Course Specifications

Course Title:	General Topology
Course Code:	30114602-3
Program:	BSc. Mathematics 301100
Department:	Mathematics
College:	Al Leith University College
Institution:	Umm Al Qura University

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A. Course Identification

1. Credit hours: 3 hours	

2. Course type
a.   University ☐   College ☐   Department ☒   Others ☐
b.   Required ☒   Elective ☐

3. Level/year at which this course is offered: Seventh Level / Fourth year

4. Pre-requisites for this course (if any)**:** Real Analysis (1) 30113102-3

5. Co-requisites for this course (if any)**:** None

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	13.5 hours	30%
2	**Blended**	13,5 hours	30%
3	**E-learning**	7 hours	15.5%
4	**Correspondence**	7 hours	15.5%
5	**Other**	4 hours	9%

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	**Lecture**	45 hours
2	**Laboratory/Studio**	0
3	**Tutorial**	0
4	**Others (Exam)**	8 hours
	Total	53 hours
Other Learning Hours*		
1	**Study**	70 hours
2	**Assignments**	15 hours
3	**Library**	0
4	**Projects/Research Essays/Theses**	20 hours
5	**Others** (specify)	0
	Total	105 hours

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

This course provides an introduction to topology, which is the field of mathematics concerned with a formalization of the notion of "shape". Most of the course will focus on the area within topology known as point set topology. We will define topological spaces and discuss some important examples, such as metric spaces. We will study a variety of properties of topological and metric spaces, including compactness and connectedness.

2. Course Main Objective

The purpose of this course is to introduce students by the concepts of topology. Precisely, students will be able to state basic definitions such as that of a topology, basis for a topology, sub-basis for a topology, open sets, closed sets, subspace and product topologies, injective, surjective, bijective and continuous maps between topological spaces, homeomorphism, connectedness, compactness, Hausdorff, normal and regular topological spaces. Students will also be able to use these notions in constructing mathematical arguments and proofs. In addition, students will be able to recite examples of standard topological spaces, and recite or create examples of topological spaces having various properties. Students will be able to complete with rigor some basic proofs of theorems involving topological spaces.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Recall terms, definitions and theorems related to topology	K1
1.2	Outline concepts such as open and closed sets, interior, closure and boundary	K1
1.3	Recognize the connection between metric spaces and topological spaces	K2
1.4	Memorize various notions of compactness	K3
2	**Skills :**	
2.1	Classify properly the most important examples of topological spaces	S6
2.2	Apply the main features of metric spaces to prove the "metrizability" of a topological space	S4
2.3	Use continuous functions and homeomorphisms to examine structure of topological spaces	S1
2.4	Employ Bolzano-Weiestrass property to study the compactness of metric spaces	S9
3	**Competence:**	
3.1	Evaluate theoretical concepts in topology to understand real world applications	C5
3.2	Write clear and precise proofs of the main results	C2
3.3	Develop the theories, methods and techniques of the course to solve complex mathematical problems	C4

C. Course Content

No	List of Topics	Contact Hours
1	Topological Spaces: Definitions and examples	6
2	Sets closure – Sets of partial spaces	6
3	Rules – the limited topological product – partial rules	6
4	The metric spaces : examples - the metric problem	9
5	Continuous Functions: Examples - Classification of continuous functions over the topological and metric spaces - topological Equivalence, Examples, Topological property.	9
6	Compact spaces: Examples, Compactness in R^n , Compactness by the endpoint, Compactness by sequences**.**	9
	Total	45

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Recall terms, definitions and theorems related to topology	Lecture Tutorials	Exams (Quizzes, Midterm and Final). Written and possibly oral exam at the end of the course. In addition, compulsory work may be given during the course
1.2	Outline concepts such as open and closed sets, interior, closure and boundary	Lecture Tutorials	
1.3	Recognize the connection between metric spaces and topological spaces	Lecture Tutorials	
1.4	Memorize various notions of compactness	Lecture Tutorials	
2.0	**Skills**		
2.1	Classify properly the most important examples of topological spaces	Lecture Individual or group work	Exams (Quizzes, Midterm and Final). Homework
2.2	Apply the main features of metric spaces to prove the "metrizability" of a topological space	Lecture Individual or group work	
2.3	Use continuous functions and homeomorphisms to examine structure of topological spaces	Lecture Individual or group work	
2.4	Employ Bolzano-Weiestrass property to study the compactness of metric spaces	Lecture Individual or group work	
3.0	**Competence**		
3.1	Evaluate theoretical concepts in topology to understand real world applications	Lecture Individual or group work	Exams (Quizzes, Midterm and Final). Research Essays
3.2	Write clear and precise proofs of the main results	Lecture Individual or group work	
3.2	Develop the theories, methods and techniques of the course to solve complex mathematical problems	Lecture Individual or group work	

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Midterm Test (1)	6th week	20%
2	Midterm Test (2)	12th week	20%
3	Homework + Reports + Quizzes	During the semester	10%
4	Final Examination	End of semester	50%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Each group of students is assigned to a faculty member where he or she will provide academic advising. All faculty members are required to be in their offices outside teaching hours. Each faculty member allocates at least 4 hours per week to give academic advice and to answer to the questions of students about concepts studied during the lectures.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	Foundations of General Topology, Ahmed Abdul Monsif Allaam, Dar Al Zaman for Publication, 1423.
Essential References Materials	Introduction to General Topology, Dr. Mohammed Abdul Moneim Esmael, King Saud University. General Topology, Kelly J. , Van Nostrand, Princeton New Jersey, 1955.
Electronic Materials	*http://www.mathramz.com/xyz/index.php.* *http://math.niu.edu.* *http://ntnu.no/conservation.*
Other Learning Materials	libraries

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Large classrooms that can accommodate more than 30 students.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data Show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	None.

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment.	Students	Direct
Quality of learning resources.	Students	Direct
Extent of achievement of course learning outcomes.	Faculty member	Direct

H. Specification Approval Data

Council / Committee	Council of the Mathematics Department	The mathematical sciences (college of applied sciences) and the mathematics (Al-Leith University College) department s first meeting of the coordinative committee
Reference No.	4101050782	First meeting
Date	Sunday, 17 November 2019	Thursday, 17 October 2019

Department Head

Dr. Ali Hassani