

DEPARTMENT OF MATHEMATICS AND STATISTICS
CLASS SYLLABUS
CLASS NUMBER - MATH 213 CREDIT HOURS - 03

TITLE OF COURSE - Vector Calculus

CALENDAR DESCRIPTION - A study of vector functions and functions of several variables and their derivatives. Topics include applied maximum and minimum problems, Lagrange multipliers, multiple integration, integration in polar, cylindrical and spherical coordinates, Green's Theorem and Stokes' Theorem.

PREREQUISITE - Math 111 and Math 122. A student cannot receive credit for Math 213 if they have already received credit for Math 214.

PURPOSE OF CLASS - A continuation of Math 110 and Math 111. This class is designed for students in mathematics, statistics, the applied sciences, and engineering.

TEXTBOOK - *Calculus*, James Stewart, 8th Ed.

CHAPTERS COVERED - 13.1, 13.2, 14.1—14.8, 15.1, 15.2, 10.3, 15.3—15.9, 16.1—16.8

DETAILED DESCRIPTION

- Vector functions (13.1)
- Derivatives and integrals of vector functions (13.2)
- Functions of several variables (14.1, 14.2)
- Partial derivatives (14.3)
- Tangent planes (14.4)
- Chain rule (14.5)
- The gradient (14.6)
- Maximum and minimum problems (14.7)
- Lagrange multipliers (14.8).
- Multiple integration (15.1 – 15.2),
- Polar Coordinates (10.3)
- Double integrals in polar form (15.4)
- Volume and surface area (15.5, 15.6)
- Triple integrals in cylindrical and spherical coordinates (15.7, 15.8).
- Change of variable (15.9)
- Vector fields (16.1)
- Line Integrals (16.2, 16.3)
- Green's theorem (16.4)
- Curl and divergence (16.5)
- Stokes' theorem (16.6 – 16.8)

Approximately weekly schedule

- week 1: Vector functions (13.1) Derivatives and integrals of vector functions (13.2)
- week 2: Functions of several variables (14.1, 14.2) Partial derivatives (14.3)
- week 3: Tangent planes (14.4) Chain rule (14.5)
- week 4: The gradient (14.6)
- week 5: Maximum and minimum problems (14.7)
- week 6: Lagrange multipliers (14.8).
- week 7: Multiple integration (15.1 – 15.2),
- week 8: Polar Coordinates (10.3), Double integrals in polar form (15.4)
- week 9: Volume and surface area (15.5, 15.6)
- week 10: Triple integrals in cylindrical and spherical coordinates (15.7, 15.8). Change of variable (15.9)
- week 11: Vector fields (16.1) Line Integrals (16.2, 16.3)
- week 12: Green's theorem (16.4) Curl and divergence (16.5)
- week 13: Stokes' theorem (16.6 – 16.8)

Notes to the instructor:

Instructors should try to save some time in the early chapters in order to leave time for the more important topics in Chapter 15 and 16.