LEWIS CLARK STATE COLLEGE

MATH-170: CALCULUS I

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Office Hours: 7:30-8:00 am, 3:20-4:00 pm M-F
Semester and Year: Fall/Spring 2025-2026
Credit Hours: 4

General Education

General Education Competency Area: Mathematical Ways of Knowing.

Course Description

Definitions of limit, derivative, antiderivative, definite integral. Computation of the derivative, including logarithmic, exponential, and trigonometric functions. Applications of the derivative, optimization, mean value theorem. The fundamental theorem of calculus, brief introduction to applications of the integral and to computation of antiderivatives. Intended for students in engineering, mathematics, and the sciences.

Pre-requisite / Co-requisite

Students who wish to enroll in MATH-170 must have successfully completed MATH-147 with a grade of C or higher.

Course Learning Outcomes

GENERAL EDUCATION LEARNING OUTCOMES:

1. Read, interpret, and communicate mathematical concepts
2. Represent and interpret information/data.
3. Select, execute and explain appropriate strategies/procedures when solving mathematical problems.
4. Apply quantitative reasoning to draw and support appropriate conclusions.

Upon successful completion of this course, students should be able to demonstrate the following competencies:

Precalculus Review:

- Analyze and graph polynomial, rational, exponential, and logarithmic functions.
- Understand inverse functions and their properties.
- Use algebraic manipulation to simplify expressions and solve equations.
- Work with trigonometric identities and solve basic trig equations.
- Understand concepts of domain, range, and transformations of functions.

Limits:

- Understand the concept of a limit both graphically and algebraically.
- Evaluate limits using algebraic techniques, including factoring and rationalizing.

- Use one-sided limits and interpret their meaning.
- Identify and understand infinite limits and vertical asymptotes.
- Apply the concept of continuity and understand removable vs. non-removable discontinuities.

Derivatives:

- Understand the definition of a derivative as a limit.
- Calculate derivatives using power, product, quotient, and chain rules.
- Differentiate polynomial, rational, exponential, logarithmic, and trigonometric functions.
- Interpret the derivative as a rate of change or slope of a tangent line.
- Understand and apply higher-order derivatives.

Applications of the Derivative:

- Use the first and second derivative tests to identify local extrema and points of inflection.
- Analyze graphs using derivatives (increasing/decreasing, concavity).
- Solve optimization problems in applied contexts.
- Use related rates to solve real-world problems involving changing quantities.
- Understand motion along a line using position, velocity, and acceleration functions.

Integration:

- Understand antiderivatives and indefinite integrals.
- Apply basic integration rules and techniques (including substitution).
- Evaluate definite integrals using the Fundamental Theorem of Calculus.
- Understand the area under a curve as a definite integral.
- Approximate area using Riemann sums (left, right, and midpoint).

Applications of the Integral:

- Use integrals to calculate area between curves.
- Apply integration to find volumes of solids of revolution (disk, washer, shell methods).
- Solve problems involving the average value of a function.
- Model and solve real-world problems involving accumulation and total change.
- Use integrals in applications like physics, economics, and biology.

Required Text/Materials

Single Variable Calculus, Jon Rogawski, Second Edition

Communication Policy

Email is the best way to reach me outside of school hours. I will reply to emails within 24 hours M-F. Feel free to come to my classroom during office hours for questions or concerns.

Grades

Grading Policy/Evaluation

15% Homework
75% Test
10% Final

Grading Scale

LC State uses the +/- system. The LCSC Registrar website offers information about grading.

Letter	Percentage
A	100 – 93
A-	92.99 – 90
B+	89.99 – 87
B	86.99 – 83
B-	82.99 – 80
C+	79.99 – 77
C	76.99 – 73
C-	72.99 – 70
D+	69.99 – 67
D	66.99 – 60
F	Below 60

Course Assignments

All course work will be completed in class, unless supplemental work is needed to grasp the concepts.

The exam schedule will be as follows:

Semester 1:

- Unit 1 Exam: End of week 5
- Unit 2 Exam: End of week 10
- Unit 3 Exam: End of week 15
- Fall Semester Final Exam: End of week 18

Semester 2:

- Unit 1 Exam: End of week 5
- Unit 2 Exam: End of week 10
- Unit 3 Exam: End of week 15
- Fall Semester Final Exam: End of week 18

Course Schedule

Semester 1: (18 weeks):

- Weeks 1-5: Unit 1-
- Weeks 6-10: Unit 2-
- Weeks 11-15: Unit 3-

- Weeks 16-18: Catch up/review for final

Semester 2: (18 weeks):

- Weeks 1-5: Unit 1-
- Weeks 6-10: Unit 2-
- Weeks 11-15: Unit 3-
- Weeks 16-18: Catch up/review for final

*The instructor reserves the right to make changes to the course schedule, as needed, to accommodate situations that may arise throughout the semester/year.

Shared College Information

The following addendum material is updated regularly and available on the Academic Affairs, Information for Faculty webpage.

Consumer Information

The Higher Education Act of 1965 (amended in 1988 and 2008) requires all post-secondary institutions offering federal financial aid programs to provide key data to both prospective and current students. To comply with this requirement, LC State has developed a consumer information webpage for your reference.

Student Rights and Responsibilities

Students are responsible for knowing their program requirements, course requirements, and other information associated with their enrollment at LC State. Students should review the LC State General Catalog and the LC State Student Handbook for more information.

Academic Freedom

Lewis-Clark State promotes, values, encourages, and creates an environment that adheres to the principle of academic freedom. Deep at the institutional core is the intellectual pursuit of all knowledge and theories, thought, reason, and perspective of truth for all LC State students, faculty, staff, and administrators.

A students' right to academic freedom and expression are specifically identified in the student handbook, which essentially states concepts expressed in the classroom are for educational purposes, and a student's adherence to any belief system will not be used as evaluative criteria.

Artificial Intelligence (AI)

Artificial Intelligence (AI) – AI tools and applications (such as Copilot, ChatGPT, etc.) have had a major impact on our professional and educational lives. LC State recognizes the role these programs play in our students' educational and professional lives. While AI can be valuable and convenient, it is important for students to understand that there are appropriate times and situations for its use.

AI Use in the Course is Situational

"Recognizing the role that Artificial Intelligence (AI) plays in education today, use of these programs on coursework will be allowed on a limited and specific basis. It is understood that if a student is permitted to use an AI tool for any academic work submitted for a grade, including assignments, discussion boards, exams, etc., the program must be cited and the student may also be asked to provide the prompts used in the program. Graded work that allows/disallows the use of AI tools will specify the rules for its use in the instructions. If AI tools are used when the instructions state it is not allowed, this will result in a sanction per the LC State Student Code of Conduct."