

Title: Calculus II

Catalog

Description: Math 30 continuation. Methods of integration; improper integrals; trigonometric and hyperbolic functions and their inverses, analytic geometry, infinite series and sequences. Students will be given periodic writing assignments that will encourage them to think through the concepts of the course.

Prerequisites: Math 30 or AP credit for AB calculus in high school.

Learning

Objectives: Understand the indefinite integral as the inverse of differentiation, know the basic rules and techniques of integration (including the method of substitution, integration by parts, and trigonometric substitutions), and use these rules to evaluate antiderivatives.
Extend the Riemann integral to improper integrals with unbounded functions and domains of integration.
Know the definition, graphs, derivatives and antiderivatives of the inverse trigonometric functions, hyperbolic functions and the inverse hyperbolic functions.
Know the definition for convergence and divergence of infinite sequences and series and apply these definitions to elementary sequences and to geometric and harmonic series.
Know the integral test, comparison test, ratio test, and alternating series test for convergence of infinite series and apply these test to standard series.
Find the power series of a function, determine the radius of convergence and the interval of convergence (including end point convergence) of a power series, and determine the error term for a function and its power series.

Text: Calculus - Early Transcendental (5th ed) by James Stewart

Coverage: Chapters 6 thru 10

Writing

Component: This is an area B4 GE course and has a writing component. To satisfy the writing requirement graded assignments involving writing and understanding of complex technical prose, interpretation of theoretical ideas, and the use of mathematical ideas will be part of the course.

Assignments: A variety of reading and problem solving assignments will be part of the course.

Examinations: There will be three midterm examinations and a comprehensive final examination for this course.

The examination schedule is given below.

Midterm I	Feb. 18
Midterm II	Mar. 18
Midterm III	Apr. 22
Final	May 16

Grading: Written work is scored on the following scale and your grade in this course is assigned according to the following percentages.

Homework	100 (10.0%)	88% - 100%	A
Midterms (150 pts each)	500 (50.0%)	76% - 87%	B
Final	400 (40.0%)	65% - 76%	C
		50% - 64%	D
Total	1000	below 50%	F

Topics covered: Math 31

- I. Applications of integration 2 Weeks
 - a. Areas between curves
 - b. Volumes by slicing

- II. Techniques of integration 3 Weeks
 - a. Integration by parts
 - b. Other techniques such as trigonometric substitutions algebraic substitutions, and partial fractions
 - c. Approximate integration

- III. Selected applications of integration from 2 1/2 Weeks
 - a. Arc length
 - b. Area of a surface of revolution
 - c. Moments and centers of mass
 - d. Work

- IV. Infinite sequences and series 4 1/2 Weeks
 - a. Sequences: definition, convergence-divergence
 - b. Series: definition, convergence-divergence
 - c. Special series: geometric, harmonic
 - d. Convergence test for series
 - e. Taylor's series: radius of convergence, differentiation, integration, remainder term
 - f. Binomial series
 - g. Polynomial approximation

- V. Parametric equations and polar coordinates 2 Weeks
- a. Parametric equations: graphs, tangents, areas
 - b. Polar coordinates: graphs, areas, arc length
 - c. Equations of conic sections in polar coordinates (optional)