

Course Outline for Math 107: Vectors and Matrices

Semester I: 1444

(10 weeks=30

Text Books: lectures)

1. Elementary Linear Algebra, Applications Version, **11th Edition** by Howard Anton and Chris Rorres, John Wiley and Sons (Only Chapters 1 and 2)

(You may download the book from my website below :)

<<https://fac.ksu.edu.sa/tmga1/course/130491>>

2. Calculus, Sixth Edition by E. R. Swokowski, M. Olinick and D. Pence, PWS Publishing Company. Boston, 1994

Detailed Syllabus and Tentative Lecture Hours

Linear Algebra (9 lectures)

Chapter 1: Systems of Linear Equations and Matrices (7 lectures)

- 1.1 Introduction to systems of linear equations
- 1.2 Gaussian elimination
- 1.3 Matrices and matrix operations
- 1.4 Inverse; Rules of matrix arithmetic
- 1.5 Elementary matrices and a method for finding A^{-1}
- 1.6 Further results on systems of equations
- 1.7 Diagonal, triangular and symmetric matrices

Chapter 2: Determinants (2 lectures)

- 2.1 Determinants by cofactor expansion
- 2.2 Evaluating determinates by row reduction
- 2.3 Properties of determinants; Cramer's Rule

Calculus (21 lectures)

Chapter 10: Vectors, and Surfaces (6 lectures)

- 10.1 Vectors in two-dimensions
- 10.2 Vectors in three-dimensions
- 10.3 The dot
- 10.4 The vector product
- 10.5 Lines and planes
- 10.6 Surfaces

Chapter 11: Vector-Valued Functions (5 lectures)

- 11.1 Vector-valued functions and space curves
- 11.2 Limits, derivatives, and integrals
- 11.3 Curvilinear motion
- 11.4 Curvature
- 11.5 Tangential and normal components of acceleration

Chapter 12: Partial Differentiation (10 lectures)

- 12.1 Functions of several variables
- 12.2 Limits and continuity
- 12.3 Partial derivatives
- 12.4 Increments and differentials
- 12.5 Chain rules
- 12.6 Directional derivatives and gradient vector
- 12.7 Tangent planes and normal lines
- 12.8 Extrema of functions of several variables

