MATH 371: Topology
Spring 2022

Contact Me	Meet with Me	Class Info
		
Name: Dr. Maggie **Pronouns:** She/Her/Hers **Email:** rahmoeller@roanoke.edu	**Office:** Trexler 270B **Office Hours:** M/W 9:30-10:30AM F Noon – 1PM Appointments through: https://drmaggieonline.youcanbook.me/	**Location:** Trexler 263 (or Zoom) **Days:** MWF **Time:** 1:10 – 2:20PM

Office Hours Comments:

- The given times above will be consistently available.
- Additional time slots will often be available through https://drmaggieonline.youcanbook.me/
- Office hours for the 1st two weeks of the semester will be on Zoom only. Hopefully after that we can switch to in-person office hours.

Course Description: This course is an introduction to topology, an area of mathematics that seeks to generalize some of the nice properties of the real numbers that make things like calculus possible and to study other spaces with these properties. We will see many examples of topological spaces and maps between them as well as sub-spaces, product spaces, and the notions of continuity and connectedness. Along the way we will hone our proof skills and our ability to develop an unfamiliar mathematical theory from its basic principles.

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

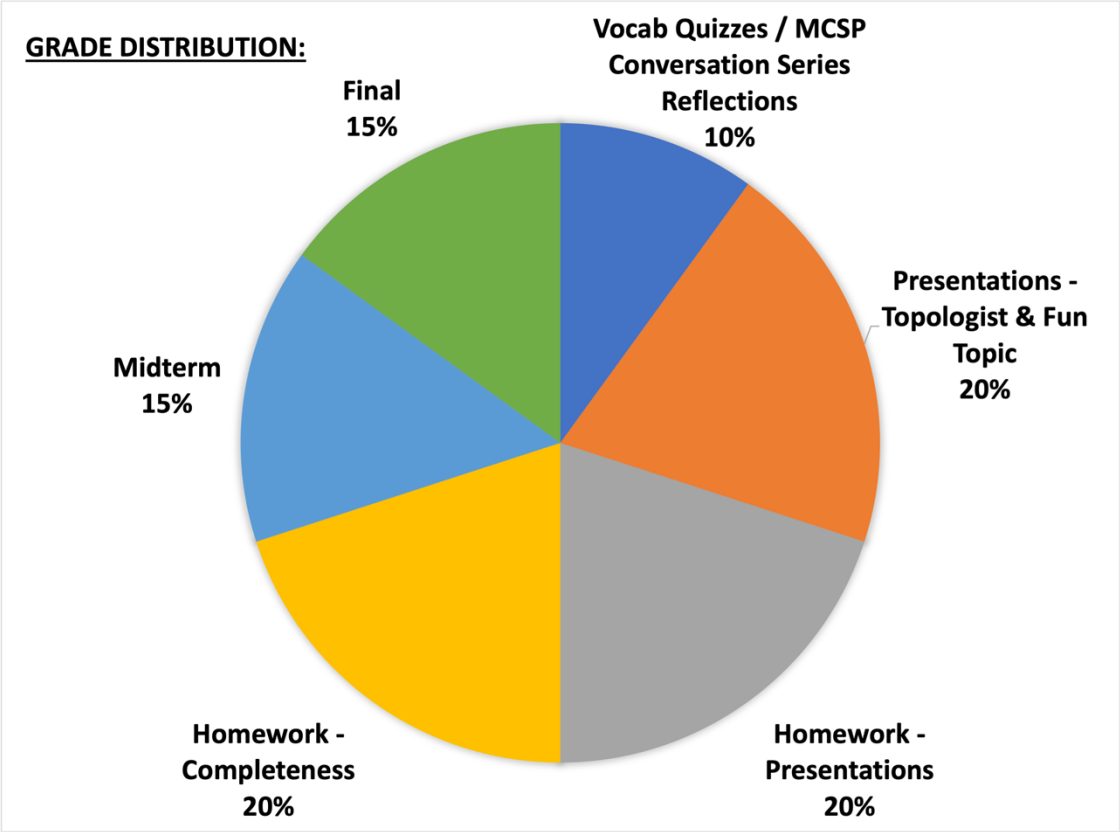
- Construct a valid proof that proceeds efficiently from hypotheses to conclusion
- Identify properties of sets and functions in the context of different topologies
- Identify homeomorphisms and be able to explain what it means for topological spaces to be homeomorphic
- Understand topological properties and use them to distinguish different topological spaces

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:

- *Introduction to Topology*, Baker.

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



A:	94-100	B:	83-86	C:	73-76	D:	63-66
A-:	90-93	B-:	80-82	C-:	70-72	D-:	60-62
B+:	87-89	C+:	77-79	D+:	67-69	F:	Below 60

Course Expectations

Class Structure: We will (sadly) be online for at least the first 2 weeks of the semester (through Jan 31). We'll be meeting via ZOOM (link on Inquire). Then (hopefully!) we'll be back in person starting in February!

Lots of information is given on Inquire. Please always check Inquire for tasks that need to be completed!

In-Class Policies: Face masks must be worn over the mouth and nose by all of us anytime we are indoors. By wearing face coverings, we protect our college community and its most vulnerable members.

Zoom Policies: To download the Zoom Client for Meetings App, click here: https://zoom.us/download. If you scroll down, you will also see Zoom Mobile Apps - you can use the app on your phone. However, Zoom on a computer is better.

In order to participate while online, I ask that:

- your video is on in such a way that I can see your face
- your Zoom name consists of your name (nickname is good) - both first and last
- you mute yourself if there's a lot of background noise around you
- you take notes, ask questions (either verbally or through chat), and are awake
- if I have you work in small groups through Zoom breakout sessions, you join your breakout group and collaborate with your group members

  Please contact me if you are having internet connectivity issues!

Attendance Policy: If you are sick (especially if you are contagious), please don't come to class! Email me and I will help you stay caught up with the material. If you are able to, feel free to join in on Zoom while class is meeting virtually.

Any absence that is not discussed with me prior to the missed class is considered unexcused. Unexcused absences may result in the lowering of the final grade (for example, a B to a B-), depending on the sheer number of absences. When absent, excused or unexcused, you are responsible for all material covered in class – so email me ASAP so we can work out a plan for you to be successful!

Late Work: No late work will be accepted unless you have contacted me prior to the due date and obtained permission to turn in late work. Permission will be granted only for rare circumstances outside your control, such as illness. Do not wait until the last minute to submit work that is due online.

Academic Integrity: You are expected to adhere to the Academic Integrity policies of Roanoke College (https://www.roanoke.edu/inside/a-z_index/academic_integrity). All work submitted for a grade is to be your own work! No collaboration is allowed on quizzes, MCSP Conversation Series Reflections, the Midterm, nor the Final Exam. Unless otherwise stated, you may work together on the homework, but you should write up your solutions separately. If you are looking at another person's work or asking someone what to do next while writing up your homework, then you are in violation of the academic integrity policy of Roanoke College. Using unauthorized sources is a violation of Academic Integrity. This includes solutions posted online (not on Inquire) and "homework help" sites such as Chegg or Course Hero. Uploading our course assignments to these sites is also a violation of Academic Integrity.

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.

COURSE ASSIGNMENTS

Vocab Quizzes: There will be vocab quizzes in this class. I may occasionally warn you about an upcoming quiz but you should be prepared to take a quiz on any given day. These may be written or oral. There's a LOT of new material and new terminology in Topology – you will want to stay on top of learning the lingo.

MCSP Conversation Series: The MCSP+ department and Roanoke College offer many opportunities to engage with mathematical ideas outside of classes. Members of this class are encouraged to attend many of these activities, however attending at least three is mandatory. Examples include MCSP Conversation Series talks (most will likely be offered through Zoom this semester) and student research showcases (should they happen this semester) - if you're unsure if a given activity makes sense for this purpose, please email me to ask.

Within one week of attendance you must submit a brief response to the activity. This should not simply be a regurgitation of the content, but rather a personal contemplation of the experience.

Additional participation (and submission of reflection papers) will earn you extra credit, with .5% added to your course average for each attended, up to 2% total. In addition, individually, you may request that other appropriate events count.

Presentations: You will give 2 non-homework related presentations this semester – one on a topologist (around midterms) and one on any fun topic in topology (around finals). You may work with one partner or you may work alone. More information will be given for each of these assignments later in the semester.

Homework: You will have 7 homework sets total throughout the semester. Each will be based on the previous "week's" material. You may work with others on the problems, but your write-ups should be done individually (see Academic Integrity). 7 class days this semester will be devoted to presenting the homework problems, which will allow you class time for asking questions about the homework and for correcting your work. All corrections must be done in a different color – homework will be submitted to me at the end of each of these presentation days, to be graded for completeness. On each

of these days, students will be selected at random to present the problems. When presenting, your goal is to successfully lead the class through the problem – you may know how to do the entire problem, but if you don't, it's ok – you can facilitate a class discussion in order to solve the entire problem. You get one free "pass" over the whole semester – if you really aren't feeling up for presenting that problem or that day, you can say "no thanks" once without any penalty.

Exams: You will have both a Midterm and a Final Exam. Both will be take-home. Your midterm will be assigned on Monday Feb 28 and due by Midnight on March 4. Your final will be assigned on Friday April 22 and due by midnight on Tuesday April 26. Note – you may not work with anyone (other than me) on either of these tests, nor may you use any sources other than your course notes and your textbook (and anything posted on Inquire). Doing so is a violation of academic integrity – which lowers the value of a Roanoke College degree.

RESOURCES

Accessible Education Services: 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: 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!

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:

Date	Section	Topic	Items Due
Wed Jan 19	Section 1.1	Introduction to Topology	
Fri Jan 21	Section 1.2	Set Theory	
Mon Jan 24	Section 1.2	Set Theory	
Wed Jan 26		Presentations - HW 1	HW 1
Fri Jan 28	Section 2.2	Topology	
Mon Jan 31	Section 2.2	Topology	*** Assign Topologist Presentation
Wed Feb 2	Section 2.1	Open Sets	
Fri Feb 4	Section 2.1	Open Sets	
Mon Feb 7		Presentations - HW 2	HW 2
Wed Feb 9	Section 2.3	Closed Sets	
Fri Feb 11	Section 2.3	Closed Sets	
Mon Feb 14	Section 1.3	Infinite Sets & Cardinality	
Wed Feb 16		Presentations - HW 3	HW 3
Fri Feb 18	Section 1.4	Functions	
Mon Feb 21	Sections 1.4, 1.5	Functions - Images	
Wed Feb 23	Section 3.1	Subspaces	
Fri Feb 25	Section 3.1	Subspaces	
Mon Feb 28		Presentations - HW 4	HW 4 *** Assign Midterm
Wed Mar 2		Presentations - Day 1	Presentation - Topologist
Fri Mar 4		Presentations - Day 2	Presentation - Topologist Midterm Due by midnight
Spring Break			
Mon Mar 14	Section 1.4	Functions	
Wed Mar 16	Section 1.5	Functions - Inverse Images	
Fri Mar 18	Section 3.2	Continuity	
Mon Mar 21	Section 3.2	Continuity	
Wed Mar 23		Presentations - HW 5	HW 5
Fri Mar 25	Section 1.2, 4.1	Products of Sets	
Mon Mar 28	Section 4.1	Product Spaces	
Wed Mar 30	Section 4.2	Product Spaces	
Fri April 1	Section 4.2	Product Spaces	
Mon April 4		Presentations - HW 6	HW 6
Wed April 6	Section 1.4, 1.5	Functions	*** Assign Fun Topic Presentation
Fri April 8		NO CLASS - Activity	
Mon April 11	Section 3.3	Homeomorphisms	
Wed April 13	Section 3.3	Homeomorphisms	
Fri April 15		NO CLASS - Good Friday	
Mon April 18		Presentations - HW 7	HW 7
Wed April 20	Section 3.3	Topological Property	
Fri April 22	Section 3.3	Topological Property	*** Assign Final
Mon April 25		Topic TBD	
Tues April 26		NO CLASS - Work on Final	Final Due by midnight
Sat April 30		Final Presentations	Fun Topic Presentation