MATH 121A, Fall 2021: Calculus I

Instructor	Dr. Karin Saoub	*Phone:* (540) 375-2348
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Class Meetings Mondays, Wednesdays, Fridays: 9:40 – 10:40 AM in Trexler 374

Office Hours Drop-in times are listed below. Other times are available by appointment (just email me!), and can be conducted in person or on Zoom.

   Mondays, Wednesdays, Fridays   11:00 – 11:45 AM

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	The College has issued a mask mandate for the start of the semester that requires masks to be worn in indoor common spaces such as our classroom. You must wear a mask in this class. If you arrive without a mask, you will not be allowed to stay and may lose credit for attendance or in-class work. The Bookstore sells masks if you need to make a quick purchase. If the mandate is extended, you will be required to continue to wear a mask. By wearing face coverings, we protect our college community and its most vulnerable members.
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 but you will need to do the work and graded assignments even if we extend a deadline for you.

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 many 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 in class (or on Inquire). Make sure your homework is neat, organized. If you choose to submit it on Inquire you must ensure that it is 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. |
| Final Exam | The final exam will be comprehensive and given during the scheduled time for block 2: **Wednesday December 15, 8:30 – 11:30 AM**. |
| 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 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. Subject Tutors are friendly, highly-trained Roanoke College students who offer free, one-on-one (and small group) tutorials in a variety of general education and major courses Check out all available subjects and schedule 30- or 60-minute appointments at . If you have a question, feel free to stop by, or contact them at subject tutoring@roanoke.edu or 540-375-2590. We hope to see you soon! |

Accessible Education Services	AES 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 Becky Harman, 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 Becky Harman at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.			

Classroom Etiquette

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

Tentative Course Schedule

The schedule on the next page is approximate and subject to change. It should give you an idea of the timing of the topics covered and assignments. Assignment due dates are approximate and any updates will appear on Inquire.
121R topics are listed in gray on Thursdays. Consult your 121R instructor or Inquire page for specific instructions for each week.

Practice Problems and Problem Sets (PS) will be posted on Inquire. Practice Problems will be completed before class but not collected, and Problem Sets will be turned in by 2:00PM on the day listed unless otherwise stated on Inquire.

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

	Date	Section	Topic	Turn-in Items Due
Wed	Sept 1	1.1	Preview; Small Group Discussion	
Thu	Sept 2	R	Test-out Quizzes	
Fri	Sept 3	1.2	The Concept of Limits	
Mon	Sept 6	1.3	Computation of Limits	
Wed	Sept 8		*Mathematica: introduction*	PS 1
Thu	Sept 9	R	Factoring, Cancelling, Fractions	
Fri	Sept 10	1.4	Continuity and its Consequences	MQ1
Mon	Sept 13	1.5	Limits Involving Infinity	
Wed	Sept 15		*Mathematica: graphs and asymptotes*	PS 2
Thu	Sept 16	R	Lines, Exponent Rules	

Fri	Sept 17		**Test 1**	
Mon	Sept 20	2.1	Tangent Lines and Velocity	MQ2 (Sunday by 11:59PM)
Wed	Sept 22	2.2	The Derivative	
Thu	Sept 23	R	Trigonometry	
Fri	Sept 24		*Mathematica: solving*	PS 3
Mon	Sept 27	2.3, 2.4	Derivative Rules Day #1	MQ3
Wed	Sept 29	2.5	Derivative Rules Day #2	
Thu	Sept 30	R	Exponential Functions, Logarithms	
Fri	Oct 1	2.6, 2.7	Derivative Rules Day #3	
Mon	Oct 4	3.2	Derivative Recap & *Mathematica: derivatives*	PS 4
Wed	Oct 6		L'Hˆopital's Rule	MQ 4
Thu	Oct 7	R	Solving $f(x) = 0$	
Fri	Oct 8		**Test 2**	
Mon	Oct 11	3.3, 3.4	Max/Mins; Increasing/Decreasing	
Wed	Oct 13	3.5, 3.6	Concavity and Curve Sketching	
Thu	Oct 14	R	Derivative Review	
Fri	Oct 15		*Mathematica: hidden graphs*	PS 5
			Fall Break	
Mon	Oct 25	3.1	Linear Approximation, Newton's Method	MQ5 (Sunday by 11:59PM)
Wed	Oct 27	2.8	Implicit Differentiation	
Thu	Oct 28	R	Right Triangles, Geometry	
Fri	Oct 29		**Test 3**	
Mon	Nov 1	3.7	Optimization	
Wed	Nov 3	3.8	Related Rates	
Thu	Nov 4	R	Optimization	
Fri	Nov 5		*Mathematica: hard optimization*	PS 6
Mon	Nov 8	4.1	Antiderivatives	MQ6 (Sunday by 11:59PM)
Wed	Nov 10		**Test 4**	
Thu	Nov 11	R	Sums	
Fri	Nov 12		*Mathematica: eye on the ball*	
Mon	Nov 15	4.2, 4.3	Sums & Area	MQ7 (Sunday by 11:59PM)
Wed	Nov 17	4.4	The Definite Integral	PS7
Thu	Nov 18	R	Integral Review	
Fri	Nov 19	4.5	Fundamental Theorem of Calculus	
Mon	Nov 22	4.6	Integration by Substitution	
			Thanksgiving Break	

Mon	Nov 29		*Mathematica: integration*	PS8
Wed	Dec 1		**Test 5**	
Thu	Dec 2	R	Exponential Functions, Logarithms	
Fri	Dec 3	7.1	Modeling with Differential Equations	MQ8 (Sunday by 11:59PM)
Mon	Dec 6	7.2	Separable Differential Equations	
Wed	Dec 8		*Mathematica: COVID models*	PS 9
Thu	Dec 9	R	Final Review	
Fri	Dec 10		**Review**	MQ9 (Sunday by 11:59PM)
Wed	Dec 15		**Final Exam: 8:30 AM - 11:30 PM**	