Math 371: Topology

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Office Hours Monday 10:30 – 11:30 am, Thursday noon – 1:30 pm, Friday 10:30 – 11:30 am, or by appointment. Office hours will be held via Zoom using Meeting ID 540 375 4961 (my office phone number).

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 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.

Learning Outcomes By the end of this course, successful students 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

Course Format Those students taking the course online will meet with me via Zoom from noon - 12:30 pm. **Join these Zoom meetings using the links on our Inquire page. I expect you to have your video on during these meetings.**

Those students taking the course in person will meet in the classroom from 12:30 - 1 pm.

We will all meet online (via Zoom) for presentation days.

Course Materials Worksheets (provided by the instructor)

Important Dates

We will have a take-home final exam, which will be handed out on the last day of class. ==**The Final Exam will be due Thursday 11/19 at noon.**==

Course Grades The final course grade is determined in the following way:

Vocabulary/MCSP Conversations	**10%**
Written Homework	**60%**
Participation (including presentations)	**20%**
Final Exam	**10%**

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

		B+	88-89	C+	78-79	D+	68-69			
A	92-100	B	82-87	C	72-77	D	62-67	F	0-59	
A-	90-91	B-	80-81	C-	70-71	D-	60-61			

Topology dictionary You will create an ongoing topology dictionary, since it is impossible to understand what is happening in class or write good proofs if you are not clear on the definitions of the words being used. Each worksheet I'll post a list of vocabulary words on Inquire, and you'll submit written definitions of those words.

MCSP Activities 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 and student research showcases - 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. Each response will count as one quiz grade. To allow for social distancing, this semester's talks will be done via Zoom.

Written Homework There will be a short homework set due at the end of every worksheet. Submit your homework as a PDF file using the link on our Inquire page. (There are several apps which allow you to scan to PDF using your phone.) Homework is due by the beginning of class on the day we start the next worksheet. **No late homework will be accepted.** You may work with your classmates on the mathematics of these assignments, but you must write up your solution independently. (This means you should not look at anyone else's write-up or let anyone else see yours.) You may not work on homework with anyone besides me and your classmates.

Proof Presentations At the end of each worksheet we will have a day where selected students present proofs of statements from the worksheet. To allow our whole class to do these together, presentations will be done on Zoom. I will assign the proofs to be presented the first day of each worksheet. I will randomly select students from the class to present each of the proofs. You are each allowed one "pass" on a proof presentation. These are graded only on participation, and my expectations are: that you have thought seriously about the problem beforehand, are able to talk clearly about the ideas being discussed, and either solve the problem yourself or facilitate a class discussion to solve it. This means even if you are not at the board you can participate by helping your classmates if they get stuck.

Participation As we work through the course material, I expect you to come to class prepared and willing to contribute to our progress. There will be many ways to do this, including: working on worksheets during class time, supporting your peers during their proof presentations, joining class discussions, and asking good questions.

Attendance Policy Class attendance is expected. If you do have to miss class, you are responsible for keeping up with the class progress on our current worksheet. If you have not discussed your absence with me beforehand, you will be unable to make up any work missed and your participation score will be affected.

Special Needs If you have a disability that may require an accommodation in this course, please provide me with your documentation within the first 2 weeks of the semester. I must have your documentation at least 48 hours prior to any accommodation made. (Check with the Center for Teaching and Learning for their scheduling guidelines.)

Academic Integrity I expect all of you to follow the Academic Integrity policies of Roanoke College. All graded work should be your own work! If you ever have questions about how these policies apply to our class please contact me. Any violations of these policies will automatically be turned over to the Academic Integrity Council.

Course Schedule The following schedule is **very approximate** and subject to change, but it should give you some idea of the timing of the topics covered. (Here "W*x*" refers to "Worksheet *x*".)

Dates	Topic	Notes
8/19	Course Introduction	
8/21 - 8/26	W0: Set Theory	**Zoom presentations 8/26**
8/28 - 9/9	W1: Topology, Open Sets	**Zoom presentations 9/9**
9/11 - 9/21	W2: Closed Sets	**Zoom presentations 9/21**

9/23 - 10/2	W3: Continuity	**Zoom presentations 10/2**
10/5 - 10/16	W4: Product Spaces	**Zoom presentations 10/16**
10/19 - 10/28	W5: Subspaces	**Zoom presentations 10/28**
10/30 - 11/11	W6: Homeomorphisms	**Zoom presentations 11/11**
11/13 - 11/16	W7: Topological Properties	**Final Exam assigned Mon 11/16**
11/19	**Final Exam due at noon**	