

Course Syllabus

Text: Leon, S. J., *Linear Algebra with Applications*, 7th Ed, Prentice Hall (ISBN 0-13-185785-1)

HOURS	TOPICS	TEXT SECT.
1-1	Vector Fundamentals, Analytic Notation	Handout
1-2	Vector Arithmetic Rules; Vector Norm	Handout
1-3*	Vector Projections; The Scalar Product; Introduction to MATLAB	Handout
2-5	Systems of Linear Equation	1.1
2-7	Gaussian Elimination; Row Echelon Form	1.2
2-9*	Matrix Operations; Matrix Algebra	1.3
2-11	Block Operations with Matrices	1.5
2-13	Elementary Matrices; Inverse Matrices; LU Factorization	1.4
1-14	Determinants; Properties of Determinants	2.1
1-15	Adjugate (aka Adjoint) of a Matrix; Cramer's Rule	2.2-2.3
1-16	Linear Transformations; Matrix of a Linear Transformation	4.1
3-19*	Rotations; Translations; Compositions; Applications (animation)	4.2
1-20	Euclidean Vector Spaces; Subspaces; Span	3.1-3.2
1-21	Linear Independence and Dependence	3.3
1-22	Basis and Dimension	3.4
1-23	Change of Basis; Transition Matrices	3.5
1-24	Row and Column Spaces; Rank and Nullity	3.6
1-25*	Orthogonality and Direction in Euclidean n-Space	5.1
1-26	Orthogonal Subspaces; Fundamental Subspace Theorem	5.2
3-29*	Least Squares Method; Straight-line and Non-linear Curve Fitting	5.3
1-30	Orthonormal Sets; Orthogonal Matrices	5.5
2-32*	Gram-Schmidt Process; QR Factorization and Algorithms	5.6
2-34	Eigenvalues; Eigenspaces; Eigenvectors	6.1
1-35*	Eigenvalue/vector Analysis of Dynamical and Stochastic Systems	6.2
1-36	Matrix Diagonalization; Defective Matrices;	6.3
1-37	Orthogonal Diagonalization; Properties of Symmetric Matrices	6.4
2-39	Definite and Indefinite Matrices; Quadratic Forms	6.6
5- 44	Reviews, Exams, Holidays	

NOTE: An asterisk indicates that the topic includes a MATLAB project designed to improve student comprehension and/or demonstrate an important application of linear algebra.