MATH 111 - LINEAR MATH MODELLING, SPRING 2022
SECTION 006, TR 1:30-2:45PM

Instructor: Simone Mazzini Bruschi

Office:	Exploratory Hall, room 4221
Office hours:	Monday & Wednesday 10:45am-12:15pm
	and by appointment
Email:	sbruschi@gmu.edu

IMPORTANT: Always start the subject line of email with the code of the course and section (Math 111-006) followed by the specific subject. For instance and email about office hours should have the following subject line: "Math 111-006 Office hours"

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

MyLab Math by Pearson - (online exercises of our textbook) - linked in Blackboard (left menu)

Math 111 - Data Fitting Notes - available in the Blackboard (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
- Data Fitting - Polynomial Interpolation, Least Squares

Course Testing schedule:

	Date and Time
Quiz 1	Thursday, February 10
Midterm 1	Tuesday, March 01
Quiz 2	Tuesday, March 22
Midterm 2	Thursday, April 07
Quiz 3	Tuesday, April 26
Final	Thursday, May 17 - 1:30pm - 4:15pm

Homework-MyMathLab There will be online homework assignments on MyMathLab. After each finished section, there will be the corresponding exercises at MyMathLab.

Grading:

MyLab Math homework	11%
Quizzes:	8% 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.

Exams Make up Policy: Quizzes, midterms and the final exam are all scheduled since the beginning of the semester. Please pay attention to these dates when scheduling any other activity/appointment. If you have an emergency, or health issue please let me know as soon as possible (preferably before the exam).

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, lie 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. If a student misses a class, it is their responsibility to get notes and relevant information on what they missed.

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 - January 24
Last day to drop with no Tuition Penalty - February 07
Last day to drop with Tuition penalty - February 14
Final Exam - Thursday, May 17, 1:30pm-4:15pm

Weekly tentative schedule:

- Week 1:

01/25 Linear Models and Graphs - Section 1.1

01/27 Slope of a Line; Writing Linear Equations - Section 1.2

- Week 2:

02/01 Intersection of a pair of lines, Intro to Matrix method of solving systems Sections 1.3, 2.1

02/03 Matrix Method of solving systems of equations, Row Operations Section 2.1

- Week 3:

02/08 Gaussian Elimination Section 2.2

02/10 Quiz 1 - Matrix Operations: Scalar and Matrix Multiplication, Addition Section 2.3

- Week 4:

02/15 Inverse of a Matrix Section 2.4

02/17 Matrix Equations Section 2.4

- Week 5:

02/22 Gauss-Jordan Method of finding inverses Section 2.5

02/24 Introduction to MatLab

- Week 6:

03/01 Midterm 1

03/03 Leontiff Input-Output Analysis - Section 2.6

- Week 7:

03/08 Markov Processes Section 8.1

03/10 Processes with Stable Distributions Section 8.2

- Spring Break: 03/14-03/20

- Week 8:

03/22 Quiz 2 - Absorbing States and Absorbing Matrices - Section 8.3

03/24 Absorbing Markov Processes - Section 8.3

- Week 9:

03/29 Data Fitting Introduction

03/31 Data Fitting Models - Polynomial Interpolation

- Week 10:

04/05 Functions: polynomial, exponential and power

04/07 Midterm 2

- Week 11:

04/12 Data Fitting Models - Least Squares

04/14 Data Fitting: Least Squares vs Polynomial Interpolation

- Week 12:

04/19 Data Fitting Models - Polynomial model

04/21 Data Fitting Models - Exponential Model

- Week 13:

04/26 Quiz 3 -

04/28 Data Fitting Models - Power Law Model

- Week 14:

05/03 Data Fitting Problems - Final Considerations

05/05 Data Fitting Problems - Final Considerations

- **05/17 Final Exam - 1:30pm - 4:15pm**