Spring 2024
Instructor: C. M. Staniunas

Math 111 Mathematical Models for the Management Sciences

Note: Students who have received credit for Math 112 or higher may not take this course. Students must receive a C or better in Math 111 or INQ 240 to declare a major in Business Administration.

Office: 266 E Trexler Hall

Office hours: MWF 10:50am – 1pm
TTh 11:45am -12:30 – pm
If you can't manage these times, e-mail me and we can meet virtually.

Phone: 540-375-2010, e-mail: staniuna@roanoke.edu

Text: Mathematical Applications for the Management, Life, and Social Sciences, tenth or eleventh edition, by R. Harshbarger and J. Reynolds.

Calculator Requirement: All students will need a **graphing** calculator for this course, preferably a TI-83 or TI-84. We will also use Microsoft Excel.

Grading Policy:

Daily grade* (average)	20%
Accuracy of graded problem sets (average)	20%
Tests (mastery grade)	60%

Grades will be assigned thus:

A 93-100	B- 80-82	D+ 67-69
A- 90-92	C+ 77-79	D 63-66
B+ 87-89	C 73-76	D- 60-62
B 83-86	C- 70-72	F under 60

*A daily grade includes preparation and classwork. Preparation: watching the class video before 5:30 am on the day of class (25 points), trying the textbook problems before class and submitting them at the beginning of class (25 points). Classwork: working on and submitting the class worksheet (50 points).

Late work submission policy: textbook problems will be collected at the beginning of class, class worksheets are due and must be submitted by the end of class. Graded problem sets must be submitted *no later than* 24 hours after the due date.

Testing Policy : We will use mastery-based testing rather than points-based testing . You will only receive credit for answers that demonstrate that you completely understand a topic. BUT you will get a number of chances to prove mastery throughout the semester with no penalty for previous attempts.
-The course has been summarized into 16 topics
-Your mastery of questions on these topics is assessed through the working of problems on Mastery days
-Each problem is graded as "mastered" or "not mastered"
-**Miss a test day**? Attempt those masteries on the **next** mastery day. Try not to miss a mastery day, though.
-Mastery means you understand and can demonstrate all fundamentals of the topic and are proficient at the level desired for the course.
-Your overall test grade is determined by the number of topics you have mastered:

#mastered	Mastery grade	#mastered	Mastery grade
16	100	8	60
15	95	7	55
14	90	6	50
13	85	5	45
12	80	4	40
11	75	3	35
10	70	2	30
9	65	1	25

Do NOT expect to attempt mastery topics on days other than mastery days. See the schedule.

You are expected to spend 12 hours per week working for this class (3 hours in class, 9^+ hours outside of class).

Academic Integrity: You are expected to be familiar with the Academic Integrity Code outlined in the booklet Academic Integrity at Roanoke College. In this class, you shall not get help from anyone but me on graded problem sets and you shall not cheat on mastery tests.

Attendance Policies:
Attendance will be taken at the beginning of every class meeting. If you arrive late, it is your responsibility to make sure you are not marked absent in my grade book. Your fourth and each additional absence will result in a 2-point reduction in your final course grade. College athletes, please come see me as soon as you know the schedule of your games—let's hope that no more than three of them conflict with class times. If you should have an emergency that requires you to miss a large portion of the course, please notify me ASAP.
I do not distinguish between excused and unexcused absences, so save your freebies for the times you are really sick : you are feverish, contagious, vomiting, hospitalized, etc.

Tentative Schedule:

week	section/topic	classwork
1	Introduction 7.5 1 1.1 2	 Permutations, Combinations Linear equations in one variable
2	1.1 cont 1.2 3 1.3 4 1.5 5	 Functions Linear functions , *graphing lines* Solutions of systems of linear equations
3	1.5 cont 1.6 6	systems of linear equations Applications of functions in Business and Economics **MASTERY on Thursday** 2/1 Topics 1-4
4	3.1 10 3.2 10 3.4 11	Matrices Multiplication of Matrices Matrix Equations, solution of systems using inverse matrices
5	3.3 11 12	Gauss Jordan elimination **MASTERY** on Thursday 2/15 Topics 5,6,10,11
6	4.1 12 4.2 12 4.3 13	Linear inequalities in two variables Linear Programming: Graphical Methods The Simplex Method
7	4.3 factoring 7 (intro)	More Simplex **MASTERY on Thursday** 2/29 Topics 12,13
		SPRING BREAK
8	factoring 7 2.1 7 2.2 8 2.3 8	Factoring review Solving Quadratic Equations Quadratic Equations: parabolas Business Applications using quadratics
9	2.4 9 exponents	Special functions and their graphs Review of exponents **MASTERY on Thursday** 3/21
10	9.1, 9.2 14 9.3 14 9.4 14 9.5 15	Limits, Continuous functions The Derivative Derivative formulas The Product Rule and the Quotient Rule
11	9.6 15 **review**	The Chain Rule and the Power Rule Review derivative rules **MASTERY on Thursday** 4/4 Topics 14-15
12	9.7 16 9.8 16 10.1 16	Using Derivative formulas Higher Order Derivatives Relative Maxima and Minima: the First Derivative Test
13	10.2 16	Concavity: the Second Derivative Test **MASTERY on Thursday** 4/18 Topic 16
4-27	**Final for 8:30 class**	**Exam Saturday 2 – 5pm** mastery opportunity topics 1-16
4-29	**Final for 10:10 class**	**Exam Monday 8:30 – 11:30am** mastery opportunity topics 1-16

Course Objective: to provide the background in the quantitative techniques necessary to better understand advanced courses in Business and Economics.

Learning Outcomes: The student will be able to:
Solve linear equations in one or more variables
Solve applied problems using linear equations
Solve systems of linear equations using graphing, substitution, elimination, or matrix methods
Solve quadratic functions and use them in applications
Solve systems of linear inequalities in two variables
Use graphical methods and the simplex method to solve linear programming problems
Find the derivatives of functions
Use derivatives in business applications

How to succeed in our Flipped Classroom

In **this** class you are expected to:
-**Watch** the lecture **before** class. The video will be posted on our Inquire page with some textbook problems.
-**Work** the textbook problems **before** class. Submit them at the beginning of class.
-**Note** which problems are giving you trouble and **ask** about them during class.
-**Work** on class worksheets during class and turn those in at the end of class. Please work in groups of 4.
-**Come to student hours** before the next class if you need more help. Do not wait until just before Mastery day.

Accessible Education Services (AES) is located in the Goode-Pasfield Center for Learning and Teaching in **Fintel Library**. AES provides reasonable accommodations to students with documented disabilities. To register for services, students must self-identify to AES, complete the registration process, and provide current documentation of a disability along with recommendations from the qualified specialist. Please contact Dustin Persinger, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment and/or obtain your accommodation letter for the current semester.

Subject Tutoring, located on the lower level of Fintel Library (Room 5), is open 4-9 PM, Sunday-Thursday. Subject Tutors are highly trained, current students who offer free, one-on-one (and small group) tutorials in over 80 courses taught at Roanoke College, including Math 111.Check out all available subjects and schedule 30- or 60-minute appointments at www.roanoke.edu/tutoring. If you have a question, feel free to stop by, or contact us at subject_tutoring@roanoke.edu or 540-375-2590.