SUMMER SEMESTER: 1435-1436

Department of Mathematics

College of Science, King Saud University

MATH 107: Vectors and Matrices

Course details and tentative lecture plan

Name of Instructor: Prof. Dr. T. M. G. Ahsanullah

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Office: 2B80 (Building 4, Department of Mathematics, College of Science, KSU)

Books: 1. Elementary Linear Algebra (Applications Version) by Howard Anton and Chris Rorres, John Wiley & Sons, Inc., New York.

2. Calculus by E. W. Swokowski, M. Olinic, D. Pence, PWS Publishing Company, Boston.

3. Lecture Notes on Linear Algebra, Vector and Several Variables Calculus by Dr. Khawaja Zafar Elahi.

STT (1 3 5) slot (**Group 2949**: 08.00 AM – 9.50 AM in Room 1A72 Building 4; **Group 2952 (jointly with Professor Dr. Akhlaq Siddiqui)**: 10.00 AM– 11.50 AM in 1A 72 Building 4)

- **Linear Algebra (Chapters: 1 and 2)**
- **Lecture #1-#4: June 9, 11, 14, and 16(Sha'aban 22, 24, 27, and 29)**.
- **1. Systems of Linear Equations**: Introduction to systems of linear equations; methods of solving system of linear equations: Gaussian elimination, Gauss-Jordan elimination (row echelon form, reduced row echelon form);homogeneous linear systems.
- **Matrices:** Matrices and matrix operations; inverses: rules of matrix arithmetic; elementary matrices and a method of finding A^{-1}; further results on systems of equations and invertibility; diagonal, triangular, and symmetric matrices.
- **Lecture #5-#7: June 18, 21, 23(Ramadan 1, 4, and 6).**
- **2. Determinants:** The determinant function;evaluating determinants by row reduction; properties of the determinant function; cofactor expansion; Cramer's rule.
- **Calculus (Chapters: 10, 11 and 12)**
- **Lecture #8-#11: June 25, 28,30 and July 2 (Ramadan 8,11,13 and15)**

- **10. Vectorsand Surfaces:** Vectors in two and three dimensions; the dot product, the vector product; lines and planes; surfaces.
- **Lecture #12-#15:July 5, 7, 9, 23 and 26(Ramadan 18, 20, 22, Shawwal 7 and 10**)
- **11.Vector-Valued Functions:**Vector-valued functions and space curves; limits, derivatives, and integrals; curvilinear motion; curvature; tangential and normal components of acceleration
- **Lecture #16-#21**: July**28, 30 August 2,4, 6 and 9(Shawwal 12,14,17,19, 21 and 24)**
- **12. PartialDifferentiation:** Functions of several variables; limits and continuity; partial derivatives; increments and differentials; chain rules; directional derivatives; tangent planes and normal lines; extrema of functions of several variables; Lagrange multipliers.
- **Examination Period: August 11 - August 13(Shawwal 26- Shawwal 28)**

Mark Distribution:

MT 1: 25
MT2: 25
Final: 40
Tutorial: 10
Total: 100.

Mid Term Examinations:

Mid-Term 1 Exam. : 14 Ramadan, Wednesday, 1436H (July 1, 2015G) 10.00 PM – 11.30 PM

Mid-Term 2 Exam. : 13 Shawwal, Wednesday, 1436H (July 29, 2015G) 7.00 PM – 8.30 PM