

Math 471-001 Fall 2013 Syllabus

day	date		main topic / text section	specific items
Tu	3-Sep		floating point	floating point number systems & arithmetic
Thu	5-Sep		§1.3, 1.4, 6.2	roundoff/cancellation error, finite differences
Tu	10-Sep		rootfinding	bisection method, fixed point iteration
Thu	12-Sep	hw 1 due	§2.1, 2.3 – 2.5, 3.10	Newton's method, secant method
Tu	17-Sep		direct methods for	linear systems, Gaussian elim., back substitution
Thu	19-Sep	drop deadline	$Ax = b$	pivoting strategies, vector/matrix norms
Tu	24-Sep		§3.0 – 3.5	error analysis, condition number, $A = LU$
Thu	26-Sep	hw 2 due	finite diff. matrices,	2-pt BVP, finite difference scheme
Tu	1-Oct		iterative methods for	tridiagonal solver, Jacobi's method
Thu	3-Oct		$Ax = b$	Gauss-Seidel, Young's thm, SOR
Tu	8-Oct		§8.1, 8.2, App. B,	special matrices, 2D Poisson problem
Thu	10-Oct	hw 3 due	3.7, 3.8	2D Poisson cont'd, iterative vs. direct methods
Tu	15-Oct	no class	Fall break	
Thu	17-Oct		eigenvalues $Ax = \lambda x$	Wilkinson's example, Rayleigh quotient
Tu	22-Oct	project 1 due	§4.0 – 4.2	power method, inverse power method with shift
Thu	24-Oct			Rayleigh quotient iteration
Tu	29-Oct	hw 4 due	interp. & approx. §5.0, 5.1	polynomial interpolation
Thu	31-Oct	Midterm	—	—
Tu	5-Nov		interp. & approx.	Lagrange & Newton form, Chebyshev points
Thu	7-Nov		§5.3 – 5.7	piecewise polynomial interpolation,
Tu	12-Nov			Hermite interpolation
Thu	14-Nov	hw 5 due	numerical	1D: midpoint and trapezoid rules, adaptivity
Tu	19-Nov		integration	1D: Richardson extrapolation, Romberg's method
Thu	21-Nov	project 2 due	§6.4, 6.7, 6.8, 6.6 (6.9)	1D & 2D midpoint rule / scattered data
Tu	26-Nov			Gaussian quadrature ** (APS conf.) **
Thu	28-Nov	no class	Thanksgiving	
Tu	3-Dec		Initial value problems	ODE Review, Euler's method
Thu	5-Dec		§7.1 – 7.5	Taylor methods and Runge-Kutta methods
Tu	10-Dec	hw 6 due		Multistep methods
Fri	13-Dec	Final Exam		