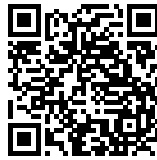


COURSE CALENDAR

NUMERICAL ANALYSIS I

FALL 2021

https://www.phys.uconn.edu/~rozman/Courses/m3510_21f/



Last modified: December 9, 2021

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 31st	Lecture 1	Sep 2nd	Lecture 2
Course logistics. Git and GitLab. Matlab and matlab programming, I: Matlab graphics		Matlab and matlab programming, II: scripts and anonymous functions; Homework 1 assigned: due 9/9/2021	
Sep 7th	Lecture 3	Sep 9th	Lecture 4
Matlab programming, III: functions		Matlab programming, IV: loops and conditionals; timing of matlab code; Homework 2 assigned: due 9/16/2021	
Sep 14th	Lecture 5	Sep 16th	Lecture 6
Matlab programming, V: vectors and matrices; preallocation of arrays; Computer representation of numbers. Sec. 1.1, pp. 9–13.		Polynomial interpolation. Sec. 2.1, pp. 31–35. Homework 3 assigned: due 9/23/2021	
Sep 21st	Lecture 7	Sep 23rd	Lecture 8
Stability of algorithms.		Systems of linear equations. Triangular systems. Sec. 2.3, pp. 44–48. Homework 4 assigned: due 9/30/2021	
Sep 28th		Sep 30th	Lecture 9
Midterm I		Gaussian elimination and LU factorization. Sec. 2.4, pp. 51–59.	
Oct 5th	Lecture 10	Oct 7th	Lecture 11
Gaussian elimination and LU factorization, II. Sec. 2.4, pp. 51–59. Efficiency of matrix computations. Sec. 2.5, pp. 61–65.		Efficiency of matrix computations, II. Sec. 2.5, pp. 61–65. Vector and matrix norms. Sec. 2.7, pp. 74–77. Homework 5 assigned: due 10/14/2021	

TUESDAY		THURSDAY	
Oct 12th	Lecture 12	Oct 14th	Lecture 13
Condition number of a matrix. Errors of the solutions of systems of linear equations. Sec. 2.8, pp. 80-83		Symmetric and symmetric positive definite matrices. Cholesky factorization. Sec. 2.9, pp. 87-91. Homework 6 assigned: due 10/21/2021	
Oct 19th	Lecture 14	Oct 21st	Lecture 15
Fitting functions to data. The least squares formulation. Sec. 3.1, pp. 96-99. The normal equations. Sec. 3.2, pp. 103-106.		The QR factorization. Least squares and QR. Sec. 3.3, pp. 107-112. Householder reflections. Sec. 3.4, pp. 113-114. Homework 7 assigned: due 10/28/2021	
Oct 26th	Lecture 16	Oct 28th	Lecture 17
Computing QR factorization. Sec. 3.4, pp. 115-117.		Take-home Midterm II – due Nov 4 Roots of nonlinear equations. Sec. 4.1, pp. 121-126.	
Nov 2nd	Lecture 18	Nov 4th	Lecture 19
Newton's method in one variable. Sec. 4.3, pp. 135-142.		Root finding without derivatives. Sec. 4.4, pp. 143-151. Homework 8 assigned: due 11/11/2021	
Nov 9th	Lecture 20	Nov 11th	Lecture 21
Newton's method for nonlinear systems of equations. Sec. 4.5, pp. 152-158.		Interpolation. Runge phenomenon. Sec. 5.1, pp. 175-180. Piecewise linear interpolation. Sec. 5.2, pp. 182-188. Homework 9 assigned: due 11/18/2021	
Nov 16th	Lecture 22	Nov 18th	Lecture 23
Numerical differentiation. Sec. 5.4-5.5. Fornberg's method for calculation of weights in finite difference formulas. (handout).		Numerical integration: trapezoid rule Sec. 5.6, pp. 208-215. Numerical integration: extrapolation, Simpson's rule, Newton-Cotes formulas. Sec. 5.6, pp. 208-215.	
Nov 23rd		Nov 25th	
Thanksgiving recess – No classes		Thanksgiving recess – No classes	
Nov 30th	Lecture 24	Dec 2nd	Lecture 25
Basics of Initial Value Problems. Sec. 6.1, pp. 227-233. Euler's method. Sec. 6.2, pp. 235-240.		Systems of differential equations. Sec. 6.3, pp. 242-247. Homework 10 assigned: due 12/9/2021	
Dec 7th	Lecture 26	Dec 9th	Lecture 27
Runge-Kutta methods. Sec. 6.4-6.5, pp. 249-259.		Multistep methods. Sec. 6.6-6.7, pp. 261-271.	
Dec 14th		Dec 16th	
Week of Finals		Week of Finals	