

MATH 121A, Fall 2016: Calculus I

Instructor	Dr. Adam Childers Trexler Hall 270G Email: childers@roanoke.edu	Phone: (540) 375-2449 Fax: (540) 375-2561 Web: see Inquire (inquire.roanoke.edu)
Class Meetings	Mondays, Wednesdays, Fridays: 9:40 AM - 10:40 AM in Trexler 374	
Office Hours	Mondays, Wednesdays, and Fridays: 10:50 AM - 11:50 AM Thursdays: 10:00 AM - 11:00 AM and by appointment	
Course Information	This course provides an introduction to Calculus, including the study of limits, derivatives, graphing, and beginning integration. A focus of the course will be the use of technology as a tool and learning aid.	
Intended Learning Outcomes	By the end of this course, students will be able to: <ul style="list-style-type: none">• 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: <i>Calculus: Early Transcendental Functions</i> ; 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		

Homework	Homework will be assigned regularly in this class (virtually every class period). It will be due at the start of the class period immediately following the assigning of homework. A few problems will be collected and graded for correctness (at 3 points) and the remainder will be graded for completion (at 2 points) for a total of 5 points. Mathematica software may be used in some fashion for one of the questions but please indicate on your homework where Mathematica was used and either attach a printed notebook, email me your notebook, or indicate what commands you used.
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 four full days using this technology, done as a combination class discussion, work with a partner, and homework. These three 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 will engage the community to think about ongoing research, novel applications and other issues that face our discipline. You are invited to be involved with all of these meetings; however participation in at least two of these sessions is mandatory. After attending, students will 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. These reaction papers will be counted as a quiz.
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. 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 every other week, plays and learns about games and hosts evening events and the annual Pi-Day celebration!

In addition, our department offers MCSP Tea every week on DAYS from TIME to TIME; come by Trexler 271 to talk to and meet other students as well as chat with the MCSP faculty members in a casual setting!

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

The Office of Disability Support Services is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. DSS provides reasonable accommodations to students with documented disabilities. To register for Disability Support Services, students must self-identify to the Office of Disability Support Services, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact JoAnn Stephens-Forrest, MSW, Coordinator of Disability Support Services, at 540-375-2247 or e-mail her at: stephens@roanoke.edu to schedule an appointment. If you have registered with DSS in the past, and would like to receive academic accommodations for this semester, please contact Ms. Stephens-Forrest at your earliest convenience, to schedule an appointment.

Academic Integrity The Roanoke College Academic Integrity System applies to all graded work in this course. Students are responsible for understanding and adhering to the Academic Integrity System. Among other things the Academic Integrity System prohibits giving or receiving unauthorized aid, assistance, or unfair advantage on academic work. Please note that having a phone or unauthorized electronic device out during a test is an academic integrity violation.

Course Schedule

Wed	Aug 31		Preview; Small Group Discussion
Fri	Sept 2	1.2, 1.3	The Concept and Computation of Limits
Mon	Sept 5	1.4	Continuity and its Consequences
Wed	Sept 7	1.5	Limits Involving Infinity
Fri	Sept 9	1.6	Formal Definition of the Limit
Mon	Sept 12	2.1, 2.2	Tangent Lines and Velocity; The Derivative
Wed	Sept 14	2.3, 2.4	Derivative Rules Day #1
Fri	Sept 16	2.5	Derivative Rules Day #2
Mon	Sept 19	2.6, 2.7	Derivative Rules Day #3
Wed	Sept 21		Review
Fri	Sept 23		Test 1
Mon	Sept 26	2.8	Implicit Differentiation
Wed	Sept 28	2.10	The Mean Value Theorem
Fri	Sept 30	3.1	Linear Approximation, Newton's Method
Mon	Oct 3	3.2	L'Hôpital's Rule, Indeterminate Forms
Wed	Oct 5	3.3, 3.4	Increasing and Decreasing Functions; Maximums/Minimums
Fri	Oct 7		Technology Day #1: Derivatives in Mathematica
Mon	Oct 10	3.5, 3.6	Concavity and Curve Sketching
Wed	Oct 12		Review
Fri	Oct 14		Test 2
Fall Break!			
Mon	Oct 24	3.7	Optimization Day #1
Wed	Oct 26	3.7	Optimization Day #2
Fri	Oct 28	3.8	Related Rates Day #1
Mon	Oct 31	4.1	Antiderivatives
Wed	Nov 2	4.2, 4.3	Sums and Area
Fri	Nov 4		Technology Day #2: Numerical Integration, Detailed Sums
Mon	Nov 7	4.4	The Definite Integral
Wed	Nov 9		Review
Fri	Nov 11		Test 3
Mon	Nov 14	4.5	The Fundamental Theorem of Calculus
Wed	Nov 16	4.6	Integration by Substitution
Fri	Nov 18	5.1	Area Between Curves
Mon	Nov 21	5.2	Volume (Disks/Washers)
Thanksgiving Break			
Mon	Nov 28	5.4	Arc Length and Surface Area
Wed	Nov 30	6.2	Integration by Parts
Fri	Dec 2	6.6	Improper Integrals
Mon	Dec 5		Review
Wed	Dec 7		Test 4
Fri	Dec 9		Review
Wed	Dec 14		Final Exam: 8:30 AM - 11:30 AM