Fall 2021
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: 161 D Trexler Hall

Office hours: MWF 9:00am-10:40am and noon- 1pm
                        TTh   10:00 -11:30
If you can't manage these times, e-mail me and we can meet virtually.

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

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

Learning Outcomes: Upon completing this course, 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

 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.

Flipped Classroom You may be used to attending a lecture, working on homework problems, and then having a few (if any!) of your questions answered during the next class period before moving on to the next lecture. We will move the lecture part of this process to before class, reserving class time for your questions and completing worksheets.
The lecture for each class period will be posted on our Inquire page, along with a few practice problems. In order to be prepared for class, you must watch the lecture and work on the problems beforehand. From time to time, you will be assigned a graded problem set to be completed outside of class.

Grading Policy:
Accuracy of graded problem sets (average)   10%
Class worksheets (average)   10%
Tests (mastery grade)   80%
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

Late work submission policy : classwork is 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
-Mastery means you understand and can underline 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 cheat on tests or collaborate on graded problems.

Attendance Policies:
If you have a temperature of 100.4 or higher or other COVID symptoms, don't come to class. Call Health Services IMMEDIATELY. Do not come to class or go to any public area on campus. In order for your absence to be excused, you

must give Health Services permission to notify me that you have consulted them about COVID symptoms. If Health Services informs you that you should isolate and not attend class for multiple days, inform me so that we can make a plan to keep you current in the course. All absences caused by consultation with Health Services about coronavirus symptoms or isolation ordered by Health Services will be excused but you will need to do the work and graded assignments even if we extend a deadline for you.

The course policy for all other absences is:

You will be working on material during class and submitting it at the end of class. If you miss class, you will have a zero for the day's work. Therefore, you are *expected* to attend *every* class. **If you have more than three unexcused absences, you may be dropped from the course.** If you miss three classes, you will receive a warning by e-mail that you are in danger of being dropped. If you miss a fourth class, you will receive another e-mail saying that you have been dropped. In that case, the grade you receive will reflect your course standing at the time, either DP or DF.

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 Becky Harman, Assistant Director of Academic Services for Accessible Education, at 540-375-2247 or by e-mail at aes@roanoke.edu to schedule an appointment. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact Becky Harman at your earliest convenience 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: Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. 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. See you soon!

The College has issued a mask mandate for the start of the semester that requires masks to be worn in indoor common spaces such as our classroom. You must wear a mask in this class. If you arrive without a mask, you will not be allowed to stay and may lose credit for attendance or in-class work. The Bookstore sells masks if you need to make a quick purchase.

If the mandate is extended, you will be required to continue to wear a mask.

Tentative Schedule:

week	section/topic		classwork
1	introduction		
2	7.5	1	Permutations, Combinations
	1.1	2	Linear equations in one variable
	1.2	3	Functions
3	1.3	4	Linear functions , *graphing lines*
	1.5	5	Solutions of systems of linear equations **MASTERY on Thursday** 9/16 Topics 1-4
4	1.6	6	Applications of functions in Business and Economics
	3.1	10	Matrices
	3.2	10	Multiplication of Matrices
	3.4	11	Matrix Equations, solution of systems using inverse matrices
5	3.3	11	Gauss Jordan elimination
	4.1	12	Linear inequalities in two variables **MASTERY** on Thursday 9/30 Topics 5,6,10,11
6	4.2	12	Linear Programming: Graphical Methods
	4.2		
	4.3	13	The Simplex Method
7	4.3		More Simplex
	factoring	7	Factoring review **MASTERY on Thursday** 10/14 Topics 12,13
			FALL BREAK
8	2.1	7	Solving Quadratic Equations
	2.2	8	Quadratic Equations: parabolas
	2.3	8	Business Applications using quadratics
9	2.4	9	Special functions and their graphs
	exponents		Review of exponents
	9.1, 9.2	14	Limits, Continuous functions **MASTERY on Thursday** 11/4
10	9.3	14	The Derivative
	9.4	14	Derivative formulas
	9.5	15	The Product Rule and the Quotient Rule
11	9.6	15	The Chain Rule and the Power Rule
	review		Review derivative rules **MASTERY on Thursday** 11/18 Topics 14-15
12	9.7	16	Using Derivative formulas **Thanksgiving 11/25**
13	9.8	16	Higher Order Derivatives
	9.9	16	Applications
	10.1	16	Relative Maxima and Minima: the First Derivative Test
14	10.2	16	Concavity and points of inflection **MASTERY on Thursday** 12/9 Topic 16
Dec 13	**Final**		**Exam Monday 8:30 – 11:30am** mastery opportunity topics 1-16