NAU NORTHERN ARIZONA UNIVERSITY

Course Title: MAT 441 Introduction To Topology
Term: Summer 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Providing an introduction to topology, The course will emphasize the content of topological spaces, continuous maps, homeomorphism, metric spaces, connectedness, compactness, product spaces, quotient spaces, elementary geometric topology. Additional topics such as set theory and logic, countability and separation axioms, separation theorems in the plane, and function algebras will be also discussed.

Course Prerequisites:

MAT 431 Introduction To Analysis

Learning Outcomes:

By the end of the course, the student should be able to:

A. Gain a good knowledge of fundamental concepts and methods in topology;

B. Use continuous functions and homeomorphism to understand structure of topological spaces;

C. Interpret and prove basic theorems in topology using rigorous mathematical language and reasoning;

D. Analyze and solve problems related to topological spaces, continuous functions, compactness, connectedness, and separation axioms;

E. Connect topology to other areas of mathematics and applications in science and engineering.

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Course Material:

"Topology" by James R. Munkres, published by Pearson in 2018 (2nd edition).

Evaluation:

- 2 Exercise [10%]
- 2 Quizzes [20%]
- Writing Paper [15%]
- Mid-term Exam [25%]
- Final Exam [30%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84
B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

1	Set Theory and Logic
2	Topological Spaces and Continuous Functions
3	Connectedness and Compactness
4	Properties of connected and compact spaces **Exercise 1**

5	Countability and Separation Axioms
6	The Tychonoff Theorem
7	Metrization Theorems and Paracompactness
8	Complete Metric Spaces and Function Spaces **Quiz 1**
9	Baire Spaces and Dimension Theory
10	The Fundamental Group
11	Separation Theorems in the Plane
12	**Mid-term Exam**
13	The Jordan Curve Theorem
14	Manifolds and Vector Bundles
15	Homology Theory
16	Cohomology Theory **Exercise 2**
17	Two-Dimensional and Three-Dimensional Manifolds
18	Knot Theory Fixed Point Theory
19	Function Algebras
20	Topological Groups **Quiz 2**
21	Vector Spaces and Banach Spaces
22	Inner Product Spaces and Hilbert Spaces
23	Normed Algebras
24	Topological Groups **Writing Paper due**
25	**Final Exam**