all necessary work shown. Each section and individual part should be clearly labeled. Equations used later in your project should be properly numbered and referenced. Be sure to submit each project at the start of lecture on the day which it is due. Late projects will receive point deductions or possibly a zero.

Exams

All exams will take place during normal class hours. You are expected to be present, seated, and ready to take the exam before the exam is to be given. The first two exams will typically occur in the first half of lecture. The final exam may take up the entirety of the final lecture. If there is to be a take-home portion for any exam, it will be given out at least 24 hours before any in-class portion.

If you must miss an exam, it is imperative that you make the instructor aware before the exam begins. If you cannot be present for an exam, you must make the instructor aware in a timely manner before the exam so that arrangements can be made. Reasons for missing an exam must be documentable and such documentation presented if requested. Each exam case will be handled on an individual basis. The final exam will be cumulative, mandatory, and is scheduled for the final day of class – August 10, 2016 – during your regular lecture time. The final exam may take the entire lecture block.

Students with Disabilities

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. My goal as your instructor is to create a learning environment that is useable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, I invite you to meet with me to discuss additional strategies beyond accommodations that may be helpful to your success.

If you believe that you need accommodations for a disability, please contact the Office of Disability Services (ODS) located at 804 University Avenue, third floor or go to the ODS website at <http://disabilityservices.syr.edu/> and click current students tab to register on-line. You may also call 315.443.4498 to speak to someone regarding specific access needs. ODS is responsible for coordinating disability-related accommodations and will issue 'Accommodation Letters' to students as appropriate. Since accommodations may require early planning and are not provided retroactively, please contact ODS as soon as possible.

Faith/Tradition Observances Policy

Syracuse University's religious observances policy, found at http://supolicies.syr.edu/emp_ben/religious_observance.htm, recognizes the diversity of faiths represented in 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 should have 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 flexibility formatted classes. You should discuss with your instructor how any missed work is to be made up in a timely fashion; in particular, discuss the issue with them *before* the absence. Student deadlines are posted in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

Counseling Services

If at any point during the semester, you feel overwhelmed with your class work, feel thoughts of depression/suicide, experience sexual assault/rape, experience problems with substance abuse or relationship abuse, or have any other struggles with physical/mental health, ***please seek help!*** The Counseling Center Services at Syracuse University is a resource offering assistance with any issue you might have - both individually and through group sessions. There is ***never*** any shame in seeking help. If you or someone you know is struggling with any of these issues, speak out! The Counseling Center Services website can be found at <http://counselingcenter.syr.edu/>, is located at 200 Walnut Place, Syracuse NY 13244-4350, and can be contacted at 315.443.4715.

If you or someone you know is having issues with gender or sexual identity issues, the LGBT[QIA]+ Center is there to create a safe space for those with marginalized genders and sexualities or those who might be struggling with these issues. The LGBT[QIA]+ Center website can be found at <http://lgbt.syr.edu/>, is located at 750 Ostrom Avenue, Syracuse, NY 13244-4350, and can be contacted at 315.443.3983. Know that my office is a safe space and should you prefer any gender specific pronoun/name, please be sure to make me aware!

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. Under the policy, students found in violation are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered as described in the Violation and Sanction Classification Rubric. 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 this course, the academic integrity aspects especially relate to quizzes/exams, as well as independent work to be done for any labs, projects, and reports. No student is allowed to use

any electronic device, except for a calculator, during any quiz or exam until the quiz or exam is turned in. Accessing material beyond what is provided on the formula card, tables, and the basic calculator functionalities during any quiz or exam is a violation of the academic integrity policy. For any project or reports, standard plagiarism policies apply. Please, review the Syracuse University Libraries page on plagiarism: <https://researchguides.library.syr.edu/c.php?g=258089&p=1723661>. Note that the university offers writing assistance to students, see the “Mathematics & Writing Help” section of the syllabus. Additional rules regarding the projects and reports will be given throughout the semester.

The Violation and Sanction Classification Rubric establishes recommended guidelines for the determination of grade penalties by faculty and instructors, while also giving them discretion to select the grade penalty they believe most suitable, including course failure, regardless of violation level. Any established violation in this course may result in course failure regardless of violation level. For more information and the complete policy, see <http://class.syr.edu/academic-integrity/policy/>.

Mathematics Help

I am always available for help, either during my office hours or whenever you stop by my office and I am there with time to spare. You may also email me to try to set-up a time to see me. While you may email me with questions, many questions are not effectively answerable in an email and may be deferred till you are in class, office hours, or to an individual appointment. You can also seek help from any person staffing the Math Clinic, located in Carnegie 109. Hours, location, and staffing information can be found at <http://math.syr.edu/undergrad/math-help.html> (be sure you are looking at Summer Session II).

Problem Resolution

Please inform the instructor of any problems, questions, or concerns that you have with this course. Do not wait to bring issues to the attention of your instructor! Problems not satisfactorily resolved with your instructor should be brought to the attention of the course supervisor without delay. The course supervisor is Professor Dan Zacharia.

Cellular Phones

Following the Mathematics Department guidelines, all electronic devices other than perhaps a calculator should be turned off and put away during class. Calculators on cellular phones or other computational devices are not to be used on quizzes, tests, or other class activities unless otherwise instructed. Unless otherwise instructed, using a cellular or other electronic device can result in dismal from lecture.