MTH 525 - Topology

Fall 2020

Course Information:

Instructor: Araceli Bonifant, bonifant@uri.edu
Textbook: Topology (Second Edition) by James R. Munkres.
Synchronous Zoom Meetings: MW 4:00-5:15 P.M.
Office Hours: TBA

Course Description: Topological spaces, and continuous functions, connectedness, compactness, separation axioms, function spaces, metrization theorems, embedding theorems and the fundamental group. (Lec. 3) Pre: MTH 435 or equivalent.

Course Goals and Learning Outcomes:

To present an introduction to the field of topology, with emphasis on those aspects of the subject that are basic to higher mathematics.

- Demonstrate an understanding of the concepts of metric spaces and topological spaces, and their role in mathematics.
- Demonstrate familiarity with a range of examples of these structures.
- Prove basic results about completeness, compactness, connectedness and convergence within these structures.
- Apply the theory in the course to solve a variety of problems at an appropriate level of difficulty.
- Demonstrate skills in communicating mathematics orally and in writing.

Evaluation:

Final grades will be computed as follows:

Participation	**15%**	
Homework	**25%**	
Midterm	**25%**	**October, 21st.**
Final Exam	**35%**	**Comprehensive Final Exam,**

Letter Grade Distribution:

Final grades will be determined according to the following scale.

95 - 100 A	85 - 89.99 B+	70 - 74.99 C+	55 - 59.99 D+	0 - 49.99 F
90 - 94.99 A-	80 - 84.99 B	65 - 69.99 C	50 - 54.99 D	
	75 - 79.99 B-	60 - 64.99 C-		

Homework:

There will be five homework assignments during the term. The solutions are to be written, in good mathematical style, to be handed in and graded.

Expectations:

- You are expected to attend every Zoom meeting, and read the material we will cover before hand since you need to be ready for our Zoom discussions of the material. Be aware, that you will need to cover a lot of information at a rapid pace. From the assigned sections in the syllabus, you will need to read something like a section and a half before each of our synchronous meetings, in such a way that will allow us to cover 3 sections every 2 synchronous meetings. But remember that the best way of learning mathematics is by solving problems.

- Your goal should be to write up solutions to all the assigned exercises in the syllabus. Whether you found the solution yourself, or worked it out in collaboration with others, does not matter. What matters is that you went through the process of writing it out and understanding it. These exercises are not to be handed in for grading, but they can be discussed during our synchronous meeting. I will assign 5 homework assignments that will need to be handed in (as explained above).

Special Needs:

Any student with a documented disability is welcome to contact their instructor as early in the semester as possible so that reasonable accommodations may be arranged. As part of this process, please be in touch with Disability Services for Students Office at 302 Memorial Union, 401-874-2098 (`https://web.uri.edu/disability/`)

Religious Holidays:

It is the policy of the University of Rhode Island to accord students, on an individual basis, the opportunity to observe their traditional religious holidays. Students who plan to be absent from classes or examinations for religious holy days that traditionally preclude secular activity shall discuss this with the appropriate instructor(s) in advance of the holy day. See the University Manual section 8.51.11 for details.

Sections	**Assigned Problems**
12. Topological Spaces	
13. Basis for a Topology	2, 6, 8
14. The Order Topology	
15. The Product Topology on $X \times Y$	
16. The Subspace Topology	3, 4, 8, 10
17. Closed Sets and Limit Points	3, 4, 5, 6, 8, 9, 10, 11, 12
18. Continuous Functions	2, 3, 7, 8
19. The Product Topology	1, 2, 3, 6, 7, 8
20. The Metric Topology I	2, 4, 5, 8a
21. The Metric Topology II	3, 4, 6, 7
22. The Quotient Topology	2, 3, 6
23. Connected Spaces	2, 3, 5, 7, 8
24. Connected Subspaces of the Real Line	1, 5, 8, 9
26. Compact Spaces	1, 4, 5, 6, 7, 8
27. Compact Subspaces of the Real Line	1, 4
28. Limit Point Compactness	1, 2, 3
29. Local Compactness	5, 6, 7, 8
30. The Countability Axioms	1, 2, 4, 7, 8, 9
31. The Separation Theorems	1, 3, 6
32. Normal Spaces	1, 2, 3, 6, 7
33. The Urysohn Lemma	2, 6, 7, 8
34. The Urysohn Metrization Theorem	1, 3, 7, 8
35. The Tietze Extension Theorem	
36. Imbeddings of Manifolds	
36. Imbeddings of Manifolds	1, 5
37. The Tychonoff Theorem	
37. The Tychonoff Theorem	2, 3
38. The Stone-Čheck Compactification	
38. The Stone-Čheck Compactification	3, 4, 5, 6