

# MAT 296: Calculus II

## M002 — Summer 2016

### Instructor Information

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*Office Hours:* MW 2:10–3:10 pm  
*Course Supervisor:* Dr. Dan Zacharia

### Class Information

*Dates:* July 5 – August 12  
*Time:* MTWTh 11:45 am–2:10 pm  
*Classroom:* Physics 106

Office hours will occur immediately following 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 296 is the second 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 more advanced courses in Mathematics. This course covers techniques of integration, applications of integration in a variety of contexts, exponential growth and decay, improper integrals, parametric curves in the plane, polar coordinates, sequences and series (including power series, Taylor and Maclaurin series).

### Course Background

Completing MAT 295 (Calculus I) with a grade of C- or better is a prerequisite for MAT 296 (Calculus II). *If you have not satisfied this prerequisite, you must drop MAT 296 and register for MAT 295.* Students who earned a C or less in MAT 295 are at great risk in MAT 296. For these students it is important to review material from earlier courses, especially as it comes up again. At the same time it is also vital not to fall behind with the current material. *Students who have scored a 4 or 5 on the Advanced Placement Calculus BC exam cannot receive both AP credit and credit for MAT 296.*

### 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). Using or having available any calculator or other computing device, unless otherwise instructed, during any exam or during the final exam is a violation of the Academic Integrity Policy.

### Course Philosophy

The emphasis in this course is on learning mathematical concepts through solving problems. You learn Mathematics by doing mathematics. It is our conviction that problems are best solved in a cooperative learning situation. Mathematics is not a passive activity! Hence, you will sometimes work in groups, an arrangement that we believe has 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.

Often, the second portion of lecture will be an individual or group activity designed to engage you in the material from lecture that day or the previous two days. The problems will be designed to test your understanding of the concepts or computational methods introduced. If you or your group does not finish the activity during the lecture, it would be beneficial to finish it outside of the lecture before attempting more difficult material.

## Homework

Homeworks are perhaps the most important factor in learning the course material. Homework gives you the opportunity to work through material on your own and test your understanding and mastery of the material. Homework will primarily be announced and distributed during lecture. While there is no set homework schedule, you can expect to be given a new assignment or have one due approximately every two class days. Homeworks and other course material can be found on the instructors webpage: <http://coffeeintotheorems.com>

Homework problems will be specifically designed by your instructor to test your mastery of the course material. This is an important distinction from in-class problems. In-class problems are given to test whether you *understand* the material while homework is designed to test whether you have *mastered* the material. Therefore, homework exercises will be very difficult. You should not delay in starting these exercises as soon as they are assigned. Homework should show good mathematical exposition: written up neatly with each step/calculation shown and explained when necessary. Each problem should be clearly indicated and given its own sheet of paper.

I encourage you to work with others on these homeworks. Mathematics is a social activity! However, I do expect each student to independently write up her/his own solutions. Do not simply use others to do your work but rather use others to help work through and engage in the concepts. If you work with others, indicate on the problem assignment with whom you worked. **Plagiarism is unacceptable** and will result in a zero grade for all persons involved and will also

result in serious academic repercussions. Even if you are not able to solve the problem - some points may be given for discussion of what you tried and your own thoughts about the problem.

It is important that your grades on an assignment give you meaningful information about your mastery of the material. Therefore, each homework problem will be graded on the following scale:

- 0 : Incognizant: The solution is blank or was not submitted. The solution is entirely incoherent, shows essentially no understanding of the material, or the solution has fatal errors.
- 1 : Beginner: The solution shows some understanding of the basic techniques involved in the problem but is seriously flawed. The solution may demonstrate a lack of organization, a lack of good mathematical exposition, or a lack of understanding of the mathematical vocabulary involved.
- 2 : Novice: The solution shows a basic understanding of the techniques involved in the problem. The solution employs basic mathematical exposition, organization, and vocabulary but has troubling flaws.
- 3 : Competent: The solution shows a good understanding of the techniques involved in the problem. The solution employs good mathematical exposition, organization, and vocabulary but requires improvement in some areas. The solution may have some errors but contains no serious errors.
- 4 : Proficient: The solution demonstrates a deeper understanding of the techniques involved in the problem. The solution demonstrates excellent usage of mathematical exposition, organization, and vocabulary – though some areas could use sharpening. The solution has at most minor errors.
- 5 : Master: The solution demonstrates an excellent understanding of the techniques involved in the problem. The solution demonstrates a command of mathematical exposition, organization, and vocabulary. The solution contains no (or perhaps the most trivial) of errors. The solution may employ innovative techniques to arrive at a solution.

Your homework grade is then an average of the points obtained in each problem. This will allow you to check your mastery of the topic(s) assigned in the homework.

## **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 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 12, 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 environments that are 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](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/>.

## Orange Alert

Orange Alert, Syracuse University's crisis notification system, uses text messages, phone, and email alerts to provide rapid notification and instructions to members of the University community in the event of a critical incident in progress. Critical incidents could include an individual who is considered armed and dangerous, a hazardous materials incident, an explosion, or any other event in which there is an immediate threat of physical harm or death to campus community members. Orange Alert contact information for students, faculty, and staff is drawn from the MySlice online information system; please keep your contact information current. In the event of an emergency, the phone emergency line from on-campus is 711; the phone emergency line from off-campus is 315.443.2224; the phone emergency line from cell phone providers ATT/Verizon/Nextel is #78. For complete details on emergency procedures, visit: <http://emergencyguide.syr.edu/>.

## **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 120. Hours, location, and staffing information can be found at <http://math.syr.edu/Help.htm>

## **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 dismial from lecture.

## Tentative Schedule

The following is a schedule for the course. This schedule is subject to change and should be considered only an approximation to the dates/order of material.

Date	Section	Topics
07/05	8.1, 8.2	Sequences, Convergence/Divergence, Series: Geometric, Telescoping
07/06	8.3, 8.4	Series Tests: Integral, Comparison, Limit Comparison, Alternating
07/07	8.5 - 8.7	Power Series, Taylor/Maclaurin Series
07/11	8.6,8.7	Taylor Series
07/12	8.8	Taylor Remainder Terms
07/13	–	Discussion & Review
07/14	–	Exam 1
07/18	5.5, 6.2, 6.4	Substitution, Integration Tables, Integration by Parts
07/19	6.2, 6.3	Trigonometric Integrals, Partial Fractions
07/20	6.3	Partial Fractions
07/21	6.2	Trig Substitution
07/25	6.6	Improper Integrals
07/26	–	A Menagerie of Integrals
07/27	–	Review
07/28	7.1 - 7.3	Exam 2, Area between curves, Volumes by Shells/Disks
08/01	7.4, 7.5	Arc Length
08/02	7.6	Applications to Science/Engineering
08/03	7.6	Applications to Science/Engineering
08/04	–	Review
08/08	–	Project Presentations
08/09	–	Project Presentations
08/10	–	Course Review
08/11	–	Mathematics in Action, Goodbyes, Exam 3 (Final)