

Quinsigamond Community College School of Math, Science, & Engineering

Instructor's Information

Instructor: Professor XX (she/her/hers)
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Course Information

Course: MAT 234 Calculus II – Section XX
Meets: Tuesdays and Thursdays from 8:00am – 9:40am
Room: 175A
Credits: 4 credits
Semester: Fall 2024

Course Description

This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be reviewed. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L'Hôpital's Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.

Prerequisites

MAT 233 Calculus I

Required Textbook/Materials/Website

Textbook: *Calculus: Early Transcendentals*, by Briggs, 3rd edition, Pearson © 2019
Materials: Graphing calculator (recommended)
Website: Access to Pearson's MyLab Math

Student Learning Outcomes

Upon completion of this course, students will be able to:

1. Apply different methods of integration to successfully solve application problems.
2. Apply exponential models to physical applications.
3. Compute integrals using different methods such as substitution, integration by parts, partial fractions, and integration tables.
4. Compute the integrals of Inverse Trigonometric and Hyperbolic functions.
5. Solve first order differential equations and apply them in physical applications.

6. Determine whether a series converges.
7. Write the power series representation of a given function and determine the interval of convergence of the series.

Course Topics & Required Section Readings/Assignments

Applications of Integration

- Velocity and Net Change
- Regions Between Curves
- Volume by Slicing
- Volume by Shells
- Length of Curves
- Surface Area
- Physical Applications

Logarithmic, Exponential, and Hyperbolic Functions

- Logarithmic and Exponential Functions Revisited
- Exponential Models
- Hyperbolic Functions

Integration Techniques

- Basic Approaches
- Integration by Parts
- Trigonometric Integrals
- Trigonometric Substitutions
- Partial Fractions
- Integration Strategies
- Other Methods of Integration
- Numerical Integration
- Improper Integrals

Differential Equations

- Basic Ideas
- Direction Fields and Euler's Method
- Separable Differential Equations
- Special First-Order Linear Differential Equations
- Modeling with Differential Equations

Sequences and Infinite Series

- An Overview
- Sequences
- Infinite Series
- The Divergence and Integral Tests
- Comparison Tests
- Alternating Series
- The Ratio and Root Tests
- Choosing a Convergence Test

Power Series

- Approximating Functions with Polynomials

- Properties of Power Series
- Taylor Series
- Working with Taylor Series

Instructional Objectives

- Evaluate velocity position and displacement.
- Calculate net change and future value.
- Evaluate the area of regions between curves.
- Understand the general slicing method and evaluate volume by slicing.
- Apply correctly the Disk and Washer methods.
- Calculate volume by shells.
- Evaluate the length of curves.
- Understand and evaluate the area of a surface of revolution.
- Define and calculate the work done by a variable force.
- Solve lifting problems.
- Define the natural logarithmic and exponential functions.
- Evaluate the derivative and integral of the exponential function.
- Define and correctly use the General Power Rule.
- Find growth rates using exponential models.
- Define the hyperbolic functions.
- Evaluate derivatives and integrals of hyperbolic functions.
- Correctly use integration by parts for indefinite integrals.
- Apply correctly trigonometric substitutions to evaluate integrals.
- Compute integrals using partial fractions.
- Approximate integrals using Numerical Integration.
- Evaluate Improper Integrals.
- Define and solve separable differential equations.
- Solve special first-order linear differential equations.
- Model with differential equations.
- Define and work with sequences.
- Evaluate the limit of a sequence.
- Evaluate geometric series.
- Determine the divergence of series using the divergence test.
- Determine the convergence or divergence of series using the Integral, Ratio, Root, and Comparison tests.
- Define and work with alternating series.
- Find Taylor polynomials of order n .
- Approximate functions with polynomials.
- Find the interval and radius of convergence of power series.
- Find Taylor and Maclaurin series for a function.
- Work with Taylor Series.

Grading Breakdown

20%	Homework
10%	Quizzes
10%	<Attendance>
35%	Exams
25%	Comprehensive Final Exam

Grade	Range	Grade	Range	Grade	Range
A	95 – 100	B –	80 – 82	D +	67 – 69
A –	90 – 94	C +	77 – 79	D	63 – 66
B +	87 – 89	C	73 – 76	D –	60 – 62
B	83 – 86	C –	70 – 72	F	0 – 59

Teaching Procedures

Most classes will be a combination of lectures, group activities, and in-class assignments. You will be given homework assignments to be completed outside of class. Occasionally, a quiz or exam will be given in class.

Attendance Policy

Students are expected to attend all classes for the entire period. Attendance will be taken in every class. If you are absent from class, proper documentation will excuse your absence.

Diversity, Equity, and Inclusion Statement for the School of Math & Science

The School of Math and Science is motivated to teach and learn from the diverse community we have at QCC. In Science, Technology, Engineering, and Mathematics (STEM), it is advantageous to approach problems from multiple perspectives. The power of diversity, equity and inclusion allows us to persevere and overcome challenges.

The faculty of the School of Math and Science pledge to help students meet the demands of STEM regardless of race/ethnicity, gender identity and expression, sexual orientation, faith, abilities/disabilities, age, socioeconomic background, political leaning, ancestry, national origin, home language and all other identities. We are dedicated to nurturing a culture of collaboration, mutual respect and understanding; and to empowering members of our community to embrace their full potential.

Accessibility Statement

Quinsigamond Community College is committed to providing access and inclusion for all persons with disabilities. Students who require an accommodation in this course should notify the professor as soon as possible. Students are responsible for forwarding the Accommodation Letter to the professor (via email or hard copy). Students may request accommodations at any time during the semester, which begin upon receipt (accommodations are not retroactive). Please discuss any barriers which may arise during the semester with your professor or coordinator in the Student Accessibility Services office.

Contact Information for Student Accessibility Services (SAS):

Call: 508-854-4471
Sorenson Video Phone: 508-502-7647
Email: disabilityservices@qcc.mass.edu

Services for Veterans

If you are a veteran of the US Armed Forces, please visit the Veteran Affairs Office located in 258A (Administration Building) or contact them at veteranaffairs@qcc.mass.edu.

Academic Honesty and Plagiarism

Our purpose of education is to seek the truth; this work requires trust and honesty between teacher and student. If we are not honest about what we know and don't know, our learning will always be impaired. Because our teaching and learning depends on this honest communication, we expect all students to understand what plagiarism is and why it is unacceptable.

Plagiarism means taking someone else's ideas or words and presenting them as one's own. The offense can take many forms including cheating on a test, passing in a paper taken from the Internet or from another student, or failing to properly use and credit sources in an essay. Sometimes the issue is subtle, involving getting too much help on an assignment from someone else. In every instance, plagiarism means cheating both oneself and the owner of the source. Since cheating sabotages a student's learning experience, consequences range from no credit for the assignment to failure for the course and possible expulsion from the college.

The penalty for getting caught cheating in this course is a failure of the quiz or test, or failure of the entire course. This is solely at the discretion of the instructor.

For further information concerning plagiarism, refer to the QCC Student Handbook.

Math Center & QCC Math YouTube Channel

The Math Center provides free, drop-in tutoring assistance for students in any QCC mathematics course. Located on the second floor of the Harrington Learning Center (HLC), the Math Center is a welcoming place where students have the opportunity to work collaboratively with tutors and classmates. Students can work intensively to improve their mathematical skills or simply drop by to ask a few questions. In addition to tutoring, the Math Center houses various math-related resources, and computers and software for math coursework. Visit their website for details and the semester schedule: <https://www.qcc.edu/services/tutoring/math-center>

Assignment & Test Schedule

<list all assignments, quizzes, and exam dates>