

MAT 397: Calculus III

M008 — Fall 2020

Instructor Information

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Office Hours: MT 8:00 pm – 9:00 pm
Course Supervisor: Dr. Leonid Kovalev
Course Webpage: <http://coffeeintotheorems.com>

Class Information

Dates: August 24 – December 7
Time: MW 2:15 pm – 3:35 pm, T 3:30 pm – 4:50 pm
Classroom: Maxwell 111 (MW), Carnegie 219 (T)

Course Description & Prerequisites

Analytic geometry and vectors; functions of more than one variable, multiple integrals, partial differentiation, physical applications. *Prerequisites: Satisfactory completion of Calculus II (MAT 296) or equivalent. Note that satisfactory completion means earning a C- or better.*

Course Objectives

After this course, you should be able to . . .

- Determine the equations of lines, planes, spheres, cylinders, and quadratic surfaces in 3D space.
- Define a 3D vector function & compute its higher order derivative.
- Define limit and continuity of a function of two or three variables.
- Define and compute the partial derivatives, total derivatives, directional derivatives, and extreme of functions of two and three variables.
- Compute line integrals.
- Compute double integrals in Cartesian and polar coordinates.
- Compute triples integrals in Cartesian, cylindrical, and spherical coordinates.
- Apply Green's Theorem to the solution of line integrals.
- Compute area, volume, mass, and center of mass using double and triple integrals.
- Describe parametric surfaces and compute their areas.

- Define and evaluate surfaces integrals.
- State and apply Stokes' Theorem.
- State and apply the Divergence Theorem.

And more importantly, after this course, you should. . .

- Develop better mathematical and problem solving skills.
- Improve your ability to understandably express complex or abstract problems and ideas.
- Know how methods from Calculus can be applied to solve real world problems.

Textbook, Calculators, & Software

Textbook: *Essential Calculus: Early Transcendentals*, 2nd Edition, James Stewart; Cengage Learning. You will get a free (cheaper) digital copy of the textbook made available to you when you purchase your WebAssign bundle.

WebAssign: The ISBN for the bundle (book and WebAssign) is 9781133425946. You also need a WebAssign access code for submitting online homework. All students are required to have a WebAssign access code for online homework assignments. This code includes access to the online electronic version of the textbook. Some students will also want a physical copy of the textbook. You may choose between the following options:

- Purchase a WebAssign access code either at the Syracuse University (SU) bookstore or online at <https://www.webassign.net>
- Purchase a new textbook bundled with a WebAssign access code at the SU bookstore. This access code includes access to the online e-book version of the textbook and is valid for future semesters in the Calculus sequence.
- Purchase a new textbook bundled with a WebAssign access code from the publisher's website at <https://www.cengage.com> You can also purchase just the WebAssign access code at the publisher's website.

The WebAssign access code for this course is **syr 7514 3726**.

Calculator: MAT 295, MAT 296, and MAT 397 students are expected to complete the calculus sequence without the use of a calculator. Calculators will not be permitted on quizzes or exams. Computational devices may be used in completing the applied mathematics assignments.

Software: 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. 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>. You can use the various demonstrations online at the Wolfram Demonstrations page without owning a copy of Mathematica using their web browser CDF player.

Phone and Device Policies

Following the Mathematics Department guidelines, unless otherwise instructed, all electronic devices should be turned off and put away during class. Use of such devices can result in dismissal from class. If there is an issue which requires you to need a phone in class, discuss this with your instructor.

Class Attendance and Participation

It is 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, any work assigned, or any course changes made during the lecture. *Do not* expect the instructor to provide notes from any class that you might miss. Six or more 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.

Moreover, your participation will constitute 10% of your course grade. The participation portion of your grade will be measured in two parts. Half of the participation grade (or 5% of your total course grade) will come from attending and participating in lecture. This participation will be measured by attending class and possibly responding to an ungraded lecture questionnaire. Attending class in this context can mean physically coming to class or attending the class virtually. Each unexcused absence will result in a 20% decrease of this portion of the participation grade (1% of the total course grade). If you participate in lecture virtually, in-person or online, you should use your preferred name for your meeting identification, and you should either have your webcam on or upload a profile photo of your face.

Due to COVID social distancing procedures, only a portion of the class will be expected to attend the lecture physically on a given day (if possible), while the remaining students will be expected to participate online (if possible). The schedule for attending lecture will be posted by the instructor. However, no student will be *required* to attend lecture if they do not feel comfortable. Any students who object to attending lectures in person may discuss the possibility of participating in the class entirely virtually with the instructor. Remember, if you feel sick, notify your instructor, *do not attend class*. If illness or perceived illness prevents you from attending class, you may participate virtually. If this is still not possible, this will count as an excused absence from the lecture. Your health and safety is by far the more important concern.

The other half of the participation grade (5% of the total course grade) will come from completing a series of applied calculus problem sets. These problem sets will be graded on effort and completion alone—not correctness. A student need only complete two of the applied calculus problem sets—though they may choose to complete more. Each is worth 50% of this portion of the participation grade (2.5% of the total course grade). However, these problem sets must be completed before the due date. There are no extensions on these problem sets. Only certain combinations of these projects will be permitted, see the course webpage for details.

Syracuse University's Attendance Policy including Verification of Medical Condition: Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that students who do not attend or cease to attend a class to be reported at the time of determination by the faculty that the student never attended or stopped attending the class. Faculty use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUCcess to alert the Registrar and Financial Aid Office. For more information, [visit this link](#). Excuses for class absences for medical reasons will be given only if such absences are advised by a health care provider at the Health Center, based on clinical findings and prescribed treatment recommendations. Excused notes will not be given solely to confirm a visit to the Health Center; Health Services does not issue excuse notes for medical absences. Students may contact the Office of Student Assistance in cases where they are absent from class for an extended period of time (48 hours or more) due to illness or other medical condition. The Office of Student Assistance will utilize Orange SUCcess to send absence notifications to faculty. For illnesses lasting less than 48 hours, the student should discuss academic arrangements with their faculty. For complete details on excuse notes, [visit this website](#).

Homework

The only way to learn Mathematics is to do Mathematics! It is essential for students to complete all of the homework assignments. The purpose of homeworks will for you to practice the concepts covered in class. There may be some problems that will be written and submitted. Written problems will be announced in class. Even if you are not in class, you are responsible for these problems. Much of the homework will be completed on WebAssign. Login at <http://webassign.net>. These assignments will often not be announced. You are responsible for regularly checking for assignments and keeping up with due dates. However, all the WebAssign assignments will be available at the start of the course (if you choose to do them in advance), and they will typically be due Sunday night of the week the material was covered or on the Monday of the following week.

If you need or desire an extension on any homework for any reason, contact your instructor in a timely fashion, as permitted by the need. There is no guarantee that you will receive an extension on any assignment, so plan your schedule carefully. Any extension on WebAssign assignments must be made on WebAssign. If the due date for the assignment has passed, an extension may be possible so long as you have not already viewed the solutions.

Finally, you are encouraged to work with others on homeworks. Mathematics is a social activity! However, 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 on written homeworks, indicate on your assignment with whom you worked. *Plagiarism is unacceptable* and will result in a zero grade for all persons involved, and will result in serious academic repercussions. Any group collaboration not occurring virtually should follow university, local, state, and federal rules or guidelines regarding COVID.

Connecting with Classmates

It may be more difficult to connect with other students in the course due to social distancing. This could make it more difficult to collaborate with other students on homeworks or to form study groups. There will be a 'class' twitter hashtag: #SUMAT397. Note that hashtags on Twitter are *not* case sensitive, so #SUMat397, #SUMat397, etc. all work. You may use this to connect with other

students, post questions, etc. The instructor has a course twitter account: CoffeeIntoTheorems with Twitter handle COffee2Theorems (note the 0 instead of an 'o'). If you choose to use Twitter for this course, you are expected to abide by all policies outlined in the Syracuse University Code of Student Conduct. No student will be required to have a Twitter account or to use Twitter during the course. Moreover, Twitter is not an 'isolated' system—people outside of the class and university use this social media, and they may not behave 'ethically.' If you choose to use Twitter, *you do so at your own risk.*

However, there are other ways to ask questions and connect with students. You may ask questions in the 'Question' section of Blackboard, where both students and the instructor can respond. You may also post about forming study groups in the corresponding Blackboard section as well. You may also use email or any other method of asking questions and connecting with students—in accordance with other course policies. Note if you form study groups and are not meeting virtually, you should follow university, local, state, and federal rules or guidelines regarding COVID.

Quizzes

There will be short daily quizzes. This a chance for you to see if you are following the course material. Though the quizzes are expected to be completed on the day of lecture, the quizzes for any given week will be due Friday of that week. This will give you a chance to study the material more, if needed, and work these into your academic schedule. *No make-up quizzes will be given.* Quizzes must be completed independently and will be closed book, closed notes, and no computational device allowed unless otherwise stated.

Exams

There are two exams and a final exam. Exams will be given online, and will be proctored. Exams will be given during your normal class time. You are responsible for finding an appropriate location that you are comfortable with for taking your exam. You will be expected to have a camera view of yourself during the exam. This can come from a webcam or smart phone camera. At the end of the exam, you will upload your solutions for grading. The conditions and procedures for the final exam will be announced at the end of the semester.

The exams are schedule for the week of September 21st, the week of October 19th, and December 7th. The exact exam dates will be announced in class. If you miss this class, you are responsible for knowing the date of the exam. You are not permitted to use any outside materials, resources, or electronic devices (including but not limited to calculators, mobile phones, smartwatches, etc.) on the exams unless otherwise instructed. Any violation of this policy is a violation of the university's Academic Integrity Policy.

There will be no make-up exams, even in the case of an emergency. A missed exam counts as a zero unless a valid excuse from a physician or the Dean's Office is presented to your instructor and accepted by the instructor. With an acceptable written excuse, a missed exam score will be replaced with the percentage earned on the corresponding subsection of the final exam.

The final exam is comprehensive and will be given during a two-hour block on Monday December 7, 2020 between 8:00 a.m. – 2:30 p.m.. The conditions and procedures for the final exam will be

announced at the end of the semester. The date of the final exam is already set by the university, and the final exam will only be given at the announced time. *There will be no exceptions, so do not make plans on this day during this time period.* If a student has a conflict with another final exam, the student must contact their instructor at least two weeks in advance in order to have it resolved.

Grading

The course grade is determined by the following components:

Exam 1	20%
Exam 2	20%
Final Exam	20%
Participation	10%
Homework	20%
Quizzes	10%

Grade Scale

Final grades will be assigned according to the following scale:

A	93 – 100	C+	77 – 79
A-	90 – 92	C	73 – 76
B+	87 – 89	C-	70 – 72
B	83 – 86	D	65 – 69
B-	80 – 82	F	0 – 64

Mathematics & Writing Help

Be proactive about your success in the course! If you need help, there are many resources available to help you. Your first primary contact for help is the instructor. If you are struggling, attend office hours or send an email. Do not wait to bring issues, course related or otherwise, to the attention of the instructor. If you cannot attend office hours, send an email to the instructor to try to make other arrangements. You may also find help at the Math Clinic, Calculus Help Center, University College Clinic, and much more, see the following: <https://thecollege.syr.edu/mathematics/undergraduate-studies/math-help/>. Furthermore, the Center for Learning and Student Success (CLASS) might offer *free* group tutoring sessions for MAT 397. They are located on the Lower Level of Bird Library, see <http://class.syr.edu/> or call 315.443.2005.

Stay Safe Pledge

Syracuse University's Stay Safe Pledge reflects the high value that we, as a university community, place on the well-being of our community members. This pledge defines norms for behavior that will promote community health and well-being. Classroom expectations include the following: wearing a mask that covers the nose and mouth at all times, maintaining a distance of six feet from others, and staying away from class if you feel unwell. Students who do not follow these norms will not be allowed to continue in face-to-face classes; repeated violations will be treated as violations of the Code of Student Conduct and may result in disciplinary action. Masks being required at all

times, students are not allowed to eat or drink in class.

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 Center for Disability Resources (CDR) located at 804 University Avenue, third floor or go to the CDR website at <https://disabilityresources.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. CDR 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 CDR as soon as possible.

Faith/Tradition Observances Policy

Syracuse University's religious observances policy, found at <https://policies.syr.edu/policies/university-governance-ethics-integrity-and-legal-compliance/religious-observances-policy/>, 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 (Barnes Center at The Arch)

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 <https://ese.syr.edu/bewell/>, is located at 150 Sims Drive, Syracuse NY 13244, and can be contacted at 315.443.8000.

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 on the fifth floor of Bird Library at 548 Bird Library, Syracuse, NY 13244, 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.

Furthermore, as stated by the University, all academic integrity expectations that apply to in-person quizzes and exams also apply to online quizzes and exams. In this course, all work submitted for quizzes and exams must be yours alone. Discussing or communicating about quiz or exam questions with anyone during the quiz or exam period violates academic integrity expectations for this course. While collaboration on other homework, such as WebAssign, the Applied Calculus Problems, etc., is allowed, students must submit their own solutions. These solutions must be sufficiently distinct—representative of the students own understanding of the material. Submissions which do not follow this guideline will be considered a violation of the academic integrity policy. If you are not sure if what you wish to submit follows the course policy guidelines, consult with your instructor *in a timely fashion before deadline and before submitting the assignment*.

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/>.

Use of Student Work

In compliance with the federal Family Educational Rights and Privacy Act, registration in this class is understood as permission for assignments prepared for this class to be used anonymously in the future for educational purposes.

Email Policy

Syracuse University has established email as a primary vehicle for official communication with students, faculty, and staff. All email communication in this course should be done using your @syr.edu email account. Due to federal laws, such as FERPA, emails coming from a non-SU email may not receive a response. Please, title emails with MAT 397: [Email Issue], where “email issue” is a summary title of the content of the email. This is to help ensure that your email is noticed and responded to.

Course Materials Policy

Unless the copyright is explicitly held by some other individual, group, or other entity, other than the instructor, all course materials (defined to include, but not limited to, course handouts, video/audio lectures, assignments, quizzes, exams, etc.) are assumed to be the intellectual property of or copyrighted by the instructor, protected by United States copyright law [Title 17, U.S. Code]. While you are allowed to download any course materials for personal use, you are not allowed to (in print, digitally, or otherwise) share, distribute, sell, publish in any form, in part or in whole, to any individual, group, or other entity. The instructor, or agent acting on behalf of the instructor, also reserves the right to delete or disable any link to any course materials. In enrolling in the course, the student agrees to abide by this course materials policy.

Important Dates

- Financial Aid/Academic Drop Deadline: 09/14
- Academic Withdrawal Deadline: 11/18
- Final Exam: 12/07

Tips for Success

- Be proactive about your success in the course.
- Do not procrastinate! Begin your assignments and studying early!
- Attend every class and recitation.

- Ask questions whether it is during class, recitation, office hours, at the math clinic or via email to your instructor.
- Form a study group! Working together will help you and others better understand the course material as you can work through different difficulties and offer each other clarifications on concepts.
- Do problems! Reading through your notes is not enough. Seek out new problems and work through them carefully. When you are done, check your answer. If you are wrong, examine carefully what misunderstanding occurred and how to avoid it in the future. If you were correct, examine if there was a faster way, check to see if your solution ‘flowed’ and was easy to read, and think over what concepts/computations were used and what ‘type’ of problem the exercise was.
- Always check to be sure that you understand what a calculus concept can be applied to and how to use it in that way.
- Every time you approach a new concept, carefully think how it could be applied in your own field of study.

Tentative Schedule

Below is a *tentative* schedule for the course, and this schedule is subject to change throughout the semester. Note that there is a class on Saturday September 5th in the classroom normally used on Wednesday — Maxwell 111.

Week	Date/Day	Sections	Week	Date/Day	Sections
1	08/24 — M	10.1, 10.2	8	10/12 — M	12.3, 12.6, 12.7 Review
	08/25 — T	10.3		10/13 — T	12.4
	08/26 — W	10.4		10/14 — W	Chapter 12 Review
2	08/31 — M	10.5 (Lines)	9	10/19 — M	Exam 2
	09/01 — T	10.5 (Planes)		10/20 — T	13.1
	09/02 — W	10.6		10/21 — W	13.5
	09/05 — S	10.7		10/26 — M	13.2
3	09/07 — M	10.8, 10.9	10	10/27 — T	13.2
	09/08 — T	11.1, 11.2		10/28 — W	13.3
	09/09 — W	11.3		11/02 — M	13.4
4	09/14 — M	11.4	11	11/03 — T	13.1–13.4 Review
	09/15 — T	11.5		11/04 — W	13.6
	09/16 — W	11.6		11/09 — M	13.7
5	09/21 — M	Exam 1	12	11/10 — T	13.6, 13.7 Review
	09/22 — T	11.7		11/11 — W	13.8, 13.9
	09/23 — W	11.7 Review		11/16 — M	13.8, 13.9 Review
6	09/28 — M	11.8	13	11/17 — T	Chapter 13 Review
	09/29 — T	12.1, 12.2		11/18 — W	Course Review
	09/30 — W	12.5		14	11/23 — M
10/05 — M	12.1, 12.2, 12.5 Review	11/24 — T	Course Review		
7	10/06 — T	12.8			
	10/07 — W	12.3, 12.6, 12.7			

Respect Policy

I respect your time:

- I will come prepared to help you understand the course material and prepare you for quizzes/exams.
- Communication is key: I cannot help you if I do not know what is going on.
- I am here to help you, this is your time, so let me know what I can do to help you succeed.
- If there is something that you would like me to do differently, please, let me know. I am happy to work with you to make class the best it can be.

Respect my time:

- Be on time to class.
- Pay attention when I am talking to you.
- Come to class prepared by doing the work and going to office hours when you need help.

Respect each other:

- Do not be disruptive. If you need to take a call or text someone, take it outside.
- Work with each other to find solutions. You learn more by helping each other.
- Allow one another to make mistakes. This is an important part of the learning process.
- Use respectful language when talking with one another.

COVID Discussion Policy

At the time of writing, there have been over 5.6 million cases of COVID-19 in the United States with over 175,000 deaths; moreover, there have been over 22.9 million cases with 798,000 deaths worldwide. It is an understatement to say that these are trying times not just for students, along with their friends and family, but for our broader community. While many of us use humor to cope with difficult situations, we are often able to do so without great offense because we can choose our words and our actions to fit an audience with which we are familiar—be it friends or family.

However, this luxury may not be available to us in the classroom. You will likely not know all your classmates and their circumstances. It is not unlikely that at least one of your classmates in at least one of your classes has lost an acquaintance, friend, or family member to COVID-19. Worse yet, because of social distancing, they may not have been able to properly mourn them. Even if a classmate has not lost someone, they or someone in their life may be experiencing financial hardships or other crises due to COVID-19.

While all students are expected to respect and protect each other by signing and abiding by Syracuse University's 'Stay Safe Pledge', we need to do more as a community. Protecting the health of others is the minimum one can do in a pandemic. We need to go beyond basic physical health and support our community's mental health. By enrolling in this course, you should refrain from making jokes or other trivialization of the COVID-19 pandemic while participating in the course, both online and in-person.