U3600-114 Calculus I

Course Format: Online

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Course credits: 4

Prerequisites: Completion of a college-level precalculus mathematics course with a C or better or the equivalent, or completion of U3600-109 Algebra for Calculus or similar college algebra course and a trigonometry course with a C or better or the equivalent, or four-years of above-average work in college-prep mathematics, including one semester of trigonometry.

Course Level: Elementary

Course Description: This course will cover limits, theory, and application of the derivative; introduction to integration. After completing this course, the student will be able to: Evaluate limits and explain the relationship between continuity, limits, and derivatives; Use the definition of a derivative and the product, quotient, and chain rules to find derivatives; Use the Fundamental Theorem of Calculus and the substitution rule to compute integrals; Solve applied problems by setting up and evaluating derivatives and integrals.

Required Course Materials
- Rogawski, J. & Adams, C. (2015) *Calculus Single Variable, Early Transcendentals (3rd ed.).* W. H. Freeman. (ISBN-13: 978- 1464114885; ISBN-10: 1464114889).

Optional/Recommended Course Materials
- A graphing calculator, such as a TI-83 or TI-84, is recommended.
- The are no additional or recommended course materials beyond those provided in the links found throughout the course. However, you are actively encouraged to use any resources you find on the internet or in your library to supplement your learning.

Hardware Requirements
- You will need a webcam, speakers, and a microphone. You will complete your exams through an online proctor, requiring all three components. You will need speakers or headphones to listen to video lectures.
- You will also need to submit written work while completing your exams. You will need a scanner or a camera to upload your written work.

Course Learning Objectives
By the end of this course, students will be able to
- Evaluate limits and explain the relationship between continuity, limits, and derivatives.
- Use the definition of a derivative and the product, quotient, and chain rules to find derivatives.
- Use the Fundamental Theorem of Calculus and the substitution rule to compute integrals.
- Solve applied problems by setting up and evaluating derivatives and integrals.

Course Overview

Topic #	TOPIC	EVALUATED ACTIVITIES
	Unit 1: Limits	

2.1	Limits, Rates of Change, and Tangent Lines	• WeBWork Homework
2.2	Limits: A Numerical and Graphical Approach	• WeBWork Homework
2.3	Basic Limit Laws	• WeBWork Homework
2.4	Limits and Continuity	• WeBWork Homework
2.5	Evaluating Limits Algebraically	• WeBWork Homework
2.6	Trigonometric Limits	• WeBWork Homework
2.7	Limits at Infinity	• WeBWork Homework
2.8	Intermediate Value Theorem	• WeBWork Homework
2.9	The Formal Definition of a Limit	• WeBWork Homework
	Unit Test	• Test 1 – Multiple Choice • Test 1 – Open-ended Problems
Unit 2: Differentiation	
3.1	Definition of the Derivative	• WeBWork Homework
3.2	The Derivative as a Function	• WeBWork Homework
3.3	Product and Quotient Rules	• WeBWork Homework
3.4	Rates of Change	• WeBWork Homework
3.5 & 3.6	Higher Derivatives & Trigonometric Functions	• WeBWork Homework
3.7	The Chain Rule	• WeBWork Homework
3.8	Implicit Differentiation	• WeBWork Homework
3.9	Derivatives of General Exponential and Logarithmic Functions	• WeBWork Homework
3.10	Related Rates	• WeBWork Homework
	Unit Test	• Test 2 – Multiple Choice • Test 2 – Open-ended Problems
	Unit 3: Applications of the Derivative	
4.1	Linear Approximation and Applications	• WeBWork Homework
4.2	Extreme Values	• WeBWork Homework
4.3	The Mean Value Theorem and Monotonicity	• WeBWork Homework
4.4	The Shape of a Graph	• WeBWork Homework
4.5	L'Hopital's Rule	• WeBWork Homework
4.6	Graph Sketching and Asymptotes	• WeBWork Homework
4.7	Applied Optimization	• WeBWork Homework
	Unit Test	• Test 3 – Multiple Choice • Test 3 – Open-ended Problems
	Unit 4: The Integral	
5.1	Approximating and Computing Area	• WeBWork Homework
5.2	The Definite Integral	• WeBWork Homework
5.3	The Indefinite Integral	• WeBWork Homework
5.4 & 5.5	The Fundamental Theorem of Calculus, Part I & II	• WeBWork Homework
5.6	Net Change as the Integral of a Rate	• WeBWork Homework
5.7	Substitution Method	• WeBWork Homework
5.8	Further Transcendental Functions	• WeBWork Homework
	Unit Test	• Test 4 – Multiple Choice • Test 4 – Open-ended Problems
	Unit 5: Applications of the Integral	

6.1	Area Between Two Curves	• WeBWork Homework
6.2	Setting Up Integrals: Volume, Density, Average Value	• WeBWork Homework
6.3	Volumes of Revolution	• WeBWork Homework
6.4	The Method of Cylindrical Shells	• WeBWork Homework
6.5	Work and Energy	• WeBWork Homework
	Final Exam	• Final Exam – Multiple Choice • Final Exam – Open-ended Problems

Evaluation Methods
Your final grade will be based on your performance on the following:
WeBWork Homework = 15% of grade
Tests = 60% of grade (15% each)
Final Exam = 25% of grade

WeBWork Homework (15%)
Your homework will be done using WeBWork. The links for WebWork assignments are given within the individual topic sections in the online course. You may rework the homework problems as many times as you wish. Your instructor will enter your scores from the homework assignments for a section into the online course when you notify them that you are ready to take the exam on that section.

Tests 1, 2, 3, and 4 (60% total; 15% each)
The tests are cumulative, but each test will emphasize material from the most recent section. There is a multiple choice test which consists of 10 multiple-choice questions. An open-ended test with 4 open-ended questions. Students have 30 minutes to take each test and may use a calculator and note pages to record their work. No notecards, other scratch paper, mobile devices or searching of the Internet is permitted. Students may request to take a second, proctored, attempt on the multiple-choice questions portion only and will have 30 minutes for their second attempt.

Final exam (25%)
Final Exam consists of 14 multiple choice and 6 open-ended questions. It is cumulative. Students have 2 hrs to complete the final exam and may use a calculator, final exam notecard, and note pages to record their work. No scratch paper, mobile devices or searching of the Internet is permitted.

Exam Method: Online with Proctoring
This course requires all students to complete all tests, including retakes, and the final exam online with a proctoring service. Students receive two attempts on each Test - multiple choice part. If you elect to make a second attempt, the highest score of either attempt will be recorded.

Grading Scale
The following grading scale is used to evaluate all course requirements and determine your final grade. Grades will always be rounded up to the nearest tenth.

A = 93–100	B = 83–87.9	C = 70–77.9	D = 60–69.9
AB = 88–92.9	BC = 78–82.9		F = Below 60

Pass/Fail Option

Students who enroll in an Independent Learning course under the pass/fail option will receive a final grade of S in place of a final grade equivalent to an A, AB, B, BC, or C and a final grade of U in place of a final grade equivalent to a D or F.