

SM233: Introduction to Applied Math

Spring 2012 Syllabus

| Module | Day/Date | Reading Assignment | | In-class probs | Homeworks |
|---|-------------|--|--|---|--|
| I. Introduction to MATLAB | 1 T 10-Jan | 1.1-1.2: Overview of Matlab | | T1.1-1, 1, 5, 12 | Ch 1: 4, 7, 11 (explain) |
| | 2 R 12-Jan | 1.3, 1.4, 1.5 Arrays, plots, scripts, help | | T1.3-1,T1.3-2,T1.3-3,T1.3-4, 15, 24, | Ch 1: 13,14,16,21 |
| | 3 F 13-Jan | 1.4: Scripts, comments, input | | T1.4-1, 25, bmi, inscribed n-gon | Ch 1: 26, circumscribed n-gon |
| | 4 R 19-Jan | 5.1 pg 205-207, 5.2 pg 211-217 | | QUIZ T5.1-1, T5.2-1, T5.2-2, T5.2-3, T5.2-4, T5.2-5 | Ch 5: 1, 5, 23 (ignore straight-line) |
| | 5 F 20-Jan | | | Ellipse project | Ellipse program |
| | 6 M 23-Jan | 2.1: Numeric arrays, access values, change values, transpose | | T2.1-1,Ex2.3-2,Ex2.3-3,Ex2.3-1,Ex 2.3-2,Ex 2.3-3,T2.3-1 | Ch 2: 3,4,5,6,8,10 |
| | 7 R 26-Jan | 2.3: Element-wise operations | | QUIZ T2.4-3, T2.4-4 eye, zeros, access subarrays | Ch 2: 13ac,16,19 |
| | 8 F 27-Jan | 2.4: Matrix operations | | Ex 2.4-3, Ch 2: 27, 35, 45, top of p 76 | Ch 2: 23, 28, 37 |
| | 9 M 30-Jan | 2.5: Systems of linear equations | | QUIZ, T2.5-2, T2.5-3, 41 | Ch2: 35, 37, 38 |
| | 10 R 2-Feb | LU decomposition, efficiency | | Magic(99) x=1:99, tic toc compare, det | Chen pg 211 |
| II. Markov chains | 11 F 3-Feb | Markov chains module | | Handout | Markov Handout 1-6 |
| | 12 M 6-Feb | Markov chains | | | Markov Handout 7-9 |
| | 13 R 9-Feb | Markov chains | | QUIZ | Markov Handout 10-13 |
| III. Programming Algorithms and Control Flow | 14 F 10-Feb | 3.2: pg 126-131 User-defined functions | | Ch 3: 8, interest on bank accounts, gamble function | Ch 3: 9, 10 |
| | 15 M 13-Feb | 4.1-4.2: Relational operators and logical variables | | QUIZ, T4.2-1,T4.2-2,T4.2-3,T4.2-4, 10 | Ch 4: 2, 3, 5, 6, 7, 9 |
| | 16 R 16-Feb | 4.3: Conditional statements | | T4.3-1, 17, isSquare | Ch 4: 13, 15b, 16, classify triangles |
| | 17 F 17-Feb | 4.4: pg 170-176, For Loops | | T4.4-3, Ex 4.4-1, Ex 4.4-2, find n so sum 1^2 to n^2 is square? | Ch 4: factorial loop, 20, 21a, 22a, 38 |
| | 18 R 23-Feb | 4.4: pg 178-181, While loops | | QUIZ, Ex 4.4-4, Ex 4.4-5, T4.4-4, T4.4-6, 30, input checking for gamblers | Ch 4: 29, 31 |
| | 19 F 24-Feb | 4.4: break statement, more practice | | Ch4: 32, nested loops | Ch 4: 36, limit of n^(1/n) to accuracy of .00001 |
| | 20 M 27-Feb | Computer-generated proofs | | What comes around goes around | handout finish |

| | | | | | | |
|---|----|---|--------|---|--|---------------------------------------|
| IV. Recursion | 21 | R | 1-Mar | EXAM 1 | EXAM 1 | |
| | 22 | F | 2-Mar | Scripts that call functions: input | Handout , 2^n , factorial | sum to n, greatest common divisor |
| | 23 | M | 5-Mar | Recursion | Fibonacci, memo-izing | Karel puzzle |
| | 24 | R | 8-Mar | Recursion | tower of hanoi puzzle | happy birthday |
| | 25 | F | 9-Mar | Recursion | bisection for zero finding | Newton's method |
| | 26 | M | 19-Mar | Recursion | QUIZ | |
| VI. Randomness and Simulation | 27 | R | 22-Mar | 6.1: Histograms, 6.3 Random number generation | Ex 6.1-1, T6.3-1, T6.3-2 | Ch 6: 2, 13, 14 |
| | 28 | F | 23-Mar | 6.3: Random number generation | Ch 6: 20, dice, Ex 6.3-1 | Ch 6: 21 |
| | 29 | M | 26-Mar | Random Numbers: Handout | linear congruential generators | 1,2,5 from beginning of handout |
| | 30 | R | 29-Mar | Simulation | QUIZ, more random number generator handout | |
| | 31 | F | 30-Mar | Simulation | Military Missions: order statistics, bank simulation | Ch 6: 19 |
| | 32 | M | 2-Apr | Simulation | Dodgeball | |
| | 33 | R | 5-Apr | Simulation | 2/C Loan | |
| VII. Chaos | 34 | F | 6-Apr | EXAM 2 | EXAM 2 | |
| | 35 | M | 9-Apr | Chaos unit | Handout | write jitterweb |
| | 36 | R | 12-Apr | Chaos unit | | write doublejitter |
| | 37 | F | 13-Apr | Chaos unit | review discovered rules for stability of fixed points | finish packet |
| | 38 | M | 16-Apr | Chaos unit | Chaos Quiz | |
| VIII. Numerical differential equations | 39 | R | 19-Apr | 7.3: Numerical differential equations (first-order) | ode45, T7.3-1, Ex. 7.3-1, Ex. 7.3-3 | Ch 7: 24, 25 |
| | 40 | F | 20-Apr | 7.4: Numerical differential equations (higher-order) | | Ch 7: 30, 35 |
| | 41 | M | 23-Apr | Numerical differential equations | Improved Euler, start 4th order from Strang handout | Fourth order Runge- Kutta, writeup |
| | 42 | R | 26-Apr | Numerical PDE - brief intro | | |
| | 43 | F | 27-Apr | Review for final | | |
| | 44 | M | 30-Apr | Review for final | | |

Contact: Prof. Pankavich, pankavic@usna.edu