

Instructor:

Dr. Chris Lee Trexler 270D
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Office Hours:

Mon/Wed: 1:00 – 2:00 pm
Tue/Thu: 3:00 – 4:00pm
Other times by appointment

Course Meetings

Tuesdays and Thursdays: 1:00 - 2:40am

Course Information

This course is designed to have students summarize and extend the mathematical knowledge obtained at Roanoke College. Given a problem of interest with mathematical content, students will identify the mathematical options available, and be able to explain the mathematics used in non-technical terms. Students should also be able to articulate what modern mathematics is, how it relates to classical mathematics, what roles theoretical and applied mathematics play, and how technology is utilized.

Intended Learning Outcomes

By the end of this course, successful students will be able to:

- Understand and use the main models and methods of mathematical programming.
- Formulate practical problems into mathematical programming models.
- Recognize applied problems that can be studied using mathematical programming.
- Use software tools to solve mathematical programming models.
- Interpret the solutions to mathematical programming models to make good decisions.
- State important results from required classes in the mathematics major.

Required Textbook: *Operations Research: Applications and Algorithms 4th Edition*, by Wayne Winston

Course Grades

The following table lists the weights for the various forms of assessment for this course

Homework	20%
Midterm Exam	25%
Presentations	30%
Participation and Inquisition	5%
Final Project	20%

A grade scale will be determined after final averages are computed, but will be no worse than the scale given below.

0	60	63	67	70	73	77	80	83	87	90	93
F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A

Class Format

Details on specific elements of this class are below, but generally speaking, the first one-half to two-thirds of this class will focus on learning and exploring a topic in mathematics that is not covered in the regular mathematics curriculum; for this class, that topic is Operations Research. Since this is a seminar course, coverage of the topic will be quite different from that of a normal class in this subject. There will be some lectures with discussion and some presentations and sharing of material and ideas by you. The last part of this course will involve a trip through the mathematics major as you will present to each other the main ideas and thoughts from each of the classes involved in the mathematics major and Roanoke College.

Homework

Homework will be assigned regularly in the first part of the class and collected for grading. Success in this course is dependent upon your ability to read mathematics, understand what a problem is asking, and then taking the time to fully investigate and solve the problem. Your solutions on homework should be well thought out and your write-ups should be clear, written using proper English, and neatly written. You are more than encouraged to work together on the homework problems and discuss problems and possible solutions to the homework, but all of your write-ups must be individually written in your own words.

Midterm Exam

While there is no final for this class (the final project will serve as the final for this course), there will be one midterm exam with both an in-class and take home portion. This exam will cover the operations research material from the course.

Presentations

Each of you will be responsible for “four” types of presentations throughout the semester. While all of these presentations will be done in groups, it is important for you to spend a lot of time preparing for these presentations! This category forms the bulk of your grade, and being able to discuss and explain mathematics to various audiences is an extremely important skill for you to have and acquire!

The first presentation will be a classroom-style presentation of an advanced chapter from our book. You and your partner will be responsible for taking over a class and delivering a lecture and discussion on a selected chapter. You will also be responsible for assigning homework (including problems beyond those in our book) and writing at least one question that will be used on the midterm exam. More details will be handed out when we approach the time for this (early February).

The second presentation will be on the background needed for your project and final presentation. Topics for this project will be self-selected (with approval), will build on ideas learned in the course, explore real world applications, and touch on the current state of research in the field. Again, more details will be handed out when we approach the time for this (immediately after Spring Break).

The third presentation will involve you presenting to the class a topic from the mathematics major at Roanoke College. For this presentation, you and your partner will lead the class in an exploration of a particular class(s) that you took in the past, highlighting the most important concepts and connections from each, and giving examples where appropriate. These presentations together are a great review for the Inquisition! More details, of course, will be handed out when we get close to this time period (late March).

The final presentation will be the oral presentation of your project. This particular presentation will be attended by other members of the MCSP Department and possibly other students, so this will need to be a polished presentation. Your audience for this presentation is a general audience that does not know virtually anything about operations research! More details are below, and note that this is a continuation of the second presentation (with the same group members).

Final Project

Each student (working in pairs) will complete a project in this course that deals with a complete and thorough exploration of an advanced topic in operations research. The final product of the project will be an 8 to 10 page.

For the project, a rough draft will be due roughly three weeks before the final version is due. Turning in a reasonable rough draft will count for part of the final project grade, but the main purpose for the rough draft is for me to provide feedback to you!

As noted above, the oral presentation of your final project will serve as your last presentation (and the grade for this presentation is counted as part of the final project). Note that while your presentation audience is a general audience, your audience for the final project paper itself is me; you may assume that I know the operations research concepts that we have discussed in class.

MCSP Conversation Series

As you already know from spending a few years here, the MCSP Department offers a series of discussions that appeal to a broad range of interests related to these fields of study. These are known as the talks and lectures in the MCSP Conversation Series. You are invited to be involved with all of these meetings; however participation in at least three of these sessions is mandatory. After attending, submit a one page paper reflecting on the discussion. This should not be a regurgitation of the content, but rather a personal contemplation of the experience. These reaction papers will be counted as part of your Participation and Inquisition grade.

Attendance & Participation

Perfect attendance is expected and is the best strategy for success in this course; if you have a valid excuse for missing class; it must be discussed with me prior to that class. If an absence is required, you are responsible for the material covered in that class. No late work will be accepted in any circumstance except in the case of an emergency discussed with me as soon as possible.

Participation in a seminar is a key to learning the material! You are expected to go beyond the scheduled presentations in the class and participate in discussions during class, and presenting homework ideas and solutions to others. Active participation will count towards your Participation and Inquisition grade.

Inquisition

As part of this class, you will have your turn before the “Inquisition,” an oral examination in front of the department faculty to is used to assess the mathematics major. Your participation in this counts as part of the Participation and Inquisition grade.

Academic Integrity

Students are expected to adhere to the Academic Integrity policies of Roanoke College. All work submitted for a grade is to be your own work! No electronic devices other than calculators can be taken out during any class or testing period without prior approval (this includes cell phones; please turn them off before class).

Tentative Daily Schedule for Math

This course expects you to spend at least 12 hours of work each week inside and outside of class.

Tue	Jan 19			
Thu	Jan 21			
Tue	Jan 26			
Thu	Jan 28		Winston Text – Chapters 1-6	
Tue	Feb 2			
Thu	Feb 4			
Tue	Feb 9			
Thu	Feb 11	Student Presentation: <i>Advanced Chapter</i>		
Tue	Feb 16	Student Presentation: <i>Advanced Chapter</i>		
Thu	Feb 18	Student Presentation: <i>Advanced Chapter</i>		
Tue	Feb 23	Student Presentation: <i>Advanced Chapter</i>		
Thu	Feb 25	Student Presentation: <i>Advanced Chapter</i>		
Tue	Mar 1	Review		
Thu	Mar 3	Midterm: In-Class	-----	Take-Home Begins
Spring Break				
Tue	Mar 15	Topic Selection & Discussions	Project Begins	
Thu	Mar 17	In-Class Project Work		Take-Home Due
Tue	Mar 22	In-Class Project Work		
Thu	Mar 24	Presentations on Project Topics	Presentations	
Tue	Mar 29	Review: <i>Calculus (121/122)</i>		
Thu	Mar 31	Review: <i>Linear Algebra (201)</i>		
Tue	Apr 5	Review: <i>Diff. Equations (331)</i>		
Thu	Apr 7	Review: <i>Stat (202)</i>	Rough Draft Due	
Tue	Apr 12	Review: <i>Proofs (131/361/431)</i>		
Thu	Apr 14	Catch Up Day / Questions		
Tue	Apr 19	Project Presentations	Presentations	
Thu	Apr 21	Inquisition		
Fri	Apr 29		Final Project Due	