ACADEMIC CALENDAR

NUMERICAL ANALYSIS I

FALL SEMESTER 2017

http://www.phys.uconn.edu/~rozman/Courses/m3510_17f/

Last modified: November 30, 2017

TUESDAY	THURSDAY
Aug 29th **Lecture 1** Why do we need numerical analysis? We already know calculus . . . , I Homework 1 assigned: due Sep 5	Aug 31st **Lecture 2** Why do we need numerical analysis, II. Comparing numerical programming languages. Example: Julia set.
Sep 5th **Lecture 3** Matlab programming, I Homework 2 assigned: due Sep 12	Sep 7th **Lecture 4** Matlab programming, II
Sep 12th **Lecture 5** Computer arithmetic and round-off errors. Ch. 1.2 Homework 3 assigned: due Sep 19	Sep 14th **Lecture 6** Computer arithmetic and round-off errors, II. Ch. 1.2
Sep 19th **Lecture 7** Linear systems of equations. Ch. 6.1, pp. 361, 363 Homework 4 assigned: due ~~Sep 26~~ ~~Oct 3~~ Oct 10	Sep 21st **Lecture 8** Linear systems of equations, II. Cramer's rule. Geometric solution. Ch. 6.1, pp. 361, 363
Sep 26th **Lecture 9** Gaussian elimination with backward substitution. Operation count. Ch. 6.1, pp. 364-371	Sep 28th **Lecture 10** Programming gaussian elimination. Pivoting; pivoting strategies. Ch. 6.2, pp. 376-379
Oct 3rd **Midterm I**	Oct 5th **Lecture 11** LU matrix factorization, I Ch. 6.5, pp. 406–412
Oct 10th **Lecture 12** LU matrix factorization, II. Programming matrix factorization. Homework 5 assigned: due ~~Oct 17~~ Oct 19	Oct 12th **Lecture 13** Matrix inversion. Determinant of a matrix. Ch. 6.3, 6.4.

Tuesday	Thursday
Oct 17th **Lecture 14** The bisection method. Newton's method. The secant method. Ch. 2.1; Ch. 2.3, pp. 66–72	Oct 19th **Lecture 15** Error analysis for bisection method and Newton's method. The secant method. Dekker's method. Programming solution of nonlinear equations. Homework 6 assigned: due Oct 26
Oct 24th **Lecture 16** Interpolation. Lagrange polynomials. Vandermonde matrix. Runge example. Ch. 3.1	Oct 26th **Lecture 17** Cubic spline interpolation. Ch. 3.5 Homework 7 assigned: due ~~Nov 2~~ ~~Nov 7~~ Nov 9
Oct 31st **Lecture 18** Numerical differentiation. Ch. 4.1, pp. 172–180.	Nov 2nd **Lecture 19** Richardson's extrapolation, Ch. 4.2, pp. 183–191. Numerical integration, I: Ch. 4.3, pp. 191–195.
Nov 7th **Midterm II**	Nov 9th **Lecture 20** Numerical integration, II: Newton-Cotes formulas, Ch. 4.3, pp. 196–199. Gaussian quadrature, Ch. 4.7, pp. 228–234. Adaptive integration, Ch. 4.6, pp. 219–225. Homework 8 assigned: due ~~Nov 28~~ Nov 30
Nov 14th **Lecture 21** Initial value problem for ordinary differential equations: Lipschitz condition and well posed problems. Euler's method. Ch. 5.1, 5.2, pp. 259–272. Runge-Kutta methods. Ch. 5.4.	Nov 16th **Lecture 22** Homework review
Nov 21st **Thanksgiving recess – No classes**	Nov 23rd **Thanksgiving recess – No classes**
Nov 28th **Lecture 23** Multistep methods: Adams-Bashforth and Adams-Moulton. Predictor-corrector methods. Ch. 5.6.	Nov 30th **Lecture 24** Systems of differential equations and higher order differential equations. Stability. Ch. 5.10 Homework 9 assigned: due Dec 7
Dec 5th **Lecture 25** Stiff differential equations	Dec 7th **Lecture 26** Course review
Dec 12th **Week of Finals**	Dec 14th **Week of Finals**