

Syllabus for Math 244 — Calculus IV

Course Description: Multiple integrals; line integrals and Green's Theorem, surface integrals, Stokes' and Gauss' Theorems.

Prerequisite: Math 243 or consent.

Text: Current Edition of *Calculus* by James Stewart.

Format: This three credit class meets for 150 minutes of lecture per week.

Final Exam: The final exam will cover all the topics listed below.

Course objectives: Upon successful completion of Math 244 the student will have an understanding of topics listed below, be able to solve routine problems, and be able to apply the ideas.

Program objectives: This is the fourth and last course of our calculus sequence for STEM (Science, Technology, Engineering, Mathematics) majors. As the sequence is introductory, the approach is more computational than theoretical. Mathematics is the basic language for STEM fields. Understanding the language, the basic ideas and results, and the computational techniques of calculus is prerequisite to advanced learning in any STEM field.

Approximate Timeline:

Weeks 1 - 6: Multiple Integrals.

- (1) Review Section 12.5 and Section 12.6.
- (2) Section 15.1: Double integrals over rectangles.
- (3) Section 15.2: Double integrals over general regions.
- (4) Section 15.3: Double integrals in polar coordinates.
- (5) Section 15.4: Applications of double integrals.
- (6) Section 15.5: Surface area.
- (7) Section 15.6: Triple integrals.
- (8) Section 15.7: Triple integrals in cylindrical coordinates.
- (9) Section 15.8: Triple integrals in spherical coordinates.
- (10) Section 15.9: Change of variables in multiple integrals.

Weeks 7 - 15: Vector calculus.

- (1) Section 16.1: Vector fields.
- (2) Section 16.2: Line integrals.
- (3) Section 16.3: The Fundamental Theorem for Line Integrals.
- (4) Section 16.4: Green's theorem.

- (5) Section 16.5: Curl and divergence.
- (6) Section 16.6: Parametric surfaces and their areas.
- (7) Section 16.7: Surface integrals.
- (8) Section 16.8: Stokes' Theorem.
- (9) Section 16.9: The Divergence Theorem.
- (10) Section 16.10: Summary.