King Fahd University of Petroleum & Minerals
Department of Mathematics
Syllabus Math 467: Graph Theory - T 251

Prof. Dr. Othman Echi (Office 5-403, Tel:1802)

Description:	Basic Set Theory (countable and uncountable sets, cartesian products). Topological spaces (basis for a topology, product topology, functions, homeomorphisms, standard examples). Connected spaces, path connectedness. Compact spaces, compactness in metrizable spaces. Countability axioms, first countable and second countable spaces. Separation axioms, Urysohn's Lemma, Urysohn's metrization theory. Complete metric spaces.
Prerequisite:	Graduate Standing
Textbook:	J. Munkres, *Topology,* 2nd edition, Pearson Education Limited (2014)
Grading Policy:	HW (15/100); Exam 1 (20/100); Exam 2 (20/100), Project (10/100); Final Exam (35/100)
Objectives:	1. Have a general knowledge about point set topology. 2. Characterize metrizable spaces and be able to apply them to different aspects of Mathematics.

Learning Outcomes:

Code	CLO
1	**Knowledge and Understanding**
1.1	Work with sets, functions, images, preimages, and distinguish between finite, countable, and uncountable sets.
1.2	Discuss how the topology on a space is determined by the collection of open sets, by the collection of closed sets, or by a basis of neighborhoods at each point, and know what it means for a function to be continuous.
1.3	Apply the Urysohn lemma and characterize metrizable spaces.
2	**Skills**
2.1	Apply basic properties of connected spaces, path connected spaces, compact spaces, and locally compact spaces.
2.2	Identify what it means for a metric space to be complete, and characterize compact metric spaces.
3	**Values**
	Manage complex ethical and professional issues and make informed judgements on ethical codes and practices

Schedule

Weeks	Chapters	Topic
1	1	Set Theory and Logic
2	Notes	Category theory and Galois connection
3, 4, 5	2	Topological Spaces and Continuous Functions
6,7,8,9	3	Connectedness, compactness and compactifications
10,11	4	Countability and separation axioms
12	5	The Tychonoff theorem
13, 14, 15	6	Complete metric spaces and completion

Exam Issues:

• No student will be allowed to take the exam if not having his/her KFUPM ID or National/Iqama ID.

• Students are not allowed to carry mobiles, smart watches, or electronic devices to the exam halls/rooms

• **Missing an Exam:** In case a student misses an exam (midterm or the Final Exam) for a legitimate reason (such as medical emergencies), he/she must bring an official excuse from Students Affairs. Otherwise, he/she will get zero in the missed exam.

Attendance: Students are expected to attend all lecture classes.

➢ If a student misses a class, he/she is responsible for any announcement made in that class.

➢ **A DN grade** will be awarded to any student who accumulates more than 20% (09) unexcused absences or 33% (15) excused and unexcused absences.