

CALCULUS & ANALYTIC GEOMETRY II
MA 193

Catalogue Description

This course deals with the application of the definite integral including area and volume problems. Logarithmic and Exponential Functions, Hyperbolic Functions, Techniques of Integration, L'Hopital's Rule, and Infinite Series are also included.

Prerequisite: Ma 192 Calculus and Analytic Geometry I or equivalent (4 credits)

Goals

- A. To provide further insight into selected topics of Differential and Integral Calculus.
- B. To demonstrate applications of Calculus to Engineering and the Physical Science students.

Procedures

- A. Lecture/Discussion
- B. Readings and problems assigned.

Course Content

A. Inverse Functions

- 1. Inverse Functions
- 2. Exponential Functions & Differentiation
- 3. Integration of Exponential Functions
- 4. Inverse Trigonometric Functions & Differentiation
- 5. Inverse Trigonometric Functions: Integration & Completing the Square
- 6. Hyperbolic Functions

B. Exponents, Logarithms, and Hyperbolic Functions

- 1. Exponential and Logarithmic Functions
- 2. Derivatives of Logarithmic Functions
- 3. Derivatives of Exponential Functions
- 4. Integrals involving Logarithms and Exponentials
- 5. Integrals of Hyperbolic Functions
- 6. Inverse Hyperbolic Functions

C. Methods of Integration

- 1. Fundamental Formulas (Review)
- 2. Integration by Substitution
- 3. Trigonometric Integrals
- 4. Trigonometric Substitutions
- 5. Integrals involving $ax^2 + bx + c$
- 6. Integration by Parts
- 7. Partial Fractions
- 8. Miscellaneous Substitutions
- 9. Other Methods

D. Infinite Series

- 1. Comparison and Integral Tests
- 2. Ratio and Root Tests

3. Alternating Series and Absolute Convergence
4. Power Series
5. A Taylor and Maclaurin Series

E. Conics

1. The Parabola
2. The Ellipse
3. The Hyperbola
4. Translation
5. Rotation
6. Direct Sketching of Conics

F. Polar Coordinates

1. Graphs in Polar Coordinates
2. Relationship between Rectangular and Polar Coordinates
3. Conics in Polar Coordinates
4. Derivatives in Polar Coordinates
5. Areas in Polar Coordinates

G. Parametric Representation

1. Parametric Equations
2. Parametric Equations of a Locus
3. Derivatives of Parametric Equations
4. Arc Length
5. The Catenary

Evaluation Methods

1. Preparation of homework assignments.
2. Class Participation
3. Periodic Tests and Comprehensive Final Examination.

Bibliography

Required Text: Finney, Ross L. and Thomas, George B. Jr., *Calculus*, 2nd Ed., Addison-Wesley Publ. Co., Reading, Mass., 1994.

Larson & Hostetler, *Calculus with Analytic Geometry*, 5th Ed., D.C. Heath Co., 1994.

Thomas, George B. Jr. and Finney, Ross L., *Calculus and Analytic Geometry*, 8th Ed., Addison-Wesley Publ. Co., Reading, Mass., 1992.

Required Calculator: TI-81 or TI-82 Graphing Calculator

Relevant Software

Anderson, Richard, *Student Edition of MATHCAD*, Addison-Wesley Publ. Co., Reading, Mass., 1988.

Finney, Hoffman, Schwartz, Wilde, *The Calculus Toolkit*, Addison-Wesley Publ. Co., Reading, Mass., 1986.

Pence, Dennis, *Calculus Activities for the TI-81 Graphic Calculator*, PWS-Kent, Boston, Mass., 1992.

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