

**INQ 241 A: Running the World Efficiently Fall
2022, MWF 2:20 - 3:20, Olin Hall 230**

Instructor: Michael Weselcouch

Office: Trex #270

Student Hours: Tu 1:00 - 3:00, W 3:30 - 4:30, 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. 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.

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	15%	Tests	36%
Final Paper	10%	Final Exam	14%
Projects	25%		

Homework. A problem set will be due about once a week. These will be assigned well in advanced and each are worth a total of 25 points. There are two parts to each problem set. The first part of each problem set is worth 20 points and will be graded based on correctness. Each week you will complete 5 problems which will be carefully graded, with each problem worth 4 points. The second portion of the problem set is based on presentation, and worth 5 points. Make sure your homework is neat and organized so that I can easily read it. You can collaborate on the problem sets, but you must write up your own solutions. If you are looking at another person’s work when you are writing up your problem set, then you are in violation of the academic integrity policy of Roanoke College.

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 three 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: Friday, September 30, covering Sections 1.1 - 2.3

Test #2: Friday, November 11, covering Sections 3.1 - 5.2

Test #3: Wednesday, December 7, covering Sections 5.3 - 6.5 **Final**

Exam: Tuesday, December 13 2:00 PM

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.

Final Exam. The final exam will be comprehensive. As with the tests, it will emphasize critical thinking and writing. The best way to review for the final is to review your performance on the tests; focus on material that you did not master the first time around and review the topics that you did master.

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.

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 work submitted for a grade must be your own (for instance, you cannot use internet resources aside from my own YouTube videos or other videos linked on Inquire and, if you do work and study with others, the final write-up must be done by yourself). 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.

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	8/31, 9/2	Section 1.1, 1.2, 1.3	
2	9/5, 9/7, 9/9	Section 1.4, 1.5	
3	9/12, 9/14, 9/16	Section 1.5, 2.1, 2.2	P1 (9/16)
4	9/19, 9/21, 9/23	Section 2.2, 2.3	
5	9/26, 9/28, 9/30	Section 3.1	P2 (9/28) Test 1 (9/30)
6	10/3, 10/5, 10/7	Section 3.1, 3.2	
7	10/10, 10/12, 10/14	Section 3.2, 4.1	P3 (10/14)
8		Fall Break	
9	10/24, 10/26, 10/28	Section 4.2, 4.3	
10	10/31, 11/2, 11/4	Section 4.4, 5.1, 5.2	
11	11/7, 11/9, 11/11	Section 5.2	P4 (11/9) Test 2 (11/11)
12	11/14, 11/16, 11/18	Section 5.3, 5.4, 6.1	

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13	11/21	Section 6.2	P5 (11/21)
14	11/28, 11/30, 12/2	Section 6.3, 6.4, 6.5	P6 (12/2) Test 4 (12/2)
15	12/5, 12/7, 12/9		Test 3 (12/7) Final Paper (12/9)
	12/13	2:00 - 5:00	Final Exam