Course Description Form

1. Course Name:
Topology II

2. Course Code:
MATH 416

3. Semester / Year:
Second / 2023-2024

4. Description Preparation Date:
23-3-2024

5. Available Attendance Forms:
Attendance lectures in the classroom

6. Number of Credit Hours (Total) / Number of Units (Total)
60 hours / 4 units

7. Course administrator's name (mention all, if more than one name)
Name: Asst. Prof. Dr. Fadhel Subhi Fadhel   Email: fadhel.subhi@nahrainuniv.edu.iq

8. Course Objectives	
Course Objectives	- To strength the theoretical mathematical backgrounds of the undergraduate students and to prepare them for the post graduate studies. - To give clear statements of pertinent definitions, principles and theorems together with illustrative descriptive examples. - Improve student's thinking capacity to prove theoretical statements (theorems, propositions, remarks, etc.), which are given as a homework. - Studying the structures, components and properties of different questions, without smooth deformations, so that these properties remain similar under the formation processes related to the tearing process or leaving openings in the transition from one to the other and vice versa, as well. - Generalize all the concepts of real analysis topic. - To cover topics including the basic properties of topological, metric and norms spaces, the separation axioms, compactness, the product topology, and connectedness, as well as, state and prove theorems related to these concepts.

9. Teaching and Learning Strategies	
Strategy	The teaching and learning strategy is considered a set of tools and practices carried out by both the teacher and the student in order to comprehend the academic subject or course, namely topology, in the best possible way. This depends on two basic factors: good transmission by the subject teacher, which is supported by teaching strategies, and good reception by the

student, which is supported by learning strategies. Teaching strategies include a set of organized plans and methods followed by the subject teacher in order to guide students towards achieving learning goals, including cognitive goals for theoretical subjects and skill goals for proving proofs in a mathematical manner through sequential and ordered steps, and emotional and value goals through sensory perception of the operative theorems and results and then their proofs. And how to deal with it. This is done through specific teaching and learning methods in order for the student to acquire general and qualifying skills that are transferable.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
1	4	Homeomorphism and homeomorphic topological spaces	The relationship between homeomorphic functions and open, closed, and continuous functions	Attendance interactive lectures	Ask questions and give assignments
2	4	Homeomorphism and homeomorphic topological spaces	Homeomorphic spaces and topological properties	Attendance interactive lectures	Ask questions and give assignments
3	4	Compact topological spaces	Open cover, definition of compact set, and examples	Attendance interactive lectures	Ask questions and give assignments
4	4	Compact topological spaces	Theorems and basic properties of compact sets	Attendance interactive lectures	Ask questions and give some homework's
5	4	Hereditary properties	Definition of subspace, examples and theorems	Attendance interactive lectures	Ask questions and give assignments
6	4	Connectedness of topological spaces	Basic definitions and examples with some properties	Attendance interactive lectures	Ask questions and give assignments
7	4	Connectedness of topological spaces	Closed paths and path wise connected paths	Attendance interactive lectures	Ask questions and give assignments
8	4	Simply and locally connected topological spaces	Definitions, examples and theorems	Attendance interactive lectures	Ask questions and give assignments
9	4	The relationship between topological and metric spaces	Theorems	Attendance interactive lectures	Ask questions, give assignments, and make a 1st

					attendance mid exam
10	4	Separation axioms	T0 and T1 Spaces and their basic theorems	Attendance interactive lectures	Ask questions and give assignments
11	4	Separation axioms	T2 space (Hausdorff space) and its relationship with T1 spaces (basic theorems)	Attendance interactive lectures	Ask questions and give assignments
12	4	Separation axioms	Regular spaces, T3 spaces, and its relationship with T2 spaces	Attendance interactive lectures	Ask questions and give assignments
13	4	Separation axioms	Normal spaces, T4 space and their relationship with T3 spaces	Attendance interactive lectures	Ask questions, give assignments, and make a 2nd attendance mid exam
14	4	Compactness and separation axioms	The relationship between compact spaces and the spaces of the separation axioms	Attendance interactive lectures	Ask questions and give assignments
15	4	Homeomorphism and homeomorphic topological spaces	The relationship between homeomorphic functions and open, closed, and continuous functions	Attendance interactive lectures	Ask questions and give assignments

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports ... etc.

30% monthly written exams

10% daily and oral exams, homework's, and class activities

60% written final exam

12. Learning and Teaching Resources

Required textbooks (curricular books any)	1. Introduction to General Topology, by: K. Joshi 2. Theory and problems of general topology, Seymour Lipchitz, Schuam's series,1965
Main references (sources)	1- Lecture Notes on Topology, by: John Rognes, 2018.

	2- General Topology, by: Tom Leinster, 2014
Recommended books and references (scientific journals, reports...)	1- Lecture Notes- General Topology, by: Ziad Khalil, 2022.
	General Topology, by: Jesper M. Møller.
Electronic References, Websites	1- lecturervv3JNSPKeEU