Marshall University

College of Science

Mathematics Department

MTH 230: Calculus with Analytic Geometry II

Course catalog description

Applications of the integral, techniques of integration, and infinite series. A study of conic sections, polar coordinates, and parametric equations.

Credit hours

4 hours

Prerequisites

A grade of C or higher in MTH229 or IST230

List of topics

Applications of the Definite Integral

- Area
- Volumes of solids with known cross-sectional area
- Volumes of solids of revolution
- Lengths of curves and area of surfaces
- Work and energy
- Other applications
- Arc length and surface area
- Fluid pressure and force
- Center of mass
- Taylor polynomials

Techniques of Integration

- Substitution
- Completing the square and trigonometric substitution
- Integration by parts
- Partial fractions

- Improper integrals
- Approximate integration

Conic Sections and Polar Coordinates

- Conic Sections
- Converting from rectangular to polar coordinates and vice-versa
- Graphing in polar coordinates
- Areas, slopes and lengths in polar coordinates
- Parametric equations in two dimensions

Infinite Sequences and Series

- Infinite sequences of constants
- Infinite series of constants
- Nonnegative series
- Series with positive and negative terms
- Absolute convergence
- Sum of series
- Power Series and Intervals of Convergence
- Taylor Series
- Taylor's Remainder formula

Learner outcomes

1. Students will determine the convergence of a sequence and find the limit of a converging sequence. Determine the convergence of a series and find the limit of a converging series.
2. Students will explain the meaning of limits, derivatives, integrals, and series in their own words, both in general terms and in the context of specific problems.
3. Students will construct appropriate functions, equations, or integrals to model an applied situation, based on a verbal description.

4. Students will apply techniques of calculus to solve applied problems from fields such as engineering and applied sciences.
5. Students will interpret symbolic and numerical results in real-world terms, and analyze the validity of their results in a real-world setting.
6. Students will explain the definition of the integral and its motivation. Explain why integration is the appropriate method to solve a particular problem.

Technology

Students must have graphing calculators. Computer labs may be assigned at the discretion of the instructor.

Suggested textbooks

- Rogawski, *Calculus (Early Transcendentals)*, second edition.

Last updated

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