

## OFFICIAL SYLLABUS

### MATH 355-ENGINEERING MATHEMATICS (Adopted - Fall 2003)

**Catalog Description.** Linear Algebra: Gaussian elimination, linear independence, vector spaces, eigenvalues; Discrete Mathematics: combinations, graph theory; and Complex Analysis: differentiation, integration, series. **Prerequisite:** MATH 305

**Textbook:** *Advanced Engineering Mathematics*, by Erwin Kreyzig

**Detailed Outline:**

Week	Topics	Sections in <i>Adv. Eng. Math.</i>	Approx # Pages
1	Basic properties of matrices. Gaussian elimination. Review of 305.	6.1-6.3	27
2	Rank of a matrix. Linear independence. Vector spaces. Solutions of linear systems. Determinants and Cramer's rule.	6.4-6.6	19
3	Inverse of a matrix. Gauss-Jordan elimination. Eigenvalues and eigenvectors.	6.7, 7.1	13
4	Applications of eigenvalue problems. Symmetric, skew-symmetric, and orthogonal matrices.	7.2-7.3	9
5	Similarity of matrices. Basis of eigenvectors. Diagonalization (optional) EXAM 1	7.4-7.5	13
6	Permutations and combinations. Binomial coefficients. Graphs and digraphs	22.4 21.1	6 6
7	Shortest path problems. Complexity. Optimality. Dijkstra's algorithm	21.2-21.3	12
8	EXAM 2 Complex numbers. Complex plane. Polar form of complex numbers. Powers and roots. Functions. Derivative. Analytic functions.	12.1-12.2	17
9	Cauchy-Riemann equation. Laplace's equation. (Skip 12.5 Conformal mapping) Exponential Function. Trig and hyperbolic functions.	12.3-12.4	18
10	Log functions. Power functions. (Skip 12.9 Linear Fractional Transformations & 12.10 Riemann Surfaces) Line integral in the complex plane.	12.6-12.8	15
11	Cauchy's integral theorem. Cauchy's integral formula. EXAM 3	13.1-13.3	13
12	Derivatives of analytic functions. Sequences. Series. Convergence. Power series	13.4 14.1-14.2	5 14
13	Functions given by power series. Taylor and Maclaurin series. (Skip 14.5 Uniform Convergence)	14.3-14.4	13
14	Laurent series. Residue integration.	15.1-15.2	11
15	Evaluation of real integrals	15.3	7

**Any instructor should cover all of the material specified, additional sections are optional.**