

King Fahd University of Petroleum and Minerals

Department of Mathematical Sciences

Syllabus 071: Course: Math 302 Title: Engineering Mathematics

Prepared by: Dr. M. A. Bokhari

Catalogue Description: Vector analysis including vector fields, gradient, divergence, curl, line and surface integrals, Gauss' and Stokes' theorems. Introduction to complex variables, vector spaces and subspaces. Linear independence, basis and dimension, solution of linear equations, orthogonality, eigenvalues and eigenvectors.

Textbook: Advanced Engineering Mathematics by P. O'Neil, 5th edition (2003).

Course Objectives: This course is primarily designed for Electrical Engineering students. The aim of this course is to provide students with basic knowledge of Linear Algebra, Vector and Complex Analysis for use in Electrical Engineering problems.

| Wk. | Date | Sec | Material | Homework |
|---|--------------------|----------------------|---|--|
| 1 | Sep. 8-12, 2007 | 5.4 5.5 | The Vector Space R^n Linear Dependence and Independence | 6,9,16,17,19 6,13,19,22 |
| 2 | Sep. 15-19 | 6.3 6.5 6.7 | Row Echelon form of a Matrix Homogeneous Sys. of Linear Equations Non-homogeneous Systems | 4,11,17 5,8,15,18 7,13,19 |
| 3 | Sep. 22-26 | 8.1 8.2 | Eigenvalues and Eigenvectors Diagonalization | 8,10,17,20,23 4,7,11,15 |
| 4 | Sep. 29- Oct. 3 | 8.3 11.1 | Orthogonal and Symmetric Matrices Vector Functions of one Variable | 3,6,11,13 4,10,12,17 |
| Eid Al-Fitr Break: October 4-19, 2007 | | | | |
| 5 | Oct. 20-25* | 11.4 11.5 12.1 | The Gradient Field Divergence and Curl Line Integrals | 4,8,14,23,29 4,11,12,16 2,7,16,22,28 |
| First Major Exam: Thursday, October 25, 2007** | | | | |
| 6 | Oct. 27-31 | 12.2 12.3 12.4 | Green's Theorem Independ. of Path & Potential Theory Surface Integrals | 2,11,13,16 3,8,13,16 5,10,13,17 |
| 7 | Nov. 3-7 | 12.7 12.8 | Divergence Theorem of Gauss The integral theorem of Stokes | 1,2,7,10,12,16 3,5,16,22 |
| 8 | Nov. 10-14 | 20.1 20.2 | Complex Numbers (Polar Form) Loci and Sets of Points in the plane | 5,9,19,21,28 4,15,32,34,36 |
| 9 | Nov. 17-21 | 21.1 | Complex Functions, Limit & Continuity Cauchy-Riemann Equations | 5,7,10,12,15 |
| 10 | Nov. 24-28 | 21.2 21.3 21.4 | Power Series The Exponential and Trig. Functions The Complex Logarithm | 2,6,9 2,6,7,9,14,20,22 3,5,8 |
| Second Major Exam Wed. November 28, 2007** | | | | |
| 11 | Dec.1-5 | 21.5 22.1 22.2 | Powers Curves in the plane (Quick Review) Integration of Complex Function | 5,7,13,19,25 3,5,9 4,7,9,12,15,20 |
| 12 | Dec. 8-12 | 22.3 22.4 | The Cauchy Integral Theorem Consequences of Cauchy's Theorem | 8,10,11,15 1,7,10,16,18,21 |
| Eid Al-Adha Break: Dec 13-28, 2007 | | | | |
| 13 | Dec. 29- Jan. 2 | 23.2 24.1 24.2 | Laurent Series (Definitions & Examples) Singularities The Residue Theorem | 1,8,12 3,7,18,20 3,5,13,18,25,26 |
| 14 | Jan 5-9, 2008 | 24.2 24.3.5 | The Residue Theorem (Contd) Evaluation of Real Integrals | 22,35,42,52,54 |
| 15 | Jan 12-16 | 24.3.5 | Evaluation of Real Integrals (cotd.) Review | |

Student Learning Outcomes:

On completion of the course, a student is expected to be able to deal with matrix computations, vector and complex calculus and apply these concepts to engineering problems.

Computer Usage:

Occasional homework assignments

Thursday,
October 25,
2007 is a
Normal Class

** Exam dates

are set by the College of Sciences to avoid conflict with other exams.

Note: For Evaluation policy, submission of homework, attendance policy, office hours and the timings of major exams, please follow the instructions of your respective course instructor.

Your instructor may change the homework problems.