

Math 306: Topology

Dr. Hannah Robbins Trexler 270H, x4906, robbins@roanoke.edu (email is the best way to reach me) **Office Hours**

Monday, Tuesday, Wednesday 9 – 10:30 am, or by appointment.

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
- Construct a topology from a given set of basic sets
- Identify homeomorphisms and be able to explain what it means for topological spaces to be homeomorphic

Course Materials Textbook: *Introduction to Topology* Baker.

Important Dates

We will have three tests and a final exam, all of which will consist of both a take-home and an in-class section. Each test will focus on the material learned since the last test, but will (necessarily) contain previous material. The final will be just like a fourth test.

If you have a conflict with one of these dates please email me ASAP.

Test 1	Wednesday 2/10, in class
Test 2	Friday 3/4, in class
Test 3	Monday 4/4, in class
Final Exam	Monday 5/2, 2 - 5 pm

Course Grades

The final course grade is determined in the following way:

Quizzes/MCSP Conversations	10%
Homework	20%
Presentation	10%
Tests/Final Exam (15% each)	60%

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.

		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		

Quizzes

Most Wednesdays we will have a short quiz where you will be asked to define two topology vocabulary words. These quizzes are to help you stay caught up on new vocabulary words, 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. No make up quizzes will be given, but at the end of the semester I will drop your lowest quiz score.

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 three talks is mandatory. Within one week of attendance you must submit your response to the talk. Each response will count as one quiz grade.

Homework There will be a short homework set due almost every Friday. Homework is due at the beginning of class. **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.

Presentation At the end of the semester you will each pick a topic related to topology but not covered in class and prepare a short presentation to give to the class. We will talk about this in much more detail when it is assigned.

Daily Problems After each section I will assign some problems from the book for practice. These will not be collected. They are your chance to make sure you understand the material and to get help if you realize you need it – don't wait!

Attendance Policy Class attendance is expected. If you do have to miss class, you are responsible for learning all material covered that day. If you have not discussed your absence with me beforehand, you will be unable to make up any work missed.

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 **approximate** and subject to change (except for the test dates). It should give you an idea of the timing of the topics covered.

Week	Dates	Topic
1	1/18 - 1/22	1.1 - 1.3
2	1/25 - 1/29	1.4 - 1.5, Cardinality
3	2/1 - 2/5	2.1 - 2.2
4	2/8 - 2/12	Review, Test 1 , 2.3
5	2/15 - 2/19	2.4 - 2.5
6	2/22 - 2/26	3.1 - 3.2
7	2/29 - 3/4	3.3, Review, Test 2
Spring Break		
8	3/14 - 3/18	Knot Theory, 4.1 - 4.2
9	3/21 - 3/23	Wedge Sums, 5.1
10	3/28 - 4/1	5.2 - 5.3, Review
11	4/4 - 4/8	Test 3 , Demo Presentation, Surfaces
12	4/11 - 4/15	7.1, 8.1
13	4/18 - 4/22	8.2, Presentations
14	4/25	Review
Monday	5/2	Final Exam 2-5 pm