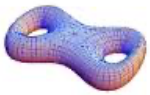
INQ 241: Running the World Efficiently
Fall 2025

Contact Me	Meet with Me	Class Info
		
Name: Dr. Maggie Hildenmoeller (nee Rahmoeller) **Pronouns:** She/Her/Hers **Email:** rahmoeller@roanoke.edu	**Office:** Trexler 270B **Student Hours:** Tues 1:30-2:30PM Wed 2:30-3:30PM Thurs 10-11AM	**Location:** Trexler 263 **Days:** MWF **Time:** Section A1 – 9:40-10:40AM Section A2 – 10:50-11:50AM

Student Hours Comments:

- The given times above will be consistently available unless emergencies arise
- These are opportunities for you to ask me questions about material and/or class, including celebrations and concerns. **Please come prepared to ask your questions!**
- Scheduled office hours don't work for you? Email me! We'll figure out a plan.

Dropping By Office OUTSIDE Of Office Hours:

It's always ok to pop by and say, "HI!" – I love getting to know you and chatting with you! But, these have to be short, fun visits ☺ Sadly, none of us have time to sit back and chill anymore. But – please pop by any time for a short 5-10 minute hello. And – never be afraid to come by if you need help ☺

Course Description: Running the World Efficiently explores the application of graph theory to address real-world problems related to fairness, efficiency, and optimization. Throughout the course, students will engage with various mathematical methodologies to understand and solve complex issues in political power distribution, routing, scheduling, and human trafficking. 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.

Intended Learning Outcomes: By the end of this course, you will be able to:

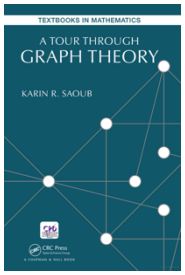
- Describe and apply graph theory to analyze and critique the fairness of political power distribution.

- Design and evaluate routes, schedules, or systems that balance efficiency and fairness.
- Apply graph theory to real-world data.
- Interpret quantitative information related to efficiency and fairness.
- Clearly and effectively explain (both in writing and verbally) the algorithms involved in solving problems that arise in the applications covered in class.

Your success in this class is important to me! We all learn differently and bring a variety of strengths and needs to the class. If there are aspects of the course that prevent you from learning or that make you feel excluded, please let me know as soon as possible. Together we'll develop strategies to meet both your needs and the requirements of the course.

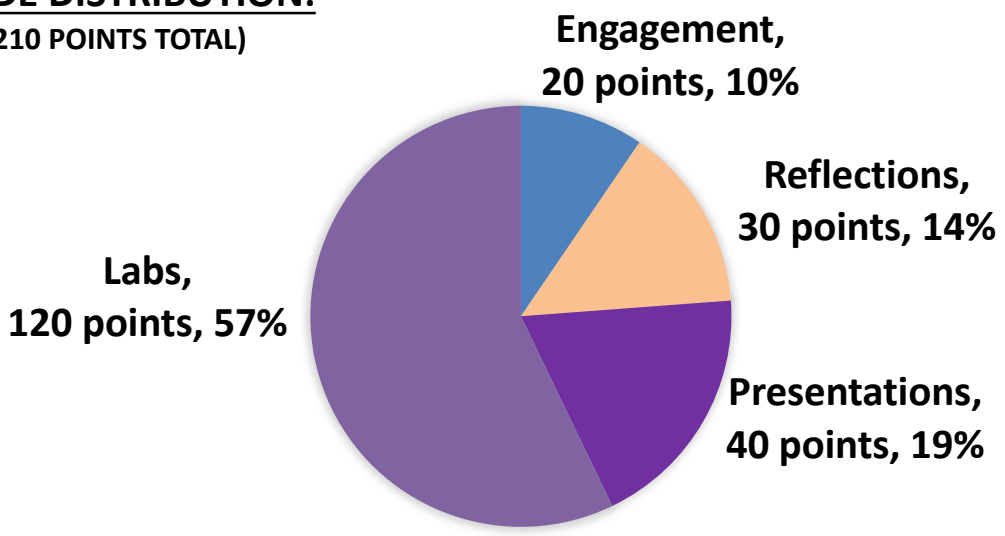
Required Materials:

- *A Tour through Graph Theory*, by Karin Saoub
- A laptop computer is recommended



Commitment Hours: This course expects you to spend at least 12 hours of work a week inside and outside of class.

GRADE DISTRIBUTION:
(210 POINTS TOTAL)



A:	93-100	B:	83-87	C:	73-77	D:	63-67
A-:	90-93	B-:	80-83	C-:	70-73	D-:	60-63
B+:	87-90	C+:	77-80	D+:	67-70	F:	Below 60

COURSE ASSIGNMENTS & LATE POLICIES

Interactive Textbook Reading: Reading a math textbook must be done interactively. When you read sections covered in this course, be sure to work through examples as the author does, keep a list of terms and their definitions (with examples as needed), and work through exercises at the end of each chapter to ensure mastery of concepts. Head over to office hours when you have questions about a term, concept, or algorithm.

Exercises: In order to learn the material so that you can apply these concepts to our course applications, you need to work through exercises from the book. I list a couple for you to work through after each class in which we cover graph theory content. Some have answers in the back of the book; some do not. You are responsible for working through these problems In A Timely Fashion and visiting office hours to ask questions about these problems. Write out more than you think necessary!

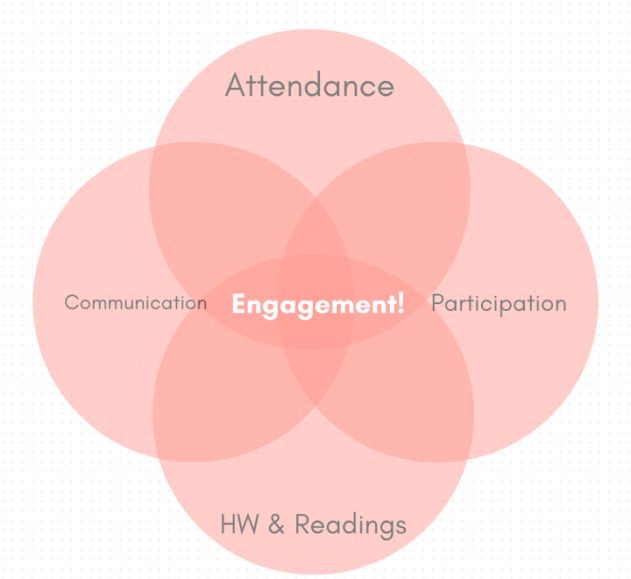
Short Reflections: You will have 3 short written reflections concerning social justice topics throughout the semester – one focusing on gerrymandering and the other two on human trafficking. Reflecting on readings will help you parse through your emotions and the issues our world faces, and they will prepare you for engaging in class discussions.

Labs: You will complete 6 labs throughout the semester. These labs will focus on gerrymandering, three different types of route problems, and human trafficking. You will start each of these labs in class and complete them outside of class, as needed. The labs will mostly be written up in report formatting, more information will be given for each lab throughout the semester. Labs 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.

Presentations: You will have two opportunities to present your work in this class –

1. Just after Fall Break, you and two other students will present on a fictional company facing a problem and your graph theory solution to that issue,
2. During the Final Exam Period, you and two other students will present on how you might use graph theory to help understand a social justice issue that you are interested in.

Engagement:



- Attendance – come to class! Our class's success depends on you attending class!
- Participation – collaborate with your peers, offer thoughts to the class, ask questions, attend office hours.
- HW & Readings – do the readings and work the exercises BEFORE class!
- Communication – respond to your group members' emails and texts, email me if you have concerns or want to share something.

COURSE EXPECTATIONS

Classroom Environment: You are expected to treat all students in the class and me with courtesy and respect. Your comments to others should be factual, constructive, and free from harassing statements. You are encouraged to disagree with other students, but such disagreements need to be based upon facts and documentation (rather than prejudices and personalities). My goal is to promote an atmosphere of mutual respect in the classroom. Please let me know if you have suggestions for improving the classroom environment. (Source: Iowa State University)

Diversity and Inclusivity

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Attendance Policy: Our course's success depends on you attending class! If you miss class, you will miss community building, engaging conversations, and information that I deem worthy of your time! Plus, we will miss you!

However, life happens! You may get sick, have a game scheduled, or have something else come up. It will not be the end of the world if you miss a class *very occasionally*. At some point, though, missing class can be detrimental to success. So, do your best to be in class! Strive for perfect attendance!

Communication is key. Let me know as soon as you know you will miss class.

****I WANT YOU TO SUCCEED IN MY CLASS****

I am willing to put in as much effort to help you in my class as you put into my class. So, do the work, come to office hours, attend subject tutoring, ask questions, and do a little INQ 241 every day.

Inquire Policy: You are responsible for:

- **Being aware of all postings on Inquire:** Check Inquire DAILY for course information.
- **Uploading your assignments to Inquire:** Anything due on Inquire will not be accepted in any other form.
- **Making and checking successful submissions:** To receive credit for uploads, your file must be readable on the instructor's college computer.
- **Resolving technology problems:** through our Information Technology (IT) department support@roanoke.edu.

Academic Integrity / Generative Artificial Intelligence: I expect all of you to follow the Academic Integrity policies of Roanoke College (https://www.roanoke.edu/inside/a-z_index/academic_integrity). All work submitted for a grade must be your own. HOWEVER, learning doesn't always happen by yourself – in fact, most of the time, we learn from or with others! The key is to know WHEN to use help and HOW to use help. **You may use Subject Tutoring, me, our textbook and readings, and your notes from class at any time! You may also use the internet, generative Artificial Intelligence (gAI), and your peers at any time for any part of this class – as long as you cite when and how you use them. ALSO – when you use any of these additional sources, you must use them interactively.**

What does this mean??

✅ Do

- **Start with your own ideas:** Try the problem, question, or draft first (with notes and/or textbook) before turning to these additional tools.
- **Use these additional tools as learning partners:** Ask them to explain a step you're stuck on, check your reasoning, or give examples—not to do the whole thing for you.
- **Revise and build on its output:** Add your own words, thoughts, and reasoning. The final work should sound like you.
- **Cite your use:** When you use these additional tools, say where, how, and why (e.g., "I chatted with my friend Billy Bob to brainstorm topic sentences for my essay, then I revised them into my own wording").

❌ Don't

- **Copy-paste prompts and answers:** Dropping in an assignment prompt (online or with gAI) and then handing in the response is not allowed.
- **Let these additional tools do the whole assignment:** They should help you learn, not replace your thinking.
- **Hide your use:** If you used any of these additional tools at any step, be transparent.

WHY? You spend a lot of money attending Roanoke College working toward a (or several) degree(s). Don't you want that degree to mean something? If RC students are only getting degrees by cheating, then does that degree actually mean anything? If we were to get a reputation for a "cheating" school…do you think you'd get a job after Roanoke College?

Trexler Tea Time

Thursdays, 2:20 – 3:20PM
Trexler 271

A chance to chill with peeps while munching on cookies and sipping tea! Often cards make an appearance – or other games! Take an opportunity to relax, have fun, and hang with other students and professors!

RESOURCES

Accessible Education Services (AES) is located on the first floor of the **Bank Building**. 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 540-375-2248 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 Dustin Persinger at your earliest convenience to schedule an appointment and/or obtain your accommodation letter for the current semester. The testing center, also located on the first floor of the Bank Building, can be reached at 540-375-2247.

The **Dr. Sandee McGlaun Writing Center and Subject Tutoring,** located in the lower level of the **Fintel Library** (Room 5), offers free one-on-one support in writing, oral presentations, and course content such as Business, Economics, Mathematics, INQ 240, Modern Languages, Lab Sciences, and Social Sciences. Open Sunday–Thursday from 4–9 PM, students can stop by or schedule through Navigate by selecting "Schedule an Appointment" → "Writing Center and Subject Tutoring" → "Writing Support" or "Course Tutoring" → preferred date and tutor. Contact subject_tutoring@roanoke.edu or 540-375-2590 for more information.

Student Health & Counseling Services supports students through in-person health appointments, in-person counseling, 24/7 telehealth (TimelyCare), Therapy Assistance Online, as well as resources related to general wellness, LGBTQ+, sexual assault, substance abuse, and suicide prevention. Unmet health needs can negatively impact your performance in this course. Student Health & Counseling Services can help. Please see https://www.roanoke.edu/shcs for more information and to access services.

TENTATIVE COURSE SCHEDULE

Day	Date	Topic	Due Dates of Assignments
How can we use mathematics—and graph theory in particular— to recognize and resist unfairness in how political power is distributed?			
Wed	Aug 27	Setting the Stage	
Fri	Aug 29	Setting the Stage	Read Syllabus
Mon	Sept 1	Sections 1.2 – Intro to Graph Theory	
Wed	Sept 3	Sections 6.1 & 6.2 – Intro to Coloring & Bounds	Exercise 1.1 a,c-f
Fri	Sept 5	Intro to Gerrymandering	Exercises 6.1 & 6.2 abd
Mon	Sept 8	Lab 1 – Redistricting	Supplemental Rdgs **Short Reflection 1**
Wed	Sept 10	Wrap Up	
How do we balance efficiency and fairness when designing routes, schedules, or systems that affect people's daily lives?			
Fri	Sept 12	Section 1.3 – Tours + Eulerian Circuits	**Lab 1**
Mon	Sept 15	Section 1.4 – Algorithms for Eulerian Circuits	Exercises 1.1 b,g-i, 1.2
Wed	Sept 17	Section 1.5 – Eulerization & Algorithm	Exercise 1.6 a,c
Fri	Sept 19	Lab 2 – Eulerian	Exercises 1.7ac, 1.9
Mon	Sept 22	Section 2.1 – Hamiltonian Cycles	
Wed	Sept 24	Section 2.2 – Algorithms	**Lab 2** Exercises 2.4 – 2.6
Fri	Sept 26	Section 2.2 – Algorithms continued	Exercises 2.8 bd parts i, ii
Mon	Sept 29	Lab 3 - Hamiltonian	Exercises 2.8 b iii, 2.9
Wed	Oct 1	Section 3.2 – Digraphs & Scheduling	
Fri	Oct 3	Section 3.2 – Critical Path Algorithm	Exercises 3.11a, 3.12a **Lab 3**
Mon	Oct 6	Lab 4 - Scheduling	Exercises 3.11, 3.12
Wed	Oct 8	Work Day – Choose Partners + Company + Problem	
Fri	Oct 10	Work Day – Create Data + Apply Algorithm	**Lab 4**
FALL BREAK!			
Mon	Oct 20	Work Day – Finalize Presentation	
Wed	Oct 22	**Presentation Day 1**	**Presentation**
Fri	Oct 24	**Presentation Day 2**	
How can we use graph theory to uncover hidden structures in systems of exploitation—and imagine ways to disrupt them?			
Mon	Oct 27	Intro to Human Trafficking + Class Discussion	Read *Sold* to pg 64
Wed	Oct 29	Class Discussion	Read *Sold* to pg 118 **Short Reflection 2**
Fri	Oct 31	Class Discussion	Read *Sold* to pg 178
Mon	Nov 3	Class Discussion	Read *Sold* to End **Short Reflection 3**
Wed	Nov 5	Section 4.1 – Intro to Trees & Spanning Trees	
Fri	Nov 7	Section 4.2 – Algorithms for Minimum Spanning Trees	Exercises 4.1 & 4.2

Day	Date	Topic	Due Dates of Assignments
Mon	Nov 10	Lab 5	Exercise 4.3 Data Collection
Wed	Nov 12	Lab 6 – Human Trafficking Lab	Supplemental Rdg
Fri	Nov 14	Lab 6 – continued (airline portion)	Finish to #2 on Lab 6 **Lab 5**
Mon	Nov 17	Lab 6 – Start highway portion	Finish to #5 on Lab 6
Wed	Nov 19	Lab 6 – Continue & Finish for next class	Finish to #7 on Lab 6
Fri	Nov 21	Wrap Up Unit	**Lab 6**
What issue do you care about—and how can graph theory help us understand or change it?			
Mon	Nov 24	Work Day – Choose Partner + Topic	**Topic Due**
T-DAY BREAK!!			
Mon	Dec 1	Work Day – Final Presentation	
Wed	Dec 3	Work Day – Final Presentation	
Fri	Dec 5	Work Day – Final Presentation	
Tues	Dec 9	**Section A2 – 8:30AM – 11:30AM Final Presentations!**	**Final Presentation**
Wed	Dec 10	**Section A1 – 8:30AM – 11:30AM Final Presentations!**	**Final Presentation**