

King Fahd University of Petroleum & Minerals

Department of Mathematics and Statistics

MATH 302 – Engineering Mathematics

Syllabus - Term 142

Coordinator: Dr. Khairul Saleh

Course Code: MATH 302

Title: Engineering Mathematics

Textbook: **Advanced Engineering Mathematics** (Fifth 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 spaces and subspaces. Linear independence, basis and dimension. Solution of linear equations. Orthogonality. Eigenvalues and eigenvectors. Vector calculus including vector fields, gradient, divergence, curl, line and surface integrals, Green's theorem, Gauss' and Stokes' theorems. Introduction to complex variables.

Grading Policy

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|--------------------------|-------------------|---|
| 1. Major Exam I: | 25% (100 points), | Material: 7.6 – 8.12 |
| 2. Major Exam II: | 25% (100 points), | Material: 9.1 – 9.14 |
| 3. Class Work: | 15% (60 points) | Quizzes + Homework + Other Class Activities |
| 4. Final Exam: | 35% (140 points) | Comprehensive |

Attendance

- Attendance is compulsory. KFUPM policy regarding attendance will be strictly enforced.
- A DN grade will be awarded to any student who accumulates 9 unexcused absences.

Wk	Date	Sec.	Material	Homework
1	Jan. 25 – 29	7.6	Vector Spaces (<i>restricted to \mathbb{R}^n only</i>)	1*, 2*, 3*, 22*, 23*, 25, 26*
2	Feb. 1 – 5	8.2 8.3	Systems of Linear Algebraic Equations Rank of a Matrix	1*, 6, 7*, 10*, 12*, 14 2, 5*, 8*, 9*, 11, 14*, 15
3	Feb. 8 – 12	8.6 8.8	Inverse of a Matrix (<i>only using Theorem 8.6.4</i>) The Eigenvalue Problem	1, 2*, 20*, 21*, 28, 30*, 49, 52* 1*, 6, 8*, 16*, 20, 26
4	Feb. 15 – 19	8.10 8.12	Orthogonal Matrices (<i>excluding example 4</i>) Diagonalization (<i>excluding example 6</i>)	5*, 6, 8*, 9*, 16, 18* 1, 2*, 4, 12, 15*, 26, 28*
5	Feb. 22 – 26	9.1 9.5 9.6	Vector Functions Directional Derivatives Tangent Planes and Normal Lines	1, 2*, 11, 15*, 18*, 33*, 36*, 42* 2, 6*, 8*, 12*, 14, 23*, 27, 42 2, 6*, 16*, 34*, 38*
Major Exam I: Date: To Be Announced, Material: 7.6 – 8.12				
6	Mar. 1 – 5	9.7 9.8	Curl and Divergence Line Integrals	4, 8*, 10*, 23*, 26*, 29, 30 1, 3*, 6, 8*, 14*, 23*, 30*, 34*
7	Mar. 8 – 12	9.9 9.12	Independence of Path Green's Theorem	2*, 4*, 6, 12*, 15*, 22*, 25*, 26 1*, 2*, 4*, 7, 19*, 20*, 29*
8	Mar. 15 – 19	9.13 9.14	Surface Integrals Stokes' Theorem	1*, 2*, 4, 6*, 18*, 20*, 30*, 34 1*, 2*, 4*, 5, 6*, 12, 16*
Midterm Vacation: March 22 – 26, 2015				
9	Mar. 29 – Apr. 2	9.16 17.1	Divergence Theorem Complex Numbers	1, 2*, 4*, 6*, 11*, 13, 14 2*, 4*, 6, 14, 18*, 30*, 34*, 40
10	Apr. 5 – 9	17.2 17.3 17.4	Powers and Roots Sets in the Complex Plane Functions of a Complex Variable	6*, 8*, 10, 12, 16, 33*, 34* 4*, 5*, 8*, 12*, 22, 23 5*, 8*, 10*, 13*, 14, 21*, 32*, 37
Major Exam II: Date: To Be Announced, Material: 9.1 – 9.14				
11	Apr. 12 – 16	17.5 17.6	Cauchy-Riemann Equations Exponential and Log. Functions	1*, 2*, 4*, 5, 6*, 8, 9, 22*, 28* 2*, 4, 8*, 13*, 21, 27*, 32*, 47*
12	Apr. 19 – 23	17.7 18.1	Trigonometric and Hyperbolic Functions Contour Integrals (<i>excluding Theorem 18.1.3</i>)	6, 8*, 10*, 16*, 30 1, 3, 5*, 6*, 7*, 9*
13	Apr. 26 – 30	18.2 18.4	Cauchy-Goursat Theorem Cauchy's Integral Formulas	2*, 4*, 5*, 8, 12, 15*, 21 3, 4*, 8*, 10*, 14*, 23
14	May 3 – 7	19.2 19.3 19.4	Taylor Series (<i>Definition & Examples</i>) Laurent Series (<i>Definition & Examples</i>) Zeros and Poles	2*, 4*, 6*, 12, 16* 2*, 6*, 10*, 21*, 25, 26*, 27*, 28 2*, 4, 6*, 8*, 10*, 14, 16*
15	May 10 – 14	19.5 19.6	Residues and Residue Theorem Evaluation of Real Integrals	1, 2, 4, 8, 10, 18, 22, 24, 30 4, 6, 11, 12, 23, 32, 35
Final Exam: Sunday, May 17, 2015 at 08:00 AM (Comprehensive)				

Homework problems with * should be submitted for grading.