

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>
1	Basic properties of matrices. Gaussian elimination. Review of 305.	7.1-7.3
2	Rank of a matrix. Linear independence. Vector spaces. Solutions of linear systems. Determinants and Cramer's rule.	7.4-7.6
3	Inverse of a matrix. Gauss-Jordan elimination. Eigenvalues and eigenvectors.	7.8, 8.1
4	Applications of eigenvalue problems. Symmetric, skew-symmetric, and orthogonal matrices.	8.2-8.3
5	Similarity of matrices. Basis of eigenvectors. Diagonalization (optional) EXAM 1	8.4-8.5
6	Permutations and combinations. Binomial coefficients. Graphs and digraphs	24.4, 23.1
7	Shortest path problems. Complexity. Optimality. Dijkstra's algorithm	23.2-23.3
8	EXAM 2 Complex numbers. Complex plane. Polar form of complex numbers. Powers and roots. Functions. Derivative. Analytic functions.	13.1-13.3
9	Cauchy-Riemann equation. Laplace's equation. (Skip 12.5 Conformal mapping) Exponential Function. Trig and hyperbolic functions.	13.4-13.6
10	Log functions. Power functions. (Skip 12.9 Linear Fractional Transformations & 12.10 Riemann Surfaces) Line integral in the complex plane.	13.7, 14.1
11	Cauchy's integral theorem. Cauchy's integral formula. EXAM 3	14.2-14.3
12	Derivatives of analytic functions. Sequences. Series. Convergence. Power series	14.4, 15.1-15.2
13	Functions given by power series. Taylor and Maclaurin series. (Skip Uniform Convergence)	15.3-15.4
14	Laurent series. Residue integration.	16.1-16.3
15	Evaluation of real integrals	16.4

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