King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics

Math 453 – Syllabus
Semester 202

Dr. Khalid Alanezy
alanezy@kfupm.edu.sa

Title Introduction to Topology

Credit 3-0-3

Textbook P. L. Shick, *Topology, Point-Set and Geometric*, Wiley (2007).

Description Topological Spaces. Basis for a topology. The order topology. The subspace topology. Closed sets and limit points. Continuous functions. The product topology. The metric topology. Connected spaces. Compact spaces. Limit point compactness. The countability axioms. The separation axioms. Urysohn's Lemma. Urysohn's Metrization Theorem. Complete metric spaces.

Grading Policy:

Midterm Exam	HW	Presentations	Final Exam
35%	15%	15%	35%

Learning outcomes: Upon completion of this course, each student should be able to:

1. Use axioms of set theory.
2. Define and construct a topology.
3. Distinguish open and closed sets.
4. Construct closure, interior, and boundary of a set.
5. Distinguish between a metric topology and nonmetrizable topology.
6. Decide whether a given function is continuous.
7. Define and apply connectedness and compactness.
8. Understand and apply Tychonoff theorem.
9. Distinguish between countability and separation axioms including countable basis, countable dense subsets, normal spaces, Urysohn lemma and Tietze extension theorem.
10. Understand the metrization problem and Urysohn Metrization theorem.
11. Know some properties and applications of complete metric spaces.

Pacing Schedule

Week	Topics
1	**Chapter2**: Sets and Functions
2	**Chapter3**: Topological Spaces
3	**Chapter3**: Topological Spaces (continued)
4	**Chapter4**: Open and Closed Sets and Continuous Functions
5	**Chapter4**: Open and Closed Sets and Continuous Functions (continued)
6	**Chapter5**: New Spaces from Old
7	**Chapter5**: New Spaces from Old (continued)
8	**Chapter6**: Connected Spaces
Midterm Exam: TBA	
9	**Chapter6**: Connected Spaces (continued)
10	**Chapter7**: Compact Spaces
11	**Chapter7**: Compact Spaces (continued)
12	**Chapter8**: Separation Axioms
13	**Chapter8**: Separation Axioms (continued)
14	**Chapter9**: Metric Spaces
15	**Chapter9**: Metric Spaces (continued)
Final Exam: TBA	

Homework: The only way to learn Mathematics is to do Mathematics!. So I encourage you to form study groups, help each other, and to seek help elsewhere (if needed) to solve the homework seriously. Homework helps to sharpen your mathematical writing skills. An optimal strategy is to try each problem yourself first, then get together with others to discuss your solutions and questions, and finally write up the solutions yourself.

Office Hours: Every Monday and Wednesday 11AM to 12PM. Try solving the problem before asking about it in the office hours.

Tests: There will be a midterm exam and a final exam. There are no makeup exams.

Remark: Above all, I hope you have fun in this course. This is one of my main two goals in the course (the other one is to learn basics of Topology).