MATH 111 - LINEAR MATH MODELLING, FALL 2021
SECTION 002, MW 3:00-4:15PM

Instructor: Simone Mazzini Bruschi

Office: Exploratory Hall, room 4219
Office hours: Monday & Wednesday 2:00-2:30pm & Tuesday 2:30-3:30 pm & Thursday 6:00-7:00pm and by appointment
Email: sbruschi@gmu.edu (Please include Math 111-002 in the subject line)

Textbook and Materials: *Finite Mathematics and Its Applications* 12th edition, by Goldstein, Schneider and Siegel, Pearson 2018.

Math 111 - Data Fitting Notes - will be available on Blackboard the left menu.

Course Description This course meets the quantitative reasoning requirement, one of the Foundation requirements of the Mason Core. 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
- DattaFitting - Polynomial Interpolation, Least Squares

Course Testing schedule:

	Date and Time
Quiz 1	Wednesday, September 08
Midterm 1	Monday, September 27
Quiz 2	Tuesday, October 12
Midterm 2	Wednesday, October 27
Quiz 3	Monday, November 15
Final	Monday, December 13 - 1:30pm - 4:15pm

Homework: There will be homework assignments. I will post assignments regularly on the course Blackboard.

Grading:

Homework Assignments (written):	10%
Matlab homework assignment:	10%
Quizzes:	5% for each quiz
Midterm :	20% each
Final Exam:	25%

Your course total (out of 100) will be converted into your letter grade by the following table.

A-, A	90 – 100
B-, B, B+	80 – 89
C-, C, C+	70 – 79
D-, D, D+	60 –69
F	0 – 59

+ or − may be attached to the grade for *approximately* the upper or lower 2 points.

Technology:

- Matlab to help with matrix calculations This software is available for students use remotely on mason.gmu.edu. The system requires your PatriotPass.
- Desmos is a free software that we will use for graphing models and making scatter plots of Data Sets

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

Academic integrity: To promote a stronger sense of mutual responsibility, thrust, and, fairness among all members of the Mason community, and with the desire for greater academic and personal achievement, we, the student members of the university community, have set forth this honor code:

Student members of the George Mason University community pledge not to cheat, plagiarize, steal, lei in matters related to academic work

For the remainder of the code, see: http://oai.gmu.edu/mason-honor-code

Students with Disabilities: All academic accommodations must be made through the Office of Disability Services (ODS) at 703.993.2474. Students must provide a copy of their Faculty Contact Sheet in order to receive accommodations. Note that accommodations are not retroactive. https://ds.gmu.edu

Equity and Inclusion: George Mason University is an intentionally inclusive community that promotes and maintains an equitable and just work and learning environment. We welcome and value individuals and their differences including race, economic status, gender expression and identity, sex, sexual orientation, ethnicity, national origin, first language, religion, age, and disability. Please email me if you have any concerns about any feeling of inequity in this course.

Attendance Policy: Students are expected to attend all classes and are responsible for all information presented. If a student misses a class, it is their responsibility to get motes on what they missed. No make-up quizzes will be give. Absences will only be excused in extreme circumstances, and with the appropriate documentation.

Tutoring Center: GMU Math Tutoring Center: The Math Tutoring Center will be offering online tutoring services to students currently enrolled in undergraduate Math courses at GMU. More information can be found at
http://math.gmu.edu/tutor-center.php
https://science.gmu.edu/academics/department-untis/mathematical-sciences/math-tutoring/tutoring-center-hours-and

Important dates:

Classes Begin - August 23
Last day to drop with no Tuition Penalty - September 7
Last day to drop - September 14
Final Exam - Monday December 13, 1:30pm-4:15pm

Weekly tentative schedule:

- Week 1:

08/23 Linear Models and Graphs - Section 1.1
08/25 Slope of a Line; Writing Linear Equations - Section 1.2

- Week 2:

08/30 Intro to Matrix method of solving systems Sections 1.3, 2.1
09/01 Matrix Method of solving systems of equations, Row Operations Section 2.1

- Week 3:

09/06 Labor Day - No class
09/08 Quiz 1 - Gaussian Elimination Section 2.2

- Week 4:

09/13 Matrix Operations: Scalar and Matrix Multiplication, Addition Section 2.3
09/15 Inverse of a Matrix Section 2.4

- Week 5:

09/20 Matrix Equations Section 2.4
09/22 Introduction to MatLab

- Week 6:

09/27 Midterm 1
09/29 Gauss-Jordan Method of finding inverses Section 2.5

- Week 7:

10/04 Leontiff Input-Output Analysis - Section 2.6
10/06 Markov Processes Section 8.1

- Week 8:

10/12 Quiz 2 - Markov Processes - Section 8.1
10/13 Processes with Stable Distributions Section 8.2

- Week 9:

10/18 Absorbing States and Absorbing Matrices Section 8.3
10/20 Absorbing Markov Processes - Section 8.3

- Week 10:

10/25 Problems Sections 8.1-8.3
10/27 Midterm 2

- Week 11:

11/01 Least Square Formulas - Section 1.4
11/03 Least Square error - Section 1.4

- Week 12:

11/08 Data Fitting Introduction
11/10 Data Fitting Models - Polynomial Interpolation

- Week 13:

11/15 Quiz 3 - Data Fitting Models - Least Squares
11/17 Data Fitting: Least Squares vs Polynomial Interpolation, Exponents Review

- Week 14:

11/22 Data Fitting Models - Exponential Model
11/24 Thanksgiving Break

- Week 15:

11/29 Data Fitting Models - Power Law Model
12/01 Data Fitting Problems - Course Review

- **12/13 Final Exam - 1:30pm-4:15pm**