

INQ 241 A: Running the World Efficiently
Spring 2024, MWF 1:10 - 2:10, Miller Hall 113

Instructor: Michael Weselcouch

Office: Trex #270J

Student Hours: M 8:30-9:30, Tu 1:00 - 2:00, Th 1:20 - 2:20, or by appointment.

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Course Description. An important aspect of mathematical reasoning is modeling real world problems with various mathematical methodologies. This course applies a specific mathematical discipline, Graph Theory, to problems concerning optimization and efficiency. The course is split into six units, each of which focuses on a specific question. The first three units focus on various routing problems, the fourth on maintaining connections, the fifth on pairings, and the sixth unit focuses on resource management. Graph theory provides an avenue for advancing critical thinking skills, formulating complex problems into a mathematical structure, and applying and understanding limitations of solution techniques.

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

- Students will be able to describe and apply methodologies of mathematics or computer science appropriate for the course's discipline and topic.
- Students will be able to write about course topics clearly and effectively.
- Students will be able to interpret quantitative information related to the course topic.

Course Materials.

(1) *Textbook:* *A Tour through Graph Theory*; Saoub, Karin

(2) *Calculator:* Any basic hand held calculator.

(3) *Computer:* A laptop computer is recommended.

(4) *YouTube:* I will be posting supplementary videos to my YouTube channel.

Attendance Policy. Class attendance is a very important aspect of a student's success in this course. The student is expected to attend every class and is accountable for missed content and assignments.

Structure and Grading. A grade scale will be determined after final grades are computed, but will be no worse than the scale given below. Attendance and class participation will be considered when determining marginal grades.

Grading Scale

	93-100 A	90-92.99 A-
87-89.99 B+	83-86.99 B	80-82.99 B-
77-79.99 C+	73-76.99 C	70-72.99 C-
67-69.99 D+	63-66.99 D	60-62.99 D-

The final course grade is determined in the following way:

Homework 12%
Projects 30%

Tests 48%
Final Paper 10%

Homework. Homework will be assigned after nearly every class. This work will be collected at the start of our next class period. If you miss class, you can submit your work to Inquire before the start of class. Late work will be accepted, but loses .5 percentage points for every hour (or partial hour) past the deadline. Late work must be submitted to Inquire.

Projects. Projects will be assigned throughout the term. Each project will apply the concepts from a class unit to a business scenario, and therefore are more in-depth and open ended than problems appearing in the homework. Instructions will be handed out well in advance and I will gladly help you with the assignments up until the night before they are due. Projects will be graded on the correctness of the mathematics and models used, explanations of concepts, and the overall form of the document. A grading rubric will be provided along with the assignment instructions.

Final Paper. Even though this is a math course, we will be spending some time on written communication. Each project will contain a writing component, but the initial grade will primarily focus on the mathematics completed. By the end of the semester, four of the projects will be compiled into a longer paper whose grade will more heavily rely on the written portion, though the correctness of the mathematics will still be emphasized. The paper will be a formal report that could be submitted to a business, and therefore must be a polished document with all figures and tables labeled and referenced appropriately.

Tests. There will be six tests this semester. Homework and class notes are absolutely the best sources of review! The tests will not be designed to be cumulative, but as with any course involving mathematics, material from previous tests can be thought of as a prerequisite for future tests.

Test #1: Wednesday, January 31, covering Chapter 1

Test #2: Friday, February 16, covering Chapter 2

Test #3: Friday, March 1, covering Chapter 3

Test #4: Friday, March 22, covering Chapter 4

Test #5: Wednesday, April 10, covering Chapter 5

Test #6: Tuesday, April 23, covering Chapter 6

Test Make-up Policy. Test make-ups are administered in accordance with College policy. Anticipated, excused absences must be reported to the instructor with appropriate certification *well before* the scheduled test date. Legitimate emergency absences must be reported with appropriate documentation within one week of returning to class. No other make-ups will be given.

Corrections to Grading. If you think an error may have been made in the grading of your test, carefully review the answer key posted on Inquire and then contact the instructor **within 1 week of the test's return** with your question. **Do NOT alter the original work.** The entire test may be re-graded and the test grade is *subject to remain the same, increase or decrease* at the discretion of the instructor.

MCSP Conversations. The MCSP department offers a series of talks designed to appeal to a broad audience. Members of this class are encouraged to attend many of these meetings, however attending at least one session is mandatory. The schedule for the talks is posted on Inquire. Within one week of attendance you must submit a response to the talk. This will replace your lowest homework grade.

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

Electronic Devices. You can use only your calculator during class. (This means no cell phones or laptops - please set them on silent and leave them in your bag.)

Inquire Policy. Students are required to be knowledgeable of all postings on Inquire. It is each student's responsibility to consistently monitor Inquire for course information. This means every day! Any assignment that requires an Inquire upload will not be accepted in any other form. Also, to receive credit for uploads, the file must be a PDF and readable on the instructor's college computer. It is the student's responsibility to make successful submissions. It is the student's responsibility to resolve technology problems through the college's IT department.

Academic Integrity. I expect all of you to follow the Academic Integrity policies of Roanoke College. All graded work should be your own work! This means that you cannot use any websites or apps that give step-by-step solutions to the problems. Additionally, you cannot use any chat bots to assist with any assignments. Unless otherwise stated, you may work together on the homework, but should write up your solutions separately. If you ever have questions about how these policies apply to our class please contact me. Any violations of our AI policies will automatically be turned over to the Academic Integrity Council.

Artificial Intelligence. There are situations when the use of generative AI may be appropriate and educational. If you believe that your use of generative AI is appropriate for a given assignment, please contact me (via email, or in person at least 3 days before the due date) to explain your rationale for its use. No use is permitted without prior permission.

Writing Center. The Writing Center @ Roanoke College offers tutorials focused on writing projects and oral presentations for students working in any field. Writers and presenters at all levels of experience may consult the Writing Center at any point in their process—including brainstorming, drafting, organizing, editing, or polishing presentation skills—to talk with trained peer tutors in informal, one-on-one sessions. Schedule an appointment at www.roanoke.edu/writingcenter, where our staff members and workshops are also posted. Questions? Email writingcenter@roanoke.edu.

AES. 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. To schedule an appointment, call (540)375-2247 or e-mail aes@roanoke.edu. If you have registered with AES in the past and would like to receive academic accommodations for this semester, please contact the AES at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester.

Tentative Course Schedule. The following schedule is approximate and subject to change except for the test dates. It should give you an idea of the timing of the topics covered and assignments.

Course Schedule

Week	Dates	Lecture Material	Assignments
1	1/17, 1/19	Section 1.1, 1.2	
2	1/22, 1/24, 1/26	Section 1.3, 1.4, 1.5	
3	1/30, 2/1, 2/3	Section 2.1	Test 1 (1/31) Project 1 (2/2)
4	2/5, 2/7, 2/9	Section 2.2	
5	2/12, 2/14, 2/16	Section 2.3	Project 2 (2/14) Test 2 (2/16)
6	2/19, 2/21, 2/23	Section 3.1, 3.2	
7	2/26, 2/28, 3/1	Section 3.2	Test 3 (3/1)
8		Spring Break	
9	3/11, 3/13, 3/15	Section 4.1, 4.2	Project 3 (3/11)
10	3/18, 3/20, 3/22	Section 4.3	Test 4 (3/22)
11	3/25, 3/27	Section 5.1, 5.2	Project 4 (3/25)
12	4/1, 4/3, 4/5	Section 5.2, 5.3, 5.4	
13	4/8, 4/10, 4/12	Section 6.1	Project 5 (4/8) Test 5 (4/10)
14	4/15, 4/17, 4/19	Section 6.2, 6.3	
15	4/22, 4/23	Section 6.4	Project 6 (4/22) Test 6 (4/23)
	4/29 23:59		Final Paper