

Calculus II
MA 241
Section: 050
Semester: 2026 Fall Term

Course Description

Second of three semesters in a calculus sequence for science and engineering majors. Techniques and applications of integration, elementary differential equations, sequences, series, power series, and Taylor's Theorem. Use of computational tools.

Student Learning Outcomes

By the end of the course a student is expected to:

- Apply advanced integration techniques, including substitution, integration-by-parts, trigonometric substitutions, and partial fraction decomposition, to evaluate indefinite and definite integrals.
- Utilize numerical integration methods (Trapezoidal and Simpson's Rules) to approximate definite integrals.
- Understand the definitions of various types of improper integrals and determine their convergence or divergence.
- Solve geometric and physical application problems using integration, such as calculating arc length, the average value of a function, work, or hydrostatic pressure.
- Understand the formal definition and use appropriate notation for sequences; sketch and analyze the graph of a sequence to visualize its behavior.
- Determine if a sequence converges or diverges by applying the Squeeze Theorem, the Monotone Convergence Theorem, or recasting the problem as the limit at infinity problem for a continuous function.
- Understand the formal definition of an infinite series as the limit of the sequence of partial sums. Utilize appropriate sigma notation.
- Analyze infinite series for convergence or divergence by applying various tests, including the Divergence, Integral, Comparison, Alternating Series, and Ratio Tests.
- Distinguish between absolute and conditional convergence and understand the implications of rearranging terms for the behavior of a series.
- Represent functions by power series, in particular by using Taylor and Maclaurin formulas, and determine their radius and interval of convergence.
- Use Taylor and Maclaurin polynomials to approximate functions and analyze the accuracy of those approximations.
- Model real-life problems involving rates of change using first-order differential equations; analyze solutions using slope fields; solve separable differential equations.
- Solve second-order linear constant-coefficient homogeneous and non-homogeneous differential equations and explore their applications in physical systems.

Student Performance Assessment

Grading

The student's numerical score will be determined by weighting course material as follows: 15% for WebAssign, 5% projects, 50% from four tests and 30% for the final exam. Final grades will be determined on the scale below.

We will use NC State's standard letter grading:

Low	Letter	High
$97 \leq$	A+	≤ 100
$93 \leq$	A	< 97
$90 \leq$	A-	< 93
$87 \leq$	B+	< 90
$83 \leq$	B	< 87
$80 \leq$	B-	< 83
$77 \leq$	C+	< 80
$73 \leq$	C	< 77
$70 \leq$	C-	< 73
$67 \leq$	D+	< 70
$63 \leq$	D	< 67
$60 \leq$	D-	< 63
$0 \leq$	F	< 60

Attendance

Attendance will be taken daily both in class and recitation. If you have no more than 4 unexcused absences and have taken all of the tests, then your lowest test grade will be replaced with your final exam grade assuming it is higher.

Course Materials Required to Purchase

ISBN: 9781337854610

Title: WEBASSIGN HOMEWORK NCSTATE CALCULUS 2

Author: NC STATE MATHEMATICS DEPARTMENT

Edition: 1

Required: REQUIRED

This course engages diverse scholarly perspectives to develop critical thinking, analysis, and debate and inclusion of a reading does not imply endorsement.

Students are responsible for reviewing the NC State University Policies, Rules, and Regulations (PRRs), which pertain to their course rights and responsibilities, including, but not limited to:

- [POL 04.25.05](#) Equal Opportunity and Non-Discrimination Policy Statement
 - [REG 02.20.01](#) Academic Accommodations for Students with Disabilities
- [POL 11.35.01](#) Student Conduct
 - [REG 11.35.05](#) Code of Student Conduct
 - [REG 11.35.02](#) Student Discipline Procedures
- [REG 02.20.03](#) Attendance Regulations
- [REG 02.50.03](#) Grades and Grade Point Average
- [REG 02.20.15](#) Credit-Only Courses
- [REG 02.20.04](#) Audits
- [REG 08.00.11](#) Online Course Material Host Requirements