

Lecture	Topic	Subtopic
0	Matlab	Introduction
0	Matlab	Help
0	Matlab	Functions and Scripts
0	Matlab	Conditional Statements
0	Matlab	Branching
0	Matlab	Loops
0	Matlab	Basic Plotting
0	Matlab	Function Handles
1		Syllabus Review, Course Overview
1	Matlab	Review, Proper Comments/Indentation
2	Vectors	Introduction
2	Vectors	Operations
2	Vectors	Dot Product
2	Vectors	Norms
2	Vectors	Geometric Interp
2	Vectors	Schwartz and Triange Inequalities
2	Vectors	Linear Combinations
2	Vectors	Matlab
3	Matrices	Introduction
3	Matrices	Operations – 1
3	Matrices	Matrix Vec Uses
3	Matrices	Operations – 2
3	Matrices	Determinant
3	Matrices	Inverse
4	Matrices	Norms
4	Matrices	Matlab
4	Graphs	Introduction
4	Graphs	Adjacency Matrix
4	Graphs	Example
4	Graphs	Matlab
4	Markov Chains	Introduction
4	Markov Chains	Stochastic/Regular Matrix
4	Markov Chains	Example
5	Linear Systems	Introduction
5	Linear Systems	Existance and Uniqueness
5	Linear Systems	Gaussian Elimination
5	Linear Systems	RREF
5	Linear Systems	RREF – Inverse
5	Linear Systems	Matlab
5	Linear Systems	Gaussian Elimination Algorithm
6	Numerical Solutions	Introduction
6	Numerical Solutions	Accuracy vs Precision
6	Numerical Solutions	Numerical Errors
6	Numerical Solutions	Finite Precision
6	Numerical Solutions	Round-off errors

Lecture	Topic	Subtopic
6	Numerical Solutions	Condition Number
6	Interpolation	Introduction
6	Interpolation	Polynomial
6	Interpolation	Lagrange
7	Interpolation	Runge-Chebyshev
7	Interpolation	Spline – Intro
7	Interpolation	Cubic Splines
7	Interpolation	Hermite Splines
7	Interpolation	Radial Basis Functions
7	Integration	Introduction
7	Integration	Left-Right
7	Integration	Midpoint
8	Integration	Trapezoid
8	Integration	Simpson
8	Integration	Newton-Cotes
8	Integration	Gauss Quadrature
8	Integration	Matlab
8	Root Finding	Introduction
8	Root Finding	Bisection
8	Root Finding	Regula Falsi
8	Root Finding	Newton Rhapson
9	Root Finding	Secant
9	Root Finding	Fixed Point
9	Nonlinear Systems	Introduction
9	Nonlinear Systems	Fixed Point
9	Nonlinear Systems	Newton Rhapson
9	Nonlinear Systems	Damped Iteration
10	Nonlinear Systems	Example
10	Nonlinear Systems	Matlab Functions
10	Minimization	Introduction
10	Minimization	Brents
10	Minimization	1D Newton
10	Minimization	Steepest Gradient Descent
10	Minimization	Multi – Newton
11	Minimization	Multi – Quasi Newton
11	Minimization	Multi – Steepest Gradient
11	Minimization	Line Search
11	Minimization	Matlab
11	Linear Curve Fitting	
11	Nonlinear Regression	Introduction
11	Nonlinear Regression	Objective Function
11	Nonlinear Regression	Gauss-Newton
12		No Class
13		Midterm

