NAU NORTHERN ARIZONA UNIVERSITY

Course Title: MAT 441 Introduction To Topology
Term: Fall 2022
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

Topology is described briefly as qualitative geometry. Advanced topics will cover topological spaces, continuous maps, homeomorphism, metric spaces, connectedness, compactness, product spaces, quotient spaces, elementary geometric topology. Finally, this course hopes to expose the students to both mathematical rigor and abstraction, giving them an opportunity further to develop mathematical maturity.

Course Prerequisites:

MAT 431 Introduction To Analysis

Learning Outcomes:

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

A. Have knowledge of fundamental concepts and methods in topology;

B. Understand terms, definitions and theorems related to topology;

C. Apply his or her knowledge of basic topology to formulate and solve problems of a topological nature in mathematics and other fields where topological issues arise;

D. Demonstrate knowledge and understanding of concepts such as open and closed sets, interior, closure and boundary;

E. Use continuous functions and homeomorphisms to understand structure of topological spaces.

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Course Material:

Theodore W. Gamelin, Robert Everist Greene, ***Introduction to Topology***, 2th Edition, Dover Publications, 1999.

Evaluation:

- 2 Quizzes [20%]
- 2 Essay [30%]
- Mid-term Exam [20%]
- 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:

Week 1

1	First notions of topology
2	Generalization of concepts of space and function
3	General topology
4	Connectedness of topological spaces
5	Analyzing Arguments **Quiz#1**

Week 2	
6	Homotopy theory
7	Mapping spaces, homotopies, retractions, and deformations
8	Category, functor and algebraization of topological problems
9	Quantification Theory
10	Computing the fundamental and homotopy groups of some spaces **Essay#1**
Week 3	
11	Manifolds and fibre bundles
12	Basic notions of differential calculus in n-dimensional spaces
13	**Mid-term Exam**
14	Tangent bundle and tangential map
15	Science and Hypothesis **Quiz#2**
Week 4	
16	Vector fields on smooth manifolds
17	Fibre bundles and coverings
18	Smooth function on manifold and cellular structure of manifold
19	Describing homotopy type of manifold by means of critical values
20	Probability **Essay#2**
Week 5	
21	Homology theory
22	Homology groups of chain complexes
23	Singular homology theory
24	Homology groups of sphere. Degree of mapping
25	**Final Exam**