

MATH 121D, Fall 2020: Calculus I

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Class Meetings Mondays, Wednesdays, Fridays: 1:10 – 2:10 PM on Zoom

Office Hours All office hours will be conducted via Zoom unless previously arranged. Drop-in hours will be as listed below, though other times will be available - just email me!

Mondays, Wednesdays, Fridays 12:00 – 12:45 PM
Tuesdays, Thursdays 11:30 – 12:30 PM

Course Information This course provides an introduction to Calculus, including the study of limits, derivatives, graphing, and beginning integration. The course will also use technology as a tool and learning aid.

Intended Learning Outcomes By the end of this course, students will be able to:

- apply techniques of differentiation and integration to model and solve problems.
- understand the role of Calculus and the infinitesimal in modern mathematics.
- understand the concepts behind limits, derivatives, and integrals.
- recognize the role of technology in Calculus, understand when it should be used, and be aware of its limitations.

Required Materials Textbook: *Calculus: Early Transcendental Functions*; Smith and Minton, 4th Edition
Calculator: TI-83 Calculator, or similar (with graphing capabilities)
Computer: A laptop computer with Mathematica installed, or access to Mathematica.

Course Grades The following table lists the weights for the various forms of assessment for this class.

Problem Sets	24%
Mathematica Assignments	8%
Recitation	10%
Tests	40%
Final Exam	18%

A grade scale will be determined after final grades are computed, but will be no worse than the scale given below. Attendance and class participation will be considered when determining marginal grades.

	B+	87-89	C+	77-79	D+	67-69		
A	93-100	B	83-86	C	73-76	D	63-66	F 0-59
A-	90-92	B-	80-82	C-	70-72	D-	60-62	

Expected Work Hours This course expects you to spend at least 12 hours of work each week inside and outside of class.

Face Mask Policy

Face coverings/masks must be worn over the mouth and nose by all students and instructors in classrooms and hallways of academic buildings. By wearing face coverings, we protect our college community and its most vulnerable members. Students who come to class without a face mask that is being worn properly will be asked to leave and will be readmitted only after they are wearing one.

Attendance & Make-Up Work

Attendance is critical to the understanding of the material in the course; however, you should not attend class if you are ill.

If you have a temperature of 100.4 or higher or other coronavirus symptoms, don't come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. Do keep up with all readings, assignments, and deadlines. In order for your absence to be excused, you must give Health Services permission to notify me that you have consulted them about coronavirus symptoms. If Health Services informs you that you should isolate and not attend class for multiple days or weeks, inform me so that we can make a plan to keep you current in the course. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused.

This course's policy for all other absences is that any absence that is not discussed with the instructor prior to the missed class is considered unexcused. I will assume that if you accumulate 4 unexcused absences you are not interested in completing the course. After the 3rd unexcused absence, you, your advisor, and the registrar will be warned that another absence will result in your removal from the class (DF).

When absent, excused or unexcused, you are responsible for all material covered in class. You will not be allowed to make up any work missed due to an unexcused absence.

No late work will be accepted unless you have contacted me prior to the due date and obtained permission to turn in late work. Permission will be granted only for rare circumstances outside your control, such as illness. Do not wait until the last minute to submit work that is due online.

Academic Integrity

Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No collaboration is allowed on quizzes or tests. Unless otherwise stated, you may work together on the homework, but should write up your solutions separately.

Cell phones must be turned off prior to entering the classroom. Laptops may be used for note-taking during regular class sessions, if this seems useful to you, but you may not log on to the internet or to an email server unless specifically told to do so. The use of laptops and other electronic devices during an in-class exam is strictly prohibited. This includes tablets, smart phones, and iPods. Any use of such devices during a quiz or exam will be considered a breach of academic integrity. Note that looking at or using your cell phone during a test or quiz is considered a violation of Academic Integrity regardless of your purpose or intent in doing so.

Recitations

You must be enrolled in the recitation portion (MATH 121R) in addition to the current course. MATH 121R will review important concepts needed for calculus (such as trigonometry, exponential and logarithmic functions, and graphing) as well as provide time to practice with new concepts encountered in MATH 121. MATH 121R operates as a separate course, but it counts as 10% of the course grade for MATH 121. Please consult the recitation course syllabus for additional information on policies and grading.

Problem Sets A problem set will be due about once a week. These will be assigned well in-advanced and each are worth a total of 25 points. There are two parts to each problem set. The first part of each problem set is worth 20 points and will be graded based on correctness. Each week you will complete 5 problems which will be carefully graded, with each problem worth 4 points. The second portion of the problem set is based on presentation, and worth 5 points.

You will turn in your problem set on Inquire. Make sure your homework is neat, organized, and scanned correctly so that I can easily read it. Solutions will be posted by the following class period. You can collaborate on problem sets but you must write up your own solutions. If you are looking at another person's work when you are writing up your problem set, then you are in violation of the academic integrity policy of Roanoke College.

At the end of the semester, your lowest grade on a Problem Set will be dropped.

Mathematica Assignments In addition to the problems sets, we will have questions and assignments based in Mathematica. Mathematica is a powerful software package that we will use throughout class to help emphasize calculus concepts over needing to compute, say, derivatives and integrals by hand every time we need them. This software will let us spend more time on the "how and why" of calculus and what it can potentially be used for in the future. As part of this class, we will spend a few full days using this technology, done as a combination class discussion, work with a partner, and homework. You must bring a laptop (with Mathematica installed) to class on the days listed in the schedule on the last page.

Mathematica Assignments will be submitted through Inquire. They will be due roughly two days following the class in which the topic was introduced. At the end of the semester, your lowest grade on a Mathematica Assignment will be dropped.

Tests Five tests will be given throughout the semester according to the schedule on the last page of this syllabus (any changes from this schedule will be announced well in advance). Each test will focus on the material learned since the last test, but as with most mathematics classes, the exam will necessarily require you to understand and remember things from the past.

Each test will be take-home. Some portion may be completed through an on-line quiz, but most of the test will be short answer format similar to the Problem Sets. See individual test instructions regarding use of notes, books, and other resources.

Final Exam The final exam will be comprehensive and given during the scheduled time for block 3: **Friday November 20, 8:00 AM – 12:00 PM.**

Co-Curricular Engagement The MCSP Department offers a series of talks (MCSP Conversation Series) that appeal to a broad range of interests related to these fields of study. These co-curricular sessions engage the community to think about ongoing research, novel applications and other issues that face our discipline.

Members of this class are invited to be involved with all of these meetings. After attending, submit a one page paper reflecting on the discussion through Inquire. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience. These reflection papers earn extra credit, with .5% added to your course average for each attended, up to 2% total. In addition, individually you may request that other appropriate events count.

**Subject
Tutoring**

Subject Tutoring is located on the lower level of Fintel Library (Room 5) and is open 4 pm -- 9 pm, Sunday -- Thursday. We are a Level II Internationally Certified Training Center through the College Reading and Learning Association (CRLA). Subject Tu- tors are friendly, highly-trained Roanoke College students who offer free, one-on-one tutorials in a variety of general education and major courses (see all available sub- jects at www.roanoke.edu/tutoring). Tutoring sessions are available in-person or on- line in 30 or 60-minute appointments (please specify if you prefer to meet with a tu- tor online or in-person when you make your appointment). All in-person appointments will maintain at least 6 feet of physical distance, desks will be cleaned between ap- pointments, and masks must be worn in all indoor, public spaces. In the event that all classes go online this semester, Subject Tutoring will remain available online, too. Schedule an appointment at www.roanoke.edu/tutoring or contact us at 540-375-2590 or subject_tutoring@roanoke.edu. We hope to see you soon!

**Accessible
Education
Services**

AES is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Laura Leonard, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Laura Leonard at your earliest convenience to schedule an appointment.

**Remote
Learning Pivot**

If the college is forced to suspend in-person attendance as was done during Spring Semester 2020, this class will continue to meet via Zoom at our regular time. I will distribute an amended syllabus. I will email the class that plan. You will need internet connectivity. If you have technology challenges, I need you to email me as soon as the decision is made to go remote so that we can discuss how you can keep up. I will continue to have office hours at my regular times via Zoom.

Tentative
Course
Schedule

The following schedule is approximate and subject to change. It should give you an idea of the timing of the topics covered and assignments. Any updates to due dates will appear on Inquire.

Practice Problems and Problem Sets (PS) will be assigned on Inquire. Practice Problems will be completed before class but not collected, and Problem Sets will be turned in on Inquire by 11:59PM on the day listed.

Mathematica questions (MQ) will be assigned following a Mathematica lesson (as listed below). These will be turned in on Inquire by 11:59PM on the day listed.

Date	Section	Topic	Turn-in Items Due
Wed Aug 19	1.1	Preview; Small Group Discussion	
Fri Aug 21	1.2	The Concept of Limits	
Mon Aug 24	1.3	Computation of Limits	
Wed Aug 26		<i>Mathematica: introduction</i>	PS 1
Fri Aug 28	1.4	Continuity and its Consequences	MQ1 (Friday by 11:59PM)
Mon Aug 31	1.5	Limits Involving Infinity	
Wed Sept 2		<i>Mathematica: graphs and asymptotes</i>	PS 2
Fri Sept 4		Test 1	Test 1 due by 7PM
Mon Sept 7	2.1	Tangent Lines and Velocity	MQ2 (Sunday by 11:59PM)
Wed Sept 9	2.2	The Derivative	
Fri Sept 11		<i>Mathematica: solving</i>	PS 3
Mon Sept 14	2.3, 2.4	Derivative Rules Day #1	MQ3 (Monday by 11:59PM)
Wed Sept 16	2.5	Derivative Rules Day #2	
Fri Sept 18	2.6, 2.7	Derivative Rules Day #3	
Mon Sept 21	3.2	Derivative Recap & <i>Mathematica: derivatives</i>	PS 4 (Monday by 11:59PM)
Wed Sept 23		L'Hopital's Rule	MQ 4
Fri Sept 25		Test 2	
Mon Sept 28	3.3, 3.4	Max/Mins; Increasing/Decreasing	
Wed Sept 30	3.5, 3.6	Concavity and Curve Sketching	
Fri Oct 2		<i>Mathematica: hidden graphs</i>	PS 5
Mon Oct 5	3.1	Linear Approximation, Newton's Method	MQ5 (Sunday by 11:59PM)
Wed Oct 7	2.8	Implicit Differentiation	
Fri Oct 9		Test 3	
Mon Oct 12	3.7	Optimization	
Wed Oct 14	3.8	Related Rates	
Fri Oct 16		<i>Mathematica: hard optimization</i>	PS 6
Mon Oct 19	4.1	Antiderivatives	MQ6 (Sunday by 11:59PM)
Wed Oct 21		Test 4	
Fri Oct 23		<i>Mathematica: eye on the ball</i>	
Mon Oct 26	4.2, 4.3	Sums & Area	MQ7 (Sunday by 11:59PM)
Wed Oct 28	4.4	The Definite Integral	PS7
Fri Oct 30	4.5	Fundamental Theorem of Calculus	
Mon Nov 2	4.6	Integration by Substitution	
Wed Nov 4		<i>Mathematica: integration</i>	PS8
Fri Nov 6		Test 5	
Mon Nov 9	7.1	Modeling with Differential Equations	MQ8 (Sunday by 11:59PM)
Wed Nov 11	7.2	Separable Differential Equations	
Fri Nov 13		<i>Mathematica: COVID models</i>	PS 9
Mon Nov 16		Review	MQ9 (Sunday by 11:59PM)
Sat Nov 21		Final Exam: 1:00 PM - 5:00 PM	