MATH 121, Fall 2018: 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 West 117

OFFICE HOURS   By appointment only. See `https://saoub.youcanbook.me`

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.

Homework/Quizzes	25%
Technology Assignments	10%
Tests	45%
Final Exam	20%

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.

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 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.

PROBLEM SETS   A problem set will be due each Wednesday. These will be assigned on the previous Wednesday and each are worth a total of 25 points. There are three parts to each problem set. The first part is worth 10 points and will be graded based on effort and completeness. This part consists of the daily homework assignments for the previous three class periods. Daily homework will include roughly 10 problems and you are welcome to ask questions about them at the beginning of class. The second part of each problem set is worth 12 points and will be graded based on correctness. Each week you will complete 3 problems which will be carefully graded, with each problems worth 4 points. The final portion of the problem set is based on presentation, worth 3 points.

When you turn in your problem set on Wednesday, make sure the three problems graded for correctness are on top and then below are your three daily assignments. Your homework should be neat, organized, and stapled. Solutions will be posted on the following Friday. You can collaborate on problem sets but you must write up your own solution. 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.

If you will be absent, turn in your homework before the class period it is due, or have a friend turn it in for you. Late homework will only be accepted within 2 days of the original due date and will automatically lose the completion points.

REFLECTIONS   As part of the homework grade, there will be 2 reflections assigned during the semester. You can find the prompts on Inquire and upload your responses there as well. They are worth 10 points each and will be graded on how thoughtful and complete you are.

QUIZZES   There may also be written quizzes in this class. They may either be in-class quizzes or take-home quizzes. I may occasionally warn you about an upcoming quiz but you should be prepared to take a quiz on any given day.

TECHNOLOGY ASSIGNMENTS   We will be using the powerful software package Mathematica 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. These assignments will be worth a good portion of your final grade.

TESTS AND FINAL   Four 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. The final exam will be comprehensive and given during the scheduled time for the final exam for our class.

MCSP CONVERSATIONS   The MCSP Department offers a series of discussions 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; however participation in at least **two** of these sessions is mandatory. After attending, submit a one page paper reflecting on the discussion. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience. This reaction paper will be counted as a quiz and should be uploaded to Inquire using the appropriate link. If you are caught leaving the talk early or being disruptive, you will receive a 0 on the assignment.

ATTENDANCE & MAKE-UP WORK

Attendance is critical to the understanding of the material in the course; it is both required and expected. 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.

STUDY ROOM

The MCSP Study Room, Trexler 271, can be used by you and your friends to meet up so that you can work on homework together or prepare for tests. It is open virtually 24 hours a day, 7 days a week (very occasionally there are meetings in that room). Your student ID card should grant you access to Trexler Hall any time of day if the doors happen to be locked (use the card access point located by the first floor entrance facing the parking lot). Take advantage of this area and time, especially during weekdays when I and the other faculty teaching calculus are around!

COMMUNITY

Please feel free to become an active member of our department's community. Each of the three disciplines in our department has a student club and you should join! The Roanoke College Student Chapter of the Mathematical Association of America (or "Math Club" for short) meetings periodically, plays and learns about games and hosts evening events and the annual Pi-Day celebration! Membership in our Math Club also grants membership into the MAA itself; one of the premiere professional mathematical organizations in the world.

In addition, our department offers a weekly tea time for students and faculty; feel free to stop by the MCSP Study Lounge (Trexler 271) for tea and cookies on Thursdays from 2:15 PM to 3:15 PM. Come meet other students as well as chat with the MCSP faculty members in a casual setting!

SUBJECT TUTORING

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4 pm – 9 pm, Sunday – Thursday. Tutoring sessions are available in 15, 30, or 45-minute appointments. Feel free to drop by for a quick question or make an appointment at www.roanoke.edu/tutoring for a longer one-on-one appointment. For questions or concerns, please contact us at 540-375-2590 or `subject_tutoring@roanoke.edu`.

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.

Wed	Aug 29		Preview; Small Group Discussion
Fri	Aug 31	1.2	The Concept of Limits
Mon	Sept 3	1.3	Computation of Limits
Wed	Sept 5	1.4	Continuity and its Consequences
Fri	Sept 7	1.5	Limits Involving Infinity
Mon	Sept 10	2.1	Tangent Lines and Velocity
Wed	Sept 12	2.2	The Derivative
Fri	Sept 14	2.3, 2.4	Derivative Rules Day #1
Mon	Sept 17	2.5	Derivative Rules Day #2
Wed	Sept 19		**Review**
Fri	Sept 21		**Test 1**
Mon	Sept 24	2.6, 2.7	Derivative Rules Day #3
Wed	Sept 26	2.8	Implicit Differentiation
Fri	Sept 28	3.8	Related Rates
Mon	Oct 1	3.3	Maximums/Minimums
Wed	Oct 3		Technology Day #1: Derivatives in Mathematica
Fri	Oct 5	3.4	Increasing and Decreasing Functions
Mon	Oct 8	3.5, 3.6	Concavity and Curve Sketching
Wed	Oct 10		**Review**
Fri	Oct 12		**Test 2**
			Fall Break!
Mon	Oct 22	3.1	Linear Approximation, Newton's Method
Wed	Oct 24	3.2	L'Hôpital's Rule, Indeterminate Forms
Fri	Oct 26	3.7	Optimization Day #1
Mon	Oct 29	3.7	Optimization Day #2
Wed	Oct 31	4.1	Antiderivatives
Fri	Nov 2	4.2, 4.3	Sums and Area
Mon	Nov 5	4.4	The Definite Integral
Wed	Nov 7		**Review**
Fri	Nov 9		**Test 3**
Mon	Nov 12		Technology Day #2: Numerical Integration, Detailed Sums
Wed	Nov 14	4.5	The Fundamental Theorem of Calculus
Fri	Nov 16	4.6	Integration by Substitution
Mon	Nov 19	6.2	Integration by Parts
			Thanksgiving Break
Mon	Nov 26	6.6	Improper Integrals
Wed	Nov 28		Integration Review
Fri	Nov 30	5.1	Area Between Curves
Mon	Dec 3		**Review**
Wed	Dec 5		**Test 4**
Fri	Dec 7		**Review**
Wed	Dec 12		**Final Exam: 8:30 AM - 11:30 AM**