

ACADEMIC CALENDAR

NUMERICAL ANALYSIS I

FALL SEMESTER 2018

http://www.phys.uconn.edu/~rozman/Courses/m3510_18f/



Last modified: December 4, 2018

| TUESDAY | THURSDAY |
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| <div style="display: flex; justify-content: space-between;"> Aug 28th Lecture 1 </div> <p>Course logistics. Matlab and matlab programming, I.</p> | <div style="display: flex; justify-content: space-between;"> Aug 30th Lecture 2 </div> <p>Matlab graphics. Matlab programming, II: scripts, functions, vector operations. Homework 1 assigned: due Sep 6</p> |
| <div style="display: flex; justify-content: space-between;"> Sep 4th Lecture 3 </div> <p>Matlab programming, III: loops and conditionals</p> | <div style="display: flex; justify-content: space-between;"> Sep 6th Lecture 4 </div> <p>Matlab programming, IV: more about functions; Fibonacci series; $\log(n!)$.</p> |
| <div style="display: flex; justify-content: space-between;"> Sep 11th Lecture 5 </div> <p>Matlab programming, V: recursion; timing of matlab code. Systems of linear equations, I: Cramer's rule</p> | <div style="display: flex; justify-content: space-between;"> Sep 13th Lecture 6 </div> <p>Systems of linear equations, II: Gaussian elimination. Sec. 2.1, pp. 71-77 Homework 2 assigned: due Sep 20</p> |
| <div style="display: flex; justify-content: space-between;"> Sep 18th Lecture 7 </div> <p>Systems of linear equations, III: Gaussian elimination. Sec. 2.1, pp. 71-77</p> | <div style="display: flex; justify-content: space-between;"> Sep 20th Lecture 8 </div> <p>LU decomposition. Sec. 2.2, pp. 79-85. Operation count Homework 3 assigned: due Sep 27</p> |
| <div style="display: flex; justify-content: space-between;"> Sep 25th Lecture 9 </div> <p>Pivoting; pivoting strategies.</p> | <div style="display: flex; justify-content: space-between;"> Sep 27th Lecture 10 </div> <p>Programming partial pivoting. Homework 4 assigned: due Oct 4</p> |
| <div style="display: flex; justify-content: space-between;"> Oct 2nd Midterm I </div> | <div style="display: flex; justify-content: space-between;"> Oct 4th Lecture 11 </div> <p>Vector and matrix norms. Condition number of a matrix. Errors of the solutions of systems of linear equations. Homework 5 assigned: due Oct 11</p> |

| TUESDAY | | THURSDAY | |
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| Oct 9th | Lecture 12 Nonlinear equations. The bisection method. Sec. 1.1, pp. 24–30 | Oct 11th | Lecture 13 Nonlinear equations. The Newton's method. Error analysis for bisection method and Newton's method. Sec. 1.4, pp. 51–60 Homework 6 assigned: due Oct 18 |
| Oct 16th | Lecture 14 Nonlinear equations. Repeated roots and modified Newton's method. Root finding without derivatives: the secant method. Error analysis of the secant method. Sec. 1.5, pp. 61–66. | Oct 18th | Lecture 15 Root finding without derivatives: the secant method. Error analysis of the secant method. Homework 7 assigned: due Oct 25 |
| Oct 23rd | Lecture 16 Polynomial interpolation. Lagrange polynomials. Vandermonde matrix. Sec. 3.1, pp. 138–141. | Oct 25th | Lecture 17 Programming Lagrange interpolation. Interpolation error. Runge phenomenon. Cubic splines. Sec. 3.4, pp. 166–178. Homework 8 assigned: due Nov 1 |
| Oct 30th | Lecture 18 Cubic spline interpolation. | Nov 1st | Midterm II |
| Nov 6th | Lecture 19 Numerical differentiation. Sec. 5.1, pp. 244–247. Fornberg's method for calculation of weights in finite difference formulas. Solving ODEs using finite difference method. | Nov 8th | Lecture 20 Rounding error in numerical differentiation. Sec. 5.1.2, pp. 247–249. Numerical integration: trapezoid rule and Simpson's rule. Sec. 5.2.1-2, pp. 255–258. Homework 9 assigned: due Nov 15 |
| Nov 13th | Lecture 21 Numerical integration: Newton-Cotes formulas. Composite rules. Sec. 5.2.3, pp. 259–262. Adaptive integration. Sec. 5.4, pp. 269–271. | Nov 15th | Classes cancelled due to snow storm |
| Nov 20th | Thanksgiving recess – No classes | Nov 22nd | Thanksgiving recess – No classes |
| Nov 27th | Lecture 22 Gaussian quadrature. Homework 10 assigned: due Dec 4 | Nov 29th | Lecture 23 Runge Kutta methods (handout). |
| Dec 4th | Lecture 24 Multistep methods: Adams-Bashforth and Adams-Moulton. Predictor-corrector methods. (handout). | Dec 6th | Lecture 25 Course review |
| Dec 11th | Week of Finals | Dec 13th | Week of Finals |