Math 155 - Calculus I, Fall 2025
Course Syllabus

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Office hours: Mon 1-2, Tues 11-12, Wed 1-2, Thurs 11-1, Fri 1-2

Class Room/Time: INN-B 204, MTWRF 10:00-10:50 am
Course website: community.wvu.edu/∼bal0018/math155F25.html (as a backup website, I will also try to keep the eCampus site updated)
Course announcements and possibly homework assignments will be posted on the website. Please be sure to check the website regularly, and to regularly check the email address you have on record. You are responsible for any information posted on the course website.

Textbook: OpenStax *Calculus*, available to download for free at
https://openstax.org/details/books/calculus-volume-1.

Catalog Data: MATH 155. Calculus 1. 4 Hours. Introduction to limits, continuity, derivatives, antiderivatives, definite integrals, and applications of the derivative. Not open to students who have earned credit in MATH 153 and/or MATH 154. This course satisfies GEF3 Mathematics & Quantitative Skills.
Prerequisite: MATH 126 and MATH 128 (or MATH 129) with minimum grade of C; or ACT math score of 28 or higher.

Course material: Calculus is the branch of mathematics studying change, primarily by making rigorous the notions of infinitely large quantities and infinitesimally small quantities. Chapter 2 accomplishes this by defining the limit of a function. Chapters 3 and 4 introduce the concept of the derivative, which allows us to study the rate of change of a function. Chapters 5 and 6 introduce the concept of the integral, which allows us to compute the area under the graph of a function.
A rough outline of the topics covered can be found on the next page.

Course Objective: This course is designed to give students in mathematics, engineering and the sciences the basic concepts of limits, continuity, differentiation and integration.

Learning Outcomes: Upon completion of this course the student will be able to do the following:

1. Find a limit of a given function and discuss its continuity and differentiability.
2. Find the first and second derivatives of a given function, and use this information to analyze the function and sketch its graphs.
3. Apply derivative analysis to optimization problems, linearization problems and approximation problems.
4. Integrate basic functions and be able to use some techniques of integration.
5. Use integration in applications, including finding the area between curves, finding the volume of solids of revolution, and finding the work done on a system.

Topics:

1. Limits and Rates of Change (8 days - Chapter 2)
   (a) Limit Laws
   (b) Continuity
2. Derivatives (12 days - Chapter 3)
   (a) Definition of Derivative
   (b) Differentiation Rules
   (c) Implicit Differentiation
   (d) Logarithmic Differentiation
3. Applications of Derivatives (13 days - Chapter 4)
   (a) Related Rates
   (b) Linearization/Approximation
   (c) Optimization
   (d) Mean Value Theorem
   (e) Curve Sketching
   (f) L'Hôpital's Rule
4. Integrals (15 days - Chapter 5)
   (a) Definite Integral
   (b) Fundamental Theorem of Calculus
   (c) Antiderivatives
   (d) Substitution
5. Applications of Integration (15 days - Chapter 6)
   (a) Areas between Curves
   (b) Volumes by Slicing or Cylindrical Shells
   (c) Work
   (d) Hyperbolic Functions

Grading: Your final grade will be based on homework, quizzes, four exams during the semester, and the final exam. Your final course score will be the maximum of the following two grading schemes:

- 10% Homework + 5% Quizzes + 15% Exam 1 + 15% Exam 2 + 15% Exam 3 + 15% Exam 4 + 25% Final Exam
- 10% Homework + 5% Quizzes + 20% (highest grade of the four exams) + 20% (2nd grade of the four exams) + 15% (3rd grade of the four exams) + 30% Final Exam

Typical Letter Grade Cutoffs: A: 90%, B: 80%, C: 70%, D: 60%, F: below 60%

Exams: There will be four exams, tentatively scheduled for Wednesday, September 10; Friday, September 26; Friday, October 24, and Friday, November 14. These will be 50 minute exams taken during the regular lecture time. The final exam time has been set by the university, and will be on Monday, December 15 from 10:00-11:50 am. Make-up exams will only be given to students with excused absences, and such make-up exams must be scheduled within 24 hours of the missed exam.

Quizzes: There will be a quiz given most weeks in which there is no exam. This will be a very brief quiz given at the beginning of class on Friday, intended to test you with more immediacy than the exams and with less consequence. The problems that appear on the quiz will be similar to the homework problems assigned. Only your best 5 quizzes will count toward your grade, and there will be absolutely NO make-up quizzes.

Homework: Homework will be completed online with MyOpenMath.com. When you sign-up, you will use the Course ID and Enrollment Key given in class. Homework assignments will be due most Fridays. Note that most problems on the homework assignments may be resubmitted as often as needed until they are correct, so you should strive for a homework percentage near 100%! For most students, doing the homework is the most important pathway to succeeding in a math class!

Class policies:

- Graphing calculators will never be allowed during any exams. Scientific calculators will be considered on an exam by exam basis. You may use any calculator to help you do the homework if you wish, but you should keep in mind that you may be required to solve similar problems without a calculator on the quizzes and exams.
- While class attendance does not directly factor into your grade computation, attendance of each lecture is highly recommended. Regular attendance will tend to lead to better understanding of the course material, which tends to lead to better performance on exams.
- If you believe a problem on a homework assignment or midterm exam has been graded incorrectly, you must notify the instructor of your complaint within 7 days of the date the exam is handed back. If you are unable to retrieve your graded material at the time it is handed back, it is your responsibility to make arrangements with the instructor to retrieve the material at another time.

Getting Help: Always remember: asking for help when you need it is not a sign of weakness, but a sign of strength! Please feel free to attend my office hours or email me if you have questions about the course material. If you are unable to make it to my regularly scheduled office hours, I am willing to make an appointment to meet at another time if possible. Free tutoring is also available through Student Support Services, located in Benedum 130, and the Student Success Center, located in the library on the second floor of LRC. Additionally, you can try to get help from any professor in the Math department with an open door. Finally, I would also encourage the formation of study groups, to learn from each other and help each other learn.

Institutional Policies: Students are responsible for reviewing policies on inclusivity, academic integrity, incompletes, sale of course materials, sexual misconduct, adverse weather, as well as student evaluation of instruction, days of special concern/religious holiday statements, and the updated COVID-19 statement. For these detailed policies of West Virginia University, please review: https://tlcommons.wvu.edu/syllabus-policies-and-statements.

QR Code for Course Website

QR Code for MyOpenMath

Date	Topic
20-Aug	Syllabus, 2.1: A Preview of Calculus
21-Aug	2.2: The Limit of a Function
22-Aug	2.2: The Limit of a Function
25-Aug	2.3: The Limit Laws
26-Aug	2.3: The Limit Laws
27-Aug	2.4: Continuity
28-Aug	2.4: Continuity, 2.5: Precise Limit Definition
29-Aug	3.1: Defining the Derivative
2-Sep	3.1: Defining the Derivative
3-Sep	3.2: The Derivative as a Function
4-Sep	3.2: The Derivative as a Function
5-Sep	Catch-up/Review
8-Sep	Catch-up/Review
9-Sep	Review
10-Sep	Exam 1
11-Sep	3.3: Differentiation Rules
12-Sep	3.3: Differentiation Rules
15-Sep	3.3: Differentiation Rules
16-Sep	3.5: Derivatives of Trigonometric Functions
17-Sep	3.6: The Chain Rule
18-Sep	3.6: The Chain Rule, (Derivatives of Exps from 3.9)
19-Sep	3.7: Derivatives of Inverse Functions, (Derivatives of Logs from 3.9)
22-Sep	3.8: Implicit Differentiation
23-Sep	3.8: Implicit Differentiation
24-Sep	3.9: Logarithmic Differentiation
25-Sep	Review
26-Sep	Exam 2
29-Sep	3.4: Derivatives as Rates of Change
30-Sep	4.1: Related Rates
1-Oct	4.1: Related Rates
2-Oct	4.2: Linear Approximations and Differentials
3-Oct	4.3: Maxima and Minima
6-Oct	4.4: The Mean Value Theorem
7-Oct	4.5: Derivatives and the Shape of a Graph
8-Oct	4.5: Derivatives and the Shape of a Graph
13-Oct	4.6: Limits at Infinity and Asymptotes
14-Oct	4.6 (and summary of curve sketching)
15-Oct	4.7: Applied Optimization Problems
16-Oct	4.7: Applied Optimization Problems
17-Oct	4.8: L'Hospital's Rule

Date	Topic
20-Oct	4.8: L'Hospital's Rule
21-Oct	Catch-up/Review
22-Oct	Catch-up/Review
23-Oct	Review
24-Oct	Exam 3
27-Oct	4.10: Antiderivatives
28-Oct	5.1: Approximating Areas
29-Oct	5.1: Approximating Areas
30-Oct	5.2: The Definite Integral
31-Oct	5.2: The Definite Integral
3-Nov	5.3: The Fundamental Theorem of Calculus
4-Nov	5.3: The Fundamental Theorem of Calculus
5-Nov	5.4: Integration Formulas, Net Change Theorem
6-Nov	5.6: Integrals Involving Exps and Logs
7-Nov	5.5: Substitution
10-Nov	5.5: Substitution (plus sub problems from 5.6)
11-Nov	5.5: Substitution (plus sub problems from 5.6)
12-Nov	Catch-up/Review
13-Nov	Review
14-Nov	Exam 4
17-Nov	6.1: Areas between Curves
18-Nov	6.1: Areas between Curves
19-Nov	6.2: Determining Volumes by Slicing
20-Nov	6.2: Determining Volumes by Slicing
21-Nov	6.3: Volumes of Revolution: Cylindrical Shells
1-Dec	6.3: Volumes of Revolution: Cylindrical Shells
2-Dec	6.5: Physical Applications
3-Dec	6.5: Physical Applications
4-Dec	6.5: Physical Applications
5-Dec	6.9: Calculus of Hyperbolic Functions
8-Dec	6.9: Calculus of Hyperbolic Functions
9-Dec	Catch-up/Review
10-Dec	Review
11-Dec	Review