

Approved syllabus for MATH243

Analytic Geometry & Calculus C

Catalog Description

Vectors, operations on vectors, velocity and acceleration, partial derivatives, directional derivatives, optimization of functions of two or more variables, integration over two and three dimensional regions, line integrals, Green's Theorem, surface integrals, the Divergence theorem. Includes use of computers to perform symbolic, numerical and graphical analysis.

PREREQ: MATH 242.

Textbook

Calculus: Early Transcendentals, by James Stewart et al., 9th edition (USA)

Syllabus

Each “unit” below is a 55-minute class meeting with the primary instructor. A regular semester has approximately 41 lecture units and 14 discussion section units.

Chapter 12: Vectors and the Geometry of Space (6 units)

- 12.1 Three-Dimensional Coordinate Systems (0.5)
- 12.2 Vectors (0.5)
- 12.3 The Dot Product (0.5)
- 12.4 The Cross Product (0.5)
- 12.5 Equations of Lines and Planes (2)
- 12.6 Cylinders and Quadric Surfaces (2)

Chapter 13: Vector Functions (5 units)

- 13.1 Vector Functions and Space Curves (1)
- 13.2 Derivatives and Integrals of Vector Functions (1)
- 13.3 Arc Length and Curvature (curvature is optional)(1)
- 13.4 Motion in Space: Velocity and acceleration (2)

Chapter 14: Partial Derivatives (8 units)

- 14.1 Functions of Several Variables (.5)
- 14.2 Limits and Continuity (.5)
- 14.3 Partial Derivatives (1)
- 14.4 Tangent Planes and Linear Approximations (1)
- 14.5 The Chain Rule (1)
- 14.6 Directional Derivatives and the Gradient Vector (2)
- 14.7 Maximum and Minimum Values (1)
- 14.8 Lagrange Multipliers (1)

Chapter 15: Multiple Integrals (10 units)

- 15.1 Double Integrals over Rectangles (1)
- 15.2 Double Integrals over General Regions (3)
- 15.3 Double Integrals in Polar Coordinates (1)
- 15.6 Triple Integrals (3)
- 15.7 Triple Integrals in Cylindrical Coordinates (1)
- 15.8 Triple Integrals in Spherical Coordinates (1)

Chapter 16: Vector Calculus (12 units)

- 16.1 Vector Fields (1)
 - 16.2 Line Integrals (2)
 - 16.3 The Fundamental Theorem for Line Integrals (1)
 - 16.4 Green's Theorem (1)
 - 16.5 Curl and Divergence (*definitions only*) (1)
 - 16.6 Parametric Surfaces and Their Areas (2)
 - 16.7 Surface Integrals (2)
 - 16.9 The Divergence Theorem (*mention Stokes Theorem in 16.8 as an extension of Green's Theorem*) (2)
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- Text material: prepared in Spring 2000 by Leung, Bergman, Wenger and approved by UGC on June 19, 2000.
 - Computer material: prepared in Summer 2001 by Rakesh, Edwards, Wenger and approved by UGC on Sept. 14, 2001.
 - Adapted to the newer edition of the textbook on February 4, 2010 by Rakesh.
 - Updated by Cristina Bacuta and approved by Lou Rossi on August 1, 2012.
 - Updated by Cristina Bacuta and approved by Lou Rossi and Gilberto Schleiniger on August 15, 2013, February 4, 2014 and August 8, 2014.
 - Updated and revised by Cristina Bacuta and Mike Shoushani, and approved by Gilberto Schleiniger and Chris Raymond on August 24, 2015.
 - Updated and revised by Cristina Bacuta, Rakesh and Chris Raymond on January 27, 2017.
 - Last edit was made by Toby Driscoll in 2019.
 - Updated by Dominique Guillot on August 23, 2023.