

## Math 397 - Calculus III - Fall 2014

**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.

**Course Supervisor.** Professor Adam Lutoborski, Carnegie Room 213 A, phone: (315) 443-1489, e-mail: [alutobor@syr.edu](mailto:alutobor@syr.edu).

**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. The subsections that will not be covered are listed on the homework sheet. Changes to these skipped subsections may be announced by your instructor during the semester.

**Pre-requisites.** 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 exam.** This includes calculators on cell phones. All electronic devices other than the calculator 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. Exams and quizzes will be given during recitation.

**Class Attendance and Participation.** You are expected to attend and participate in class. Missing class is the most common reason for poor performance in the course. 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 be holding regular office hours and will make appointments with students having class conflicts with their scheduled office hours. In addition, the Mathematics Department offers regular math 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 departments 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 above) without delay.

**Homework:** Homework assignments are listed on the Homework Sheet for the entire semester. Some variations from this list may be announced in class. You may submit some homework assignments to your instructor on paper for grading. Some sections will use the online homework system WebAssign. You may also have weekly quizzes during recitation which are based on the homework assignments.

**Midterm Exams.** There will be three in-class examinations. There will be **no make-up quizzes or exams**. A missed quiz or examination 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 that portion of the material on the final.

**Final Exam.** The final examination covers the entire course. It is a two-hour exam and will be given on **Wednesday, December 10, 8:00–2:30**. The exact time and location of your final examination will be announced in lecture. The final examination is given at this announced time and at no other time. **Do not make plans to leave campus before 2:30 pm on Friday, December 10.**

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

**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 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.** SU 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 holidays 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 are religious observance provided they notify their instructors **before the end of the second week of classes**. An online notification process is available through MySlice (Student Services → Enrollment → My Religious Observances) from the first day of class until the end of the second week of class.

**Academic Integrity.** Syracuse University sets high standards for academic integrity. Those standards are supported and enforced by students, including those who serve as academic integrity hearing panel members and hearing officers. The presumptive sanction for a first offense is course failure, accompanied by the transcript notation Violation of the Academic Integrity Policy. Students should review the Office of Academic Integrity online resource Twenty Questions and Answers About the Syracuse University Academic Integrity Policy and confer with instructors about permitted collaboration and rules for examinations. The Policy also governs the veracity of signatures on attendance sheets and other verification of participation in class activities. Additional guidance for students can be found in the Office of Academic Integrity resource: What does academic integrity mean?

## Learning Goals.

- A basic knowledge and understanding of the analytic and geometric concepts taught, and of some of their classical applications to other sciences, such as physics
- An understanding of the nature and role of deductive reasoning in mathematics
- Ability to use and understand mathematical notation
- Ability to do hand calculations accurately
- Ability to follow proofs and other mathematical discourse

## 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 the sections in the textbook covered in the 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.

# Homework Sheet

| <b>Chapter 10 - Vectors and the geometry of space</b><br>approximately 4 weeks |  |  |
|--|--|--|
| Section  | Problems   | Notes  |
| 10.1   | online: 3, 4, 10, 13, 27, 31.                                |  |
|  | not-online: 1, 2, 7, 15, 21, 23, 33, 35.                     |  |
| 10.2   | online: 5, 7, 9, 11, 13, 15, 17, 18, 24, 28, 34              |  |
|  | not-online: 2, 3, 4, 10, 12, 18, 21, 22, 33.                 |  |
| 10.3   | online: 1, 2, 5, 7, 9, 15, 16, 19, 21, 31, 32, 37, 39        |  |
|  | not-online: 6, 10, 11, 14, 17, 29, 33, 34, 43.               |  |
| 10.4   | online: 1, 3, 11, 13, 16, 17, 19, 27, 29, 33, 37, 40         |  |
|  | not-online: 2, 5, 7, 9, 15, 20, 31, 34, 38, 39               |  |
| 10.5(a)  | online: 1, 2, 4, 5, 7, 8, 11, 14, 17, 42, 43                 | Homework broken into 2 parts.<br>(a)-lines and (b)-planes                |
|  | not-online: 3, 9, 10, 13, 15, 18, 19, 44, 46                 |  |
| 10.5(b)  | online: 23, 25, 26, 27, 29, 35, 39, 40, 47, 51               |  |
|  | not-online: 21, 31, 33, 37, 41, 45, 49                       |  |
| 10.6   | online: 1, 3, 4, 9, 11, 12-16, 23, 25, 27                    |  |
|  | not-online: 5, 7, 17, 19, 21, 24, 26, 29, 30                 |  |
| 10.7   | online: 1, 3, 5, 7, 17, 21, 25, 28, 39-41, 49, 59, 60, 62    | Skip using computers to draw space curves                                |
|  | not-online: 9, 11, 19, 23, 27, 29, 43, 51, 61, 67.           |  |
| 10.8   | online: 1, 2, 3, 39, 41                                      | Skip curvature.  |
|  | not-online: 4, 40, 42.                                       |  |
| 10.9   | online: 1, 8, 10, 13(a), 15, 19, 20, 21, 27                  | Skip tangential and normal components of acceleration and Kepler's laws. |
|  | not-online: 3, 5, 7, 9, 24, 25                               |  |
| <b>Chapter 11 - Partial Derivatives</b><br>approximately 4 weeks               |  |  |
| Section  | Problems   | Notes  |
| 11.1   | online: 5, 8, 11, 13, 15, 25, 29, 33, 41-47                  |  |
|  | not-online: 1, 3, 7, 17, 22, 24, 31, 49                      |  |
| 11.2   | online: 4, 5, 9, 12, 19, 20, 21, 23                          |  |
|  | not-online: 7, 11, 22, 25                                    |  |
| 11.3   | online: 3, 5, 6, 8, 9, 14, 23, 25, 32, 39, 43, 45, 55        | Skip partial differential equations.                                     |
|  | not-online: 1, 7, 11, 13, 15, 21, 31, 33, 41, 47, 51, 53, 57 |  |
| 11.4   | online: 3, 6, 11, 19, 27, 30                                 |  |
|  | not-online: 1, 5, 13, 17, 39                                 |  |
| 11.5   | online: 1, 4, 7, 9, 11, 17, 32, 33                           | Skip implicit differentiation  |
|  | not-online: 2, 3, 5, 13, 15, 19, 34, 35                      |  |
| 11.6   | online: 3, 7, 11, 15, 21, 24, 32, 42                         |  |
|  | not-online: 1, 5, 9, 13, 17, 23, 25, 31, 33, 35, 43          |  |
| 11.7   | online: 7, 11, 25, 28, 34, 37, 43                            |  |
|  | not-online: 1, 2, 5, 9, 13, 23, 35,                          |  |
| 11.8   | online: 2, 3, 5, 7, 17, 30                                   | Skip two constraints.  |
|  | not-online: 1, 9, 19, 31, 37                                 |  |

| <b>Chapter 12 - Multiple Integrals</b><br>approximately 3 1/2 weeks |   |                             |
|---|---|-----------------------------|
| <b>Section</b>  | <b>Problems</b>   | <b>Notes</b>                |
| 12.1  | online: 1, 7, 8, 12, 15, 17, 24, 29, 35                 | Skip midpoint rule.         |
|   | not-online: 3, 9, 11, 13, 19, 21, 23, 31, 34            |                             |
| 12.2  | online: 1, 3, 7, 9, 11, 15, 17, 19, 21, 24, 37, 41, 43. |                             |
|   | not-online: 5, 13, 23, 27, 39, 45, 49                   |                             |
| 12.3  | online: 1, 3, 9, 13, 14, 17, 21, 23, 25.                |                             |
|   | not-online: 2, 4, 5, 7, 11, 15, 19, 24, 26,             |                             |
| 12.4  | online: 5, 7, 10, 11, 12                                | Skip moments of inertia.    |
|   | not-online: 3, 9, 13, 15                                |                             |
| 12.5  | online: 5, 6, 7, 11, 13, 15, 17, 25, 29, 31, 37         |                             |
|   | not-online: 9, 10, 14, 19, 26, 27, 33, 39               |                             |
| 12.6  | online: 3, 5, 8, 11, 17, 20, 23, 27, 29                 |                             |
|   | not-online: 1, 2, 4, 6, 7, 9, 13, 15, 19, 21, 30        |                             |
| 12.7  | online: 1, 3, 5, 9, 13, 15, 17, 20, 21, 23, 27          |                             |
|   | not-online: 2, 4, 6, 7, 8, 11, 19, 25, 29, 37           |                             |
| 12.8  | online: 1, 6, 7, 9, 15, 17, 23                          |                             |
|   | not-online: 3, 8, 16, 19, 25                            |                             |
| <b>Chapter 13 - Vector Calculus</b><br>approximately 2 1/2 weeks    |   |                             |
| <b>Section</b>  | <b>Problems</b>   | <b>Notes</b>                |
| 13.1  | online: 1, 5, 7, 13, 15, 25                             |                             |
|   | not-online: 11, 12, 14, 16-18                           |                             |
| 13.2  | online: 1, 3, 5, 7, 9, 17, 19, 21                       |                             |
|   | not-online: 6, 11, 13, 15, 18, 22                       |                             |
| 13.3  | online: 1, 3, 5, 7, 9, 11, 15, 17, 20, 21               | Skip conservation of energy |
|   | not-online: 4, 8, 13, 18, 21, 22, 31                    |                             |
| 13.4  | online: 5, 7, 9, 13, 17                                 |                             |
|   | not-online: 1, 3, 6, 11, 18                             |                             |

**Final Exam: December 10**