MATH 111-H01 Linear Math Modeling   **Spring 2019**
TR 12:00 - 1:15   IN 215G

Instructor: Ellen O'Brien   **Office Hours:** T 1:30-2:30, W 1:30-2:30;
Email: eobrien@gmu.edu   **Office:** Exploratory Hall 4205

Text and Materials: Finite Mathematics and Its Applications, *Twelfth Edition*, by
Goldstein, Schneider and Siegel, Pearson 2018
                          Math 111 Data Fitting Notes – available on Blackboard

Course Description: This course meets the quantitative reasoning requirement, one of the
Foundation requirements of the Mason Core and the Math requirement for the Honor's
College. The goal of the Foundation requirement is to help ensure that students are
equipped with the tools and techniques necessary to succeed in college and throughout
their lives and careers. We will cover the following topics:

- Linear Equations
- Linear Systems and Matrices
- Leontiff Input/Output Analysis
- Markov Processes
- Data Fitting - Polynomial Interpolation, Least Squares

Active Learning with Technology Classroom: I chose this classroom for Math 111
because the space facilitates active learning and collaboration.
 Students will be able to try problem solving skills and procedures immediately after being
introduced to them. Eliminating the time gap between the introduction of a skill and the
first individual attempt (usually homework several hours later) will provide the
opportunity for better retention of the mathematical concepts introduced in the course.
 The circular seating arrangement allows for comparing, sharing and discussing results. This
approach is beneficial to everyone. The students who understand a concept can reinforce
their understanding by explaining it others. On the other hand, students who are not
confident with a certain skill can get assistance from their tablemates.

Student Expectations
- Attendance- you are expected to attend every class. There will be collected/graded
  work on most (if not all) class days.
- Preparation- you are expected to be prepared for class. The preparation includes
  doing homework problems and reading the textbook. There will also be videos
  posted on blackboard that can be used for review and reinforcement. Please check
  the Math 111 Blackboard the night before **each class** for announcements and other
  information.
- Collaboration – I am requesting that you help other students at your table when it is
  appropriate. However, keep in mind that not all exercises will allow for
  collaboration. For instance, tests are individual efforts and sharing information
  about them is prohibited. Please don't hesitate to ask if you are not sure whether or
  not collaboration is permitted.

Final Exam: Thursday, May 9 10:30am-1:15pm
Tests:

      Test 1 Tuesday, February 19
      Test 2 Thursday, March 28
      Test 3 Thursday, April 25

Grading: Your grade for the course will be calculated based on three semester exams, a final exam, collected class work, and Matlab Assignments. Matlab assignments will be worth 25 points each (total 100). Each test is worth 100 points, class work will total 100 points, and the final exam 100 points. The sum of these grades divided by 6 will determine your grade according to the scale:

      A: **90**-100   B: 80-**89.9** C:70-**79.9**   D:65-**69.9**   F: below 65
+ or – will be attached to the grade for the upper or lower 2 points in each range

NO MAKE UP TESTS or CLASSWORK will be given. If you miss an exam contact me ASAP.

Homework: Homework problems will be assigned at the end of each class and presented at the beginning of the next class meeting by students. Reading the sections of the text related to the problems is a part of the homework assignment. I will post the assignment regularly on the course Blackboard.

Calculators: You will need a calculator for class work, homework, and exams. Any calculator that does arithmetic and exponential calculations is acceptable. Matrix computations on graded class work and exams are to be **done by hand**.

Honor Code: Sharing information of any kind about exams is an Honor Code violation. The assigned *Matlab* problems are *NOT GROUP PROJECTS*. Each student is to work independently at the computer terminal and hand in his or her own computer printout. Any violations will be referred to the Office of Academic Integrity.

Disability statement: If you are a student with a disability and you need academic accommodations, please see me and contact the Office of Disability Services at 703-993-2474. All academic accommodations must be arranged through that office.

Computers: We will be using *Matlab* to help with matrix calculations. This software is available for student use either on campus or remotely on mason.gmu.edu. The system requires your Patriot Pass. Details for connecting will be available on Blackboard. You can use your own computer or the computers available in the Johnson Center in room 342 and Innovation 301.
For open hours see
    http://doit.gmu.edu/faculty-and-staff/computer-labs/computer-lab-locations/

General Remarks: Please be considerate of other students in the class. Turn your cell phones off before entering the classroom and keep the noise level at a minimum.
Be respectful of other students in the class. We all have different experiences in Mathematics. What is easy for one person may be challenging for another.

The following is a tentative schedule for the course:

T	R
Jan. 22: Sec 1.1 Linear Models and Graphs	Jan. 24: Sec 1.2, Slope of a line; Writing Linear Equations
Jan. 29: Sec 1.3, 2.1 Intro to Matrix method of solving systems.	Jan. 31: Sec 2.1 Matrix Method of solving systems of Equations; Row Operations
Feb. 5 Sec 2.2 Gaussian Elimination	Feb. 7: Sec 2.3 Matrix Operations: Scalar and Matrix Multiplication, Addition
Feb. 12: Sec 2.4 Inverse of a Matrix	Feb. 14: Sec 2.4 Matrix Equations
Feb. 19: **Test 1**	Feb. 21: Introduction to Matlab
Feb. 26: Sec 2.5, 2.6 Gauss-Jordan Method of finding Inverses	Feb. 28: Sec 2.6 Leontiff Input-Output Analysis
Mar. 5: Sec 8.1 Markov Processes	Mar. 7: Sec 8.1. 8.2 Markov Processes
Mar. 12: **Spring Break**	Mar. 14: **Spring Break**
Mar. 19: Sec. 8.2 Processes with Stable Distributions	Mar. 21: Sec 8.3 Absorbing States and Absorbing Matrices
Mar. 26: Chapter 8 Problems	Mar. 28: **Test 2**
Apr 2: Sec 1.5 Method of Least Squares	Apr 4: Data Fitting Models Polynomial Interpolation
Apr 9: Data Fitting Polynomial Interpolation	Apr 11: Data Fitting Least Squares
Apr 16: Data Fitting Exponential Model	Apr 18: Data Fitting Power Law Model
Apr 23: Data Fitting Problems	Apr 25: **Test 3**
Apr 30: Presentation of Projects	May 2: Presentation of Projects
	May 9: **Final Exam** **10:30-1:15**

- February 25 is last day to self-drop
- February 26-March 25 is the Selective withdrawal period