

King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics

SYLLABUS (Term 112)

Instructor: Dr. M. Tahir Mustafa

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| Course: | Math 302 |
| Title: | Engineering Mathematics |
| Textbook: | Advanced Engineering Mathematics (Fourth Edition) by D.G. Zill and W.S. Wright, International Edition. |
| Objectives: | This course is designed to expose electrical and other engineering students to some basic ideas in vector calculus, linear algebra and complex numbers. |
| 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. |

Grading Policy

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| KFUPM attendance policy will be enforced. Final Exam shall be comprehensive. |
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| Grading Policy: Two Majors 25% each; Quizzes 10%; HW and Attend. 5 %, Final 35%. |

EXAMS:

- Major Exam I:** Wednesday February 29, 2012 (8:30-10:30 pm)
Material: 7.6, 8.2, 8.3, 8.6, 8.8, 8.10, 8.12
- Major Exam II:** Day and Time will be announced later.
Material: 9.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.12, 9.13, 9.14.
- Final Exam:** Sunday, May 20, 2012 (7:30 am)

| Week | Date | Sec. | Material | Homework |
|--------------------------------------|-----------------|-----------------------------------|--|--|
| 1 | Jan. 28-Feb. 01 | 7.6 | Vector Spaces (<i>restricted to R^n only</i>) | 1*, 2*, 3*, 22*, 23*, 26* |
| 2 | Feb. 04-08 | 8.2 8.3 | Systems of Linear Algebraic Equations Rank of a Matrix | 1*, 7*, 12* 8*, 9, 10, 14* |
| 3 | Feb 11.-Feb 15 | 8.6 8.8 | Inverse of a Matrix (<i>only using Theorem 8.6.4</i>) The Eigenvalue Problem | 1, 2*, 19*, 30*, 51, 52* 1*, 8*, 16* |
| 4 | Feb 18.-Feb 22 | 8.10 8.12 | Orthogonal Matrices (<i>excluding example 4</i>) Diagonalization (<i>excluding example 6</i>) | 5*, 8*, 9*, 16 1, 2*, 4, 14*, 28* |
| 5 | Feb 25.-Feb 29 | 9.1 9.5 9.6 | Vector Functions Directional Derivatives Tangent Planes and Normal Lines | 1, 2, 15*, 18*, 33*, 36*, 41* 2, 6*, 8*, 14, 23* 2, 6, 16*, 34*, 38* |
| 6 | Mar. 03-Mar. 07 | 9.7 9.8 | Curl and Divergence Line Integrals | 4, 8*, 10*, 26*, 29, 30 4, 6, 14*, 23*, 30*, 34* |
| 7 | Mar. 10-Mar. 14 | 9.9 9.12 | Independence of Path Green's Theorem | 2*, 6, 20*, 12, 15*, 22*, 25* 1*, 2*, 4, 7, 17, 20*, 29* |
| 8 | Mar. 17-Mar. 21 | 9.13 9.14 | Surface Integrals Stokes' Theorem | 1*, 2*, 4, 6, 18* 1*, 2*, 5, 6* |
| Midterm Vacation: March 24-28 | | | | |
| 9 | Mar. 31-Apr. 04 | 9.16 17.1 | Divergence Theorem Complex Numbers | 1, 2*, 4*, 11*, 13, 14 2*, 6, 18*, 30*, 34*, 40 |
| 10 | Apr 07-11 | 17.2 17.4 ¹ | Powers and Roots Functions of a Complex Variable | 6*, 12, 16, 33*, 34* 8*, 10*, 12, 14, 21*, 28, 32* |
| 11 | Apr 14-18 | 17.5 17.6 | Cauchy-Riemann Equations Exponential and Log. Functions | 1*, 2*, 5, 6*, 8, 22* 2, 4, 8, 13*, 28*, 32*, 47* |
| 12 | Apr 21-25 | 17.7 18.1 | Trigonometric and Hyperbolic Functions Contour Integrals (<i>excluding Theorem 18.1.3</i>) | 6, 8, 10*, 16* 1, 3, 7*, 9* |
| 13 | Apr 28-May 02 | 18.2 18.4 | Cauchy-Goursat Theorem Cauchy's Integral Formulas | 2*, 5*, 8, 12, 15* 3, 4*, 10*, 14*, 23 |
| 14 | May 05- 09 | 19.2 ² 19.3 19.4 | Taylor Series (<i>Definition & Examples</i>) Laurent Series (<i>Definition & Examples</i>) Zeros and Poles | 2*, 4* 2*, 4, 6*, 21*, 25, 26*, 27, 28 2*, 4*, 6*, 10*, 14*, 16* |
| 15 | May 12- 16 | 19.5 19.6 | Residues and Residue Theorem Evaluation of Real Integrals | 1, 2, 8, 10, 22, 24 11, 12, 32 |

Only homework problems with * should be submitted for grading.

¹“Equations of open/closed disks in complex form” to be explained before 17.4

²“Sequences and series” to be briefly discussed before 19.2