

MATH 2263 SYLLABUS

ANALYTIC GEOMETRY AND CALCULUS III

Course Description

Higher dimensional and vector calculus, functions of several variables, partial derivatives, multiple integrals, line and surface integrals.

Prerequisites

Math 2262.

Textbook

Calculus: Concepts and Contexts, by James Stewart, Brooks/Cole, 1998.

Incorporation of Technology

Computer software may be used as deemed appropriate by the instructor.

Approximate Timeline

Below are the text sections to be covered with approximate times based on 60 meetings. Ample room is left to allow the teacher the flexibility to cover additional topics, hold problem solving sessions, laboratory sessions, reviews and exams.

Chapter 10. Vector Functions 7 - 9 hours

Included topics: Vector functions and space curves, derivatives and integrals of vector functions, arc length, curvature, motion in space, and parametric surfaces.

Chapter 11. Partial Derivatives 12 - 15 hours

Included topics: Functions in several variables, limits, continuity, partial derivatives, linear approximation and tangent planes, directional derivatives and the gradient, maximum and minimum values, and Lagrange multipliers.

Chapter 12. Multiple Integrals 13 - 17 hours

Included topics: Double and iterated integrals, applications, triple integrals, integration using polar, cylindrical and spherical coordinates, and change of variables in multiple integrals.

Chapter 13. Vector Calculus 10 - 14 hours

Included topics: Vector fields, line integrals, Green's theorem, the curl and divergence operations, surface integrals, Stoke's theorem and the divergence theorem.

Text Summary for Math 2261, 2262, 2263 - Continued

Calculus, Concepts and Contexts, James Stewart, 1998.

Math 2263: Calculus and Analytic Geometry III

- 10.1 Vector functions and space curves
- 10.2 Derivatives and integrals of vector functions
- 10.3 Arc length and curvature
- 10.4 Motion in space
- 10.5 Parametric surfaces

11.1 Functions in several variables

11.2 Limits and continuity

Appendix D: Precise definition of limit (optional)

- 11.3 Partial derivatives
 - 11.4 Tangent planes and linear approximations
 - 11.5 The chain rule
 - 11.6 Directional derivative and gradients
 - 11.7 Max and min values
 - 11.8 Lagrange multipliers
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- 12.1 Double integrals over rectangles
 - 12.2 Iterated integrals
 - 12.3 Double integrals over general regions
 - 12.4 Double integrals in polar coordinates
 - 12.5 Applications (Mass, moments, probability) (optional)
 - 12.6 Surface area
 - 12.7 Triple integrals
 - 12.8 Triple integrals in cylindrical and spherical coordinates
 - 12.9 Change of variables in multiple integrals

13.1 Vector fields

13.2 Line integrals

13.3 The FTC for line integrals

13.4 Green's theorem

13.5 Curl and divergence

13.6 Surface integrals

13.7 Stoke's theorem

13.8 The divergence theorem

13.9 Summary