

# Topology

Math 431-001

Spring 2021

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This is the web page <http://math.cos.gmu.edu/~wanner/courses/m431s21/index.html>. It will be updated regularly and always contain the latest information on the course.

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## General Information:

<b>Instructor:</b>	Thomas Wanner
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<b>Office hours:</b>	By appointment, please e-mail!

<b>Lectures:</b>	R 5:55pm-7:10pm, online on Zoom
<b>Prerequisites:</b>	Grade of C or better in Math 315
<b>Textbook:</b>	<i>Topology</i> by James Munkres, 2nd edition, Pearson Modern Classics, 2017.

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## Important Links:

- [Detailed syllabus](#)
- [Youtube links](#) to all the lecture videos (in case Blackboard fails, or you want to listen to me in double-speed)
- Relevant [official GMU policies](#)
- Homework assignments will be posted on Gradescope.

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## Syllabus:

This course provides a basic introduction to topology. We will cover fundamental topics such as metric spaces, topological spaces, compactness, connectedness, the fundamental group, and covering spaces. A more detailed syllabus can be found [here](#). It will be updated weekly.

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## Online Format:

This course will be taught through a combination of asynchronous lecture videos and a weekly synchronous session. Every Monday morning I will post lecture videos for the week on Blackboard under *Course Content*, and Youtube links will be made available [here](#). In addition, lecture notes will be posted on Blackboard under *Course Content*. You will have to watch the lecture videos before Thursday's session, during which I will address any questions you might have. The remaining time of the synchronous sessions will be used to work through problems.

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## Homework Assignments:

Homework problems will be assigned once a week and posted on Gradescope. These assignments will be graded and count towards your homework score. At the end of the semester, I will drop some of the lowest scores. More details will be announced later in the semester.

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## Grading Policy:

Your final grade in the course will be determined from your performance in the homework assignments, a final project/presentation, and your attendance and class participation. Weights for these items will be distributed approximately according to the following schedule:

<b>Homework</b>	<b>Final Project/Presentation</b>	<b>Participation</b>
60%	30%	10%

The assignment of your course grade is based on the total course score. The following grading scale may serve as a guideline, although changes are possible:

<b>Score above</b>	90%	80%	70%	60%	otherwise
<b>Letter grade</b>	A	B	C	D	F

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Thomas Wanner, January 18, 2021.

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## Math 431-001

### Spring 2021

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The following table contains the schedule for the course. This page will be updated regularly throughout the semester.

Week	Dates		Sections in the Book
1	01/25 - 01/29	<b>I. Topological Spaces and Continuity</b>	
		1. What is Topology?	
		2. Topological Spaces	12
2	02/01 - 02/05	3. Basis for a Topology	13
		4. Topology via Order and Products	14, 15
3	02/08 - 02/12	5. The Subspace Topology	
		6. Closed Sets and Limit Points	
4	02/15 - 02/19	7. Continuous Functions	
		8. The Product Topology	
5	02/22 - 02/26	9. The Metric Topology	
		10. The Quotient Topology	
6	03/01 - 03/05	<b>II. Connectedness and Compactness</b>	
		1. Connected Spaces	
		2. Connected Subspaces of the Real Line	
7	03/08 - 03/12	3. Components and Local Connectedness	
		4. Compact Spaces	
8	03/15 - 03/19	5. Compact Subspaces of the Real Line	
		6. Limit Point Compactness	
9	03/22 - 03/26	7. Local Compactness	
		<b>III. Countability and Separation Axioms</b>	
		1. The Countability Axioms	
10	03/29 - 04/02	2. The Separation Axioms	
		3. Normal Spaces	
11	04/05 - 04/09	4. The Urysohn Lemma	
		5. The Urysohn Metrization Theorem	
12	04/12 - 04/16	<b>IV. Fundamental Group and Covering Spaces</b>	
		1. Homotopy of Paths	
		2. The Fundamental Group	
13	04/19 - 04/23	3. Covering Spaces	
		4. The Fundamental Group of the Circle	

Thomas Wanner, January 22, 2021.

## **Relevant George Mason Official University Policies**

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The following policies apply to all courses at George Mason University:

1. It is expected that each student will conduct himself or herself within the guidelines of the Honor Code. All academic work should be done with the level of honesty and integrity that this University demands.
  2. You are responsible for the accuracy of your own schedule. Check Patriot Web regularly to verify that you are registered for the classes that you think you are. A student who is not registered may not continue to attend class. Faculty are not permitted to grade work of students who do not appear on the official class roster.
  3. You are responsible for knowing the last days to drop and add this class.
  4. Once the add and drop deadlines have passed, instructors do not have the authority to approve any requests from students to add or drop/withdraw late. It is NOT permissible to drop the class and leave it at that. It needs approval. Late adds (up until the last day of classes) must be reviewed and approved by the department chair of the course being offered. They will be approved only in the case of a documented university error (such as a problem with Financial Aid being processed). All student requests for withdrawals and retroactive adds (after the last day of classes) must be reviewed by the student's academic dean. In the case of students whose major is in COS, this is the office of Undergraduate Academic Affairs in Enterprise.
  5. Instructors are required to give the final exam at the time and place published in the Schedule of Classes, as set by the Registrar. It cannot be changed. You need to plan vacation (make plane reservations, etc.) around these published dates.
  6. Once final grades have been recorded, instructors cannot accept any work to change that course grade. Grade changes can only be approved when they are due to a calculation or recording error on the part of the instructor.
  7. An IN (incomplete) grade is a very special grade that can only be applied for in writing. It can only be given in cases in which a student is passing a course and has a very limited amount of work left to complete the course.
  8. Federal law (a law known as FERPA) requires the protection of privacy of student information. Therefore, no instructor on campus can speak about a student's record with anyone other than the student. The record includes how a student is doing in a course, whether a student has attended class, information about grades, whether a paper has been turned in. Anything. This prohibition includes parents, siblings, and spouses, anyone.
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