

Tompkins Cortland Community College
Master Course Syllabus

Course Discipline and Number: MATH 201
Course Title: Calculus I

Year: 2021-2022
Credit Hours: 4

Attendance Policy: *To maintain good grades, regular attendance in class is necessary. Absence from class is considered a serious matter and absence never excuses a student from class work. It is the responsibility of all instructors to distribute reasonable attendance policies in writing during the first week of class. Students are required to comply with the attendance policy set by each of their instructors. Students are not penalized if they are unable to attend classes or participate in exams on particular days because of religious beliefs, in accordance with Chapter 161, Section 224-a of the Education Law of the State of New York. Students who plan to be absent from classroom activity for religious reasons should discuss the absence in advance with their instructors. See college catalog for more information.*

Services for Students with Disabilities: *It is the College's policy to provide, on an individual basis, appropriate academic adjustments for students with disabilities, which may affect their ability to fully participate in program or course activities or to meet course requirements. Students with disabilities should contact the Coordinator of Access and Equity Services, to discuss their particular need for accommodations. All course materials are available in alternate formats upon request.*

Course Description

This is a first course in calculus for all disciplines. Topics include limits, continuity, derivatives and anti-derivatives of algebraic, trigonometric, logarithmic, and exponential functions, and the definite integral. Applications include curve sketching, optimization problems, and related rates. A graphing calculator is recommended. MATH 201 fulfills the SUNY General Education Mathematics requirement. Prerequisites: C or better grade in MATH 138 or appropriate qualifying test score; RDNG 099 if required by placement testing; prior completion or concurrent enrollment in ENGL 100 or ESL 120, 121, and 122 (or prior completion of ESL 103). 4 Cr. (4 Lec.) Fall and spring semesters.

Course Context/Audience

This is a first course in calculus for all disciplines. It is required for engineering, computer science, and the liberal arts math/science degree programs. It transfers well to business administration and liberal arts bachelor's degree programs.

Basic Skills/Entry Level Expectations

Writing: WC College level writing skills are required. See course co-requisites or pre-requisites.

Math: MC College level math skills – Course requires college level math skills. See course description for co-requisite and/or prerequisite requirement(s).

Reading: R2 Before taking this course, students must have a C or better in RDNG 099 or assessment indicating that RDNG 099 was not required.

Course Goals

A student successfully completing this course should be able to

1. Analyze polynomials, rational functions, and trig functions graphically, numerically, and analytically.
2. Find the derivative of functions using the definition of the derivative.
3. Understand the concepts of limits and continuity and apply them to finding asymptotes and the derivative.
4. Differentiate algebraic, trigonometric, logarithmic, and exponential functions using the rules of differentiation, both implicit and explicit.

5. Apply derivatives and higher degree derivatives to physics problems, curve sketching, optimization problems, related rates, and Newton's Method.
6. Be able to find definite and indefinite integrals and the constant of integration.
7. Be able to find the area under a curve using Riemann sums and apply integration to physics problems.
8. Use a graphing calculator to produce graphs of functions and their derivatives and perform other calculus related operations.

Course Objectives/Topics

Objective/Topic	# Hours
Review of functions, graphs and trigonometry	2 Hours
Limits and Continuity	4 Hours
Derivatives as Slopes and Rates of Change	4 Hours
Rules of Differentiation, Product and Quotient Rules	4 Hours
Chain Rule and Implicit Differentiation	4 Hours
Related Rates and Review	4 Hours
Extrema and the Mean Value Theorem	2 Hours
First and Second Derivative Tests, Limits at Infinity, Curve Sketching	6 Hours
Optimization Problems	4 Hours
Newton's Method, Differentials	2 Hours
Antiderivatives, Area, and Riemann Sums	4 Hours
The Fundamental Theorem, Other methods of Integration	4 Hours
Exponential differentiation and integration	4 Hours
Logarithmic differentiation and integration	4 Hours
Reviews and assessment	4 Hours

General Education Goals - Critical Thinking & Social/Global Awareness

CRITICAL THINKING OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<p>Students will be able to</p> <ul style="list-style-type: none"> ➤ develop meaningful questions to address problems or issues ➤ gather, interpret, and evaluate relevant sources of information ➤ reach informed conclusions and solutions ➤ consider analytically the viewpoints of self and others 	<p>Students learn to solve higher level math problems via various techniques. Lecture, example and drill.</p> <p>Students learn that calculators can give erroneous results.</p> <p>Students need to consider the reasonableness of their solutions, "Does the answer make sense?"</p>

SOCIAL/GLOBAL AWARENESS OUTCOMES	HOW DOES THE COURSE ADDRESS THE OUTCOMES (Include required or recommended instructional resources, strategies, learning activities, assignments, etc., that must or could be used to address the goal/outcomes)
<ul style="list-style-type: none"> ➤ Students will begin to understand how their lives are shaped by the complex world in which they live. ➤ Students will understand that their actions have social, economic and environmental consequences 	<p>Smart phone apps can be used by students and are more readily available than computer software programs.</p> <p>Cheating is discussed.</p>

Instructional Methods

Lecture and discussion, frequent assessment, and group work are suggested.

Methods of Assessment/Evaluation

Method	% Course Grade
Exams/Quizzes	70-80%
Final Exam	15-25%
Other (homework, group work, projects, participation)	0-10%

Text(s)

Calculus, Larson, Hostetler, Edwards, 10th Edition, © 2014 Houghton Mifflin

Bibliography

Calculus, Stewart, James, latest edition, Brooks Cole.

Calculus Problems for a New Century, Fraga, Robert, latest edition, Mathematical Association of America.

Applications of Calculus, Straffin, Phillip D., latest edition, Mathematical Association of America.

Other Learning Resources

Audiovisual

No resources specified

Electronic

No resources specified

Other

Principles and Standards for School Mathematics, National Council of Teachers of Mathematics ISBN 0-87353-480-8.
DYNAMIC Calculus web page: www.monroecc.edu/wusers/pseeburger