MATH 121 B: Calculus 1
Fall 2024, MWF 10:50 - 11:50, Trexler Hall 374

Instructor: Dr. Michael Weselcouch
Office: Trex #270F
Student Hours: Tu 11:00-12:00, Th 1:30-2:30, or by appointment.
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Course Description. 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.

Learning Outcomes. By the end of this course, successful 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.

Course Materials.
(1) *Textbook: Calculus: Early Transcendental Functions;* Smith and Minton, 4th Edition
(2) *Calculator:* Any scientific or graphing calculator.
(3) *Computer:* A laptop computer with Mathematica installed, or access to Mathematica.
(4) *YouTube:* I will be posting supplementary videos to my YouTube channel.
(5) *MyOpenMath:* Homework will be posted here.

Attendance Policy. Class attendance is a very important aspect of a student's success in this course. The student is expected to attend every class and is accountable for missed content and assignments.

Structure and Grading. 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.

Grading Scale

		93-100	A	90-92.99	A-
87-89.99	B+	83-86.99	B	80-82.99	B-
77-79.99	C+	73-76.99	C	70-72.99	C-
67-69.99	D+	63-66.99	D	60-62.99	D-

The final course grade is determined in the following way:

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

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.

Homework. There will be one homework assignment after nearly every lecture. These assignments are on our class's MyOpenMath page. All work submitted for a grade must be your own (for instance, you cannot use internet resources aside from my own YouTube videos or other videos linked on Inquire and, if you do work and study with others, the final write-up must be done by yourself). You will be granted 5 late passes at the beginning of the semester. You may apply these to any of the online assignments for an automatic 24 hour extension with no late penalty. Note that if you try to use a late pass on an assignment due say 14 days prior, you will not be able to as you would need an extension of over 14 days. You therefore need to keep up with the online homework.

Problem of the Day. We will start nearly every class with a Problem of the Day (POD). You will have about 5 minutes to complete the problem and you can use your notes (not computer) for assistance. PODs cannot be made up for unexcused absences. At the end of the semester, your lowest three POD grades will be dropped.

Technology. In addition to the problems sets, we will occasionally have questions and assignments based in Mathematica. Mathematica is a powerful software package that. we will use throughout the 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 of class discussion, work with a partner, and homework.

Tests. Four tests will be given throughout the semester according to the schedule on the last pages of the 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 Block 3: December 10, 8:30-11:30 AM.

Test Make-up Policy. Test make-ups are administered in accordance with College policy. Anticipated, excused absences must be reported to the instructor with appropriate certification *well before* the scheduled test date. Legitimate emergency absences must be reported with appropriate documentation within one week of returning to class. No other make-ups will be given.

Corrections to Grading. If you think an error may have been made in the grading of your test, carefully review the answer key posted on Inquire and then contact the instructor **within 1 week of the test's return** with your question. **Do NOT alter the original work**. The entire test may be re-graded and the test grade is *subject to remain the same, increase or decrease* at the discretion of the instructor.

MCSP Conversations. The MCSP department offers a series of talks designed to appeal to a broad audience. Members of this class are encouraged to attend many of these meetings, however attending at least one session is mandatory. The schedule for the talks is posted on Inquire. Within one week of attendance you must submit a response to the talk. This will count towards your Homework grade.

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

Electronic Devices. You can use only your calculator during class unless stated otherwise. (This means no cell phones - please set them on silent and leave them in your bag.)

Inquire Policy. Students are required to be knowledgeable of all postings on Inquire. It is each student's responsibility to consistently monitor Inquire for course information. This means every day! Any assignment that requires an Inquire upload will not be accepted in any other form. Also, to receive credit for uploads, the file must be readable on the instructor's college computer. It is the student's responsibility to make successful submissions. It is the student's responsibility to resolve technology problems through the college's IT department.

Academic Integrity. I expect all of you to follow the Academic Integrity policies of Roanoke College. All work submitted for a grade must be your own (for instance, you cannot use internet resources aside from my own YouTube videos or other videos linked on Inquire and, if you do work and study with others, the final write-up must be done by yourself). If you ever have questions about how these policies apply to our class please contact me. Any violations of our AI policies will automatically be turned over to the Academic Integrity Council.

Subject Tutoring. Subject Tutoring, located on the lower level of Fintel Library (Room 5), 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 Tutors are friendly, highly-trained Roanoke College students who offer free, one-on-one tutorials in a variety of general education and major courses such as: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, INQ 250, and Social Sciences (see all available subjects at www.roanoke.edu/tutoring). Tutoring sessions are available in 30 or 60-minute appointments. 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!

AES. 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. To schedule an appointment, call (540)375-2247 or e-mail aes@roanoke.edu. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact the AES at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Course Schedule

Date	Section	Topic
Wed Aug 28		Preview; Small Group Discussion
Thu Aug 29	R	Test-out Quizzes
Fri Aug 30	1.2	The Concept of Limits
Mon Sep 2	1.3	Computation of Limits
Wed Sep 4	M	Introduction to Mathematica
Thu Sep 5	R	Factoring, Cancelling, Fractions
Fri Sep 6	1.4	Continuity and its Consequences
Mon Sep 9	1.5	Limits Involving Infinity
Wed Sep 11	2.1	Tangent Lines and Velocity
Thu Sep 12	R	Lines, Exponent Rules
Fri Sep 13	2.2	The Derivative
Mon Sep 16	2.2	The Derivative
Wed Sep 18	Review	
Thu Sep 19	R	Trigonometry
Fri Sep 20		Test 1
Mon Sep 23	2.3, 2.4	Derivative Rules Day # 1
Wed Sep 25	2.5	Derivative Rules Day # 2
Thu Sep 26	R	Exponential Functions, Logarithms
Fri Sep 27	2.6, 2.7	Derivative Rules Day # 3
Mon Sep 30	3.2	L'Hôpital's Rule, Indeterminate Forms
Wed Oct 2	3.3	Maximums/Minimums
Thu Oct 3	R	Solving $f(x) = 0$
Fri Oct 4	3.4	Increasing and Decreasing Functions
Mon Oct 7	3.5, 3.6	Concavity and Curve Sketching
Wed Oct 9	Review	
Thu Oct 10	R	Derivative Review
Fri Oct 11		Test 2
		Fall Break

Course Schedule continued

Mon Oct 21	3.1	Linear Approximation, Newton's Method
Wed Oct 23	2.8	Implicit Differentiation
Thu Oct 24	R	Right Triangles, Geometry
Fri Oct 25	3.8	Related Rates
Mon Oct 28	3.7	Optimization Day #1
Wed Oct 30	3.7	Optimization Day #2
Thu Oct 31	R	Optimization
Fri Nov 1	4.1	Antiderivatives
Mon Nov 4		Review
Wed Nov 6		Test 3
Thu Nov 7	R	Sums
Fri Nov 8	4.2	Sums
Mon Nov 11	4.3	Area
Wed Nov 13	4.4	The Definite Integral
Thu Nov 14	R	Integral Review
Fri Nov 15	4.5	The Fundamental Theorem of Calculus
Mon Nov 18	4.6	Integration by Substitution
Wed Nov 20		Integration Review
Thu Nov 21	R	Exponential Functions, Logarithms
Fri Nov 22	7.1	Modeling with Differential Equations
Mon Nov 25	7.2	Separable Differential Equations
Mon Dec 2		Review
Wed Dec 4		Test 4
Thu Dec 5	R	Final Review
Fri Dec 6		Review
Tue Dec 10		Final Exam 8:30 - 11:30