Department of Mathematics
College of Sciences
King Saud University, Riyadh

Semester II: **1438-1439**
Course outline for Math 240: **Introduction to Linear Algebra**
Prerequisite: **Math 111**
Name of Instructor: **Prof. Dr. T M G Ahsanullah**
Office: 2B 80 Tel.: 11- 4675177 Website: http://fac.ksu.edu.sa/tmga1

Text Book: Elementary Linear Algebra with Supplemental Applications, Eleventh Edition, by H. Anton and Chris Rorres, John Wiley & Sons, 2015

1. **Matrices**
   - Matrices and their operations
   - Types of matrices
   - Inverse of a matrix
   - Algebraic properties of matrices
   - Method for finding inverse
   - Linear systems of equations
2. **Determinants**
   - Determinants by cofactor expansion
   - Evaluating determinants by row reduction
   - Properties of determinants: Cramer's Rule
3. **Vector Spaces**
   - Real vector spaces
   - Subspaces
   - Linear dependence
   - Basis and dimension (finite)
   - Row space, column space, and null space
   - Rank and nullity
4. **Inner Product Spaces**
   - Inner products
   - Angle of orthogonality in inner product spaces
   - Best approximation: Least Squares
5. **Linear Transformations**
   - General linear transformations
   - Kernel and range of a linear transformation
   - Isomorphism
   - Compositions and inverse transformations
   - Matrices for general linear transformations
6. **Eigenvalues and Eigenvectors**
   - Eigenvalues and eigenvectors of a matrix
   - Diagonalization
   - Eigenvalues for linear operators

Mark Distribution: Mid Term 1 and 2: 25+25=50
Tutorial: 10
Final: 40
Total: 100
Note: The date of Exams will be announced in due time