MATH 121B Fall 2024: Calculus I

Dr. Adam Childers

Instructor Information

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Class Meetings

Mondays, Wednesdays, Fridays: 9:40-10:40 AM in Trexler 374.

Student Hours

Tuesdays and Thursdays: 11:00 AM - 12:00 PM in Trexler 270G or on Zoom. You can also schedule an appointment through email.

Course Information

This course introduces 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 with Mathematica installed or access to Mathematica.

Course Grades

Homework	15%
Problem of the Day	10%
Recitation	10%
Tests	50%
Final Exam	15%

Grade Scale

A grade scale will be determined after final grades are computed but will be no worse than the scale given below:

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

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 electronic devices can be used during any class or testing period.

Recitations

You must be enrolled in the recitation portion (MATH 121R) in addition to the current course. MATH 121R operates as a separate course but it counts as 10% of the course grade for MATH 121.

Online Homework

There is daily online homework and it is due before the start of the next class via My Open Math (`https://www.myopenmath.com`). Course ID: 243058, Enrollment key: RCMath. I will drop your 2 lowest grades. You have 5 late passes that will give you a 24-hour extension. Note that if you turn in an assignment 2 days late, that will count for 2 late passes.

Problem of the Day

Each class will begin with a quick problem (POD) that will cover content from the previous section we covered in class. You will be given the POD at the beginning of class and have about 5 minutes to complete it. If you get to class late, the POD is still due 5 minutes after class starts. If you are absent or more than 5 minutes late to class, then you will get a 0 for the POD. I will drop your 2 lowest scores.

Attendance & Make-Up Work

Attendance is critical to understanding the material in the course; it is both required and expected. Any absence not discussed with me prior to missing class is considered an unexcused absence. There are no make-up opportunities for missed HW or POD. If you have to miss a test and have spoken to me before the test period, you can make it up before the class meets again. If you cannot make the test up in that time period then I will replace the test with your final exam score.

Tests and Final

Four tests will be given throughout the semester. The final exam will be comprehensive and held on December 11, 8:30 AM - 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. Attendance at one of these talks is required and will count towards your homework grade.

Study Room

The MCSP Study Room, located in Trexler 271, can be used by you and your friends to meet and work on homework together or prepare for tests. It is open virtually 24 hours a day, 7 days a week, although there are occasional meetings in that room. Your student ID card should grant you access to Trexler Hall anytime 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 space and time, especially during weekdays when I and the other faculty teaching calculus are around!

Community

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 are encouraged to join! The Roanoke College Student Chapter of the Mathematical Association of America (or "Math Club" for short) meets periodically, plays games, and hosts evening events as well as the annual Pi-Day celebration. Membership in our Math Club also grants membership in the MAA itself, one of the premier professional mathematical organizations in the world.

Additionally, our department offers a weekly teatime for students and faculty. Stop by the MCSP Study Lounge (Trexler 271) for tea and cookies on Thursdays from 2:20 PM to 3:20 PM. This is a great opportunity to meet other students and chat with MCSP faculty members in a casual setting!

Subject Tutoring

Subject Tutoring is located on the lower level of Fintel Library (Room 5) and is open from 4 PM to 9 PM, Sunday through Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (or small group) tutorials in over 80 courses taught at Roanoke College, including Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Check out all available subjects and schedule 30- or 60-minute appointments at www.roanoke.edu/tutoring. If you have questions, feel free to stop by or contact Subject Tutoring at subjecttutoring@roanoke.edu or call 540-375-2590.

Accessible Education Services (AES)

AES is located in the Goode-Pasfield Center for Learning and Teaching in Fintel Library. AES provides 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 a qualified specialist.

Please contact Dustin Persinger, 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 Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Course Schedule (Tentative)

Date	Section	Topic
Wed, 28-Aug		Preview; Small Group Discussion
Thu, 29-Aug	R	Test-out Quizzes
Fri, 30-Aug	1.2	The Concept of Limits
Mon, 2-Sep	1.3	Computation of Limits
Wed, 4-Sep		Introduction to Mathematica
Thu, 5-Sep	R	Factoring Cancelling Fractions
Fri, 6-Sep	1.4	Continuity and its Consequences
Mon, 9-Sep	1.5	Limits Involving Infinity
Wed, 11-Sep	2.1	Tangent Lines and Velocity
Thu, 12-Sep	R	Lines Exponent Rules
Fri, 13-Sep	2.2	The Derivative
Mon, 16-Sep	2.3 2.4	Derivative Rules Day #1
Wed, 18-Sep		Review
Thu, 19-Sep	R	Trigonometry
Fri, 20-Sep		Test 1
Mon, 23-Sep	2.5	Derivative Rules Day #2
Wed, 25-Sep	2.6 2.7	Derivative Rules Day #3
Thu, 26-Sep	R	Exponential Functions Logarithms
Fri, 27-Sep	Derivative Recap	
Mon, 30-Sep	3.2	L'Hopital's Rule Indeterminate Forms
Wed, 2-Oct	3.3	Maximums/Minimums
Thu, 3-Oct	R	Solving f(x) = 0

Fri, 4-Oct	3.4	Increasing and Decreasing Functions
Mon, 7-Oct	3.5 3.6	Concavity and Curve Sketching
Wed, 9-Oct		Review
Thu, 10-Oct	R	Derivative Review
Fri, 11-Oct		Test 2
Mon, 21-Oct	3.1	Linear Approximation Newton's Method
Wed, 23-Oct	2.8	Implicit Differentiation
Thu, 24-Oct	R	Derivative Review
Fri, 25-Oct	3.8	Related Rates
Mon, 28-Oct	3.7	Optimization Day #1
Wed, 30-Oct	3.7	Optimization Day #2 Applications Recap
Thu, 31-Oct	R	Optimization
Fri, 1-Nov	4.1	Antiderivatives
Mon, 4-Nov		Review
Wed, 6-Nov		Test 3
Thu, 7-Nov	R	Sums
Fri, 8-Nov	4.2	Sums
Mon, 11-Nov	4.3	Area
Wed, 13-Nov	4.4	The Definite Integral
Thu, 14-Nov	R	Integral Review
Fri, 15-Nov	4.5	The Fundamental Theorem of Calculus
Mon, 18-Nov	4.6	Integration by Substitution
Wed, 20-Nov		Integration Review
Thu, 21-Nov	R	Exponential Functions Logarithms
Fri, 22-Nov	7.1	Modeling with Differential Equations
Mon, 25-Nov	7.2	Separable Differential Equations
Mon, 2-Dec		Review
Wed, 4-Dec		Test 4
Fri, 6-Dec		Review
Wed, 11-Dec		Final Exam: 8:30 AM - 11:30 AM

Note: This schedule is approximate and subject to change.