Department of Mathematics

Syllabus Math 107, First Semester 1437/38 H

Course Code: Math 107
Course Title: Matrices and Vectors

Instructor:

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Text Books:

1. Elementary Linear Algebra with Applications by H. Anton and Chris Rorres

2. Calculus by Swokowski, Olinick and Pence, 6th Ed, PWS publishing Co.

Additional Material:

Lecture Notes on
Linear Algebra, Vectors and Several Variables Calculus
by Khawaja Zafar Elahi

Weekly Course Details

Linear Algebra

WEEK 1
Chapter 1: System of Linear Equations
1.0 Basic Definitions of Matrices
1.1 System of linear equation
1.2 Methods for solving system of linear equations
1.3 Gauss Elimination Method

WEEK 2
1.4 Gauss Jordon Method
1.5 Row Echelon form
1.6 Reduced Row Echelon form
1.7 Homogeneous system
1.8 Applications

WEEK 3
Chapter 2: Matrices
2.1 Properties of Matrices and Algebra of matrices
2.2 Scalar Multiplication
2.3 Matrix Multiplication
2.4 Inverse of 2x2 matrix
2.5 Power of Matrix
2.6 Elementary Matrix
2.7 Methods of finding inverse of matrix
2.8 Solving linear system by Inverse Matrix

WEEK 4
Chapter 3: Determinant
3.1 Determinant
3.2 By Direct Multiplication
3.3 By cofactor
3.4 By row operation

Calculus

WEEK 6
Chapter 10: Vectors and the Geometry of Space
10.1 Vectors in the Plane
10.2 Vectors in Space
10.3 the Dot Product

WEEK 7,8
10.4 The Cross Product
10.5 Lines and Planes in Space
10.6 Surfaces in Space

WEEK 9
Chapter 11: Vector-Valued Functions
11.1 Vector-Valued Functions
11.2 Limits, Derivatives
11.3 Velocity, Acceleration.

WEEK 10
11.4 Curvature, Unit Tangent Vector, Principal Normal Vector
11.5 Tangential and Normal Components of Acceleration

WEEK 11
Chapter 12: Functions of Several Variables and Differentiation
12.1 Functions of Several Variables
12.2 Limits and Continuity

WEEK 12
12.3 Partial Derivatives

WEEK 13
12.4 Tangent Planes and Linear Approximations, Increments and Differentials
12.5 The Chain Rule
12.6 The Gradient and Directional Derivatives

WEEK 14
12.7 Extrema of Functions of Several Variables
12.8 Constrained Optimization and Lagrange Multipliers

WEEK 5

3.5 Properties of Determinant function
3.6 Minor and cofactors, Inverse by cofactors
3.7 Crammer' Rule

WEEK 15
Revision WEEK