ACADEMIC CALENDAR

MATH 3510, NUMERICAL ANALYSIS I

FALL SEMESTER 2019

http://www.phys.uconn.edu/~rozman/Courses/m3510_19f/

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Section and page numbers in the table below refer to the following edition of the course textbook: T. Driscoll and R. Braun, *Fundamentals of Numerical Computation*, SIAM, 2017.

TUESDAY	THURSDAY
Aug 27th **Lecture 1** Matlab and matlab programming, I: matlab as a calculater; vectors and matrices	Aug 29th **Lecture 2** Matlab programming, II: scripts and functions; matlab graphics
Sep 3rd **Short Class Day**	Sep 5th **Lecture 3** Matlab programming, III: ; loops and conditionals; timing of matlab code; more graphics; Homework 1 assigned: due 9/12/2019
Sep 10th **Lecture 4** Matlab programming, IV: preallocation of arrays; vector operations.	Sep 12th **Lecture 5** Computer representation of numbers. Sec. 1.1, pp. 9–13. Polynomial interpolation.. Sec. 2.1, pp. 31–35. Homework 2 assigned: due 9/19/2019
Sep 17th **Lecture 6** Systems of linear equations. Triangular systems. Sec. 2.3, pp. 44–48.	Sep 19th **Lecture 7** Gaussian elimination and LU factorization. Sec. 2.4, pp. 51–59. Homework 3 assigned: due 9/26/2019
Sep 24th **Lecture 8** Efficiency of matrix computations. Sec. 2.5, pp. 61–65.	Sep 26th **Lecture 9** Pivoting. Sec. 2.6, pp. 68–72. Vector and matrix norms. Sec. 2.7, pp. 74–77. Condition number of a matrix. Errors of the solutions of systems of linear equations. Sec. 2.8, pp. 80-83 Homework 4 assigned: due 10/3/2019

Tuesday	Thursday
Oct 1st **Midterm I**	Oct 3rd **Lecture 10** Fitting functions to data. The least squares formulation. Sec. 3.1, pp. 96–99. The normal equations. Sec. 3.2, pp. 103–106.
Oct 8th **Lecture 11** The QR factorization. Sec. 3.3, pp. 107–112.	Oct 10th **Lecture 12** Computing QR factorization: Householder reflections. Sec. 3.4, pp. 113–114. Homework 5 assigned: due 10/17/2019
Oct 15th **Lecture 13** Computing QR factorization: factorization algorithm. Sec. 3.4, pp. 115–117. Roots of nonlinear equations. Sec. 4.1, pp. 121–126.	Oct 17th **Lecture 14** Newton's method in one variable. Sec. 4.3, pp. 135–142. Homework 6 assigned: due 10/24/2019
Oct 22nd **Lecture 15** Root finding without derivatives: bisection and interpolation-based methods. Sec. 4.4, pp. 143–151.	Oct 24th **Lecture 16** Newton's method for nonlinear systems. Sec. 4.5, pp. 152–158. Homework 7 assigned: due 10/31/2019
Oct 29th **Lecture 17** Quasi-Newton methods. Sec. 4.5, pp. 159–165.	Oct 31st **Midterm II**
Nov 5th **Lecture 18** Interpolation. Runge phenomenon. Sec. 5.1, pp. 175–180. Piecewise linear interpolation. Sec. 5.2, pp. 182–188.	Nov 7th **Lecture 19** Cubic splines. Sec. 5.3, pp. 189-195. Homework 8 assigned: due 11/14/2019
Nov 12th **Lecture 20** Cubic splines, II. Numerical differentiation. Sec. 5.4–5.5. Fornberg's method for calculation of weights in finite difference formulas.	Nov 14th **Lecture 21** Numerical integration: trapezoid rule, Simpson's rule, Newton-Cotes formulas. Sec. 5.6, pp. 208–215. Adaptive integration. Sec. 5.7. Homework 9 assigned: due 11/21/2019
Nov 19th **Lecture 22** Basics of Initial Value Problems. Sec. 6.1, pp. 227–233.	Nov 21st **Lecture 23** Euler's method. Sec. 6.2, pp. 235–240. Systems of differential equations. Sec. 6.3, pp.242–247. Homework 10 assigned: due 12/5/2019
Nov 26th **Thanksgiving recess – No classes**	Nov 28th **Thanksgiving recess – No classes**
Dec 3rd **Lecture 24** Runge-Kutta methods. Sec. 6.4–6.5, pp. 249–259.	Dec 5th **Lecture 25** Multistep methods. Sec. 6.6–6.7, pp. 261–271.

Tuesday	Thursday
Dec 10th **Week of Finals**	Dec 12th **Week of Finals**