Course Specification
— (Bachelor)

Course Title:	**Topology**
Course Code:	**442MATH-3**
Program:	**BSc in Mathematics**
Department:	**Mathematics**
College:	**Science**
Institution:	**Jazan University**
Version:	**2024**
Last Revision Date:	**9/2024**

Table of Contents

A. General information about the course:

1. Course Identification

1. Credit hours:	03

2. Course type

A.	University ☐	College ☐	Department☒	Track☐	Others☐
B.	Required ☒		Elective☐		

3. Level/year at which this course is offered:	Level: 11/ Year 4

Level 7 / Year 4

4. Course general Description

This course is designed to provide students with

topological space **-** Accumulation points(Limit points)and the derived set**-** Closed sets and Closure of set **-** Interior, Exterior and Boundary set –Neighborhoods and Neighborhoods systems **-** Subspace Topology and relative Topology - Bases and subbases **-** Continuity and Topological Equivalent **-** Open and Closed functions **-** Homeomorphism and Topological properties - Connected and Compact space.

5. Pre-requirements for this course (if any): Math 315

6. Co- requirements for this course (if any): None

7. Course Main Objective(s)

After finishing the course, the student is expected to be familiar with the following:

- Know the definitions of topology and some concepts of topology
- Recognize between the closure, interior and derived sets
- Write a topology generating by base and subbase
- Prove the equivalent properties of continuity and open, closed functions
- Learn the concepts of neighborhood, compactness and connectedness

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	45	100%
2.	E-learning		
3.	Hybrid • Traditional classroom • E-learning		
4.	Distance learning		

3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	42
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	3
5.	Others (specify)	
	Total	45

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	Distinguish mathematical concepts relevant to Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness.	K1	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.2	Identify structures and features of Mathematics problems in Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness.	K2	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain required notations and concepts in Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness	K3	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.0	Skills			
2.1	Apply aspects relevant to Topological spaces, Neighbourhood systems, Base and subbase, continuous	S1	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	functions, compactness and connectedness			answer), Quizzes, Assignments
2.2	Compute rates/quantities and Approximate Solutions in Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness.	S2	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.3	Apply various math rules, techniques and theorems in Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness.	S3	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Solve mathematical problems using critical thinking and problem solving in Topological spaces, Neighbourhood systems, Base and subbase, continuous functions, compactness and connectedness.	S4	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
3.0	Values, autonomy, and responsibility			
3.1	Cultivate a mathematical attitude and nurture the interest.	V1	Group work, problem solving, web based work	Assignments
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2	Group work, problem solving, web based work	Assignments
3.3	Inculcating values and ethics in thought, expression and deed.	V3	Group work, problem solving, web based work	Assignments

C. Course Content

No	List of Topics	Contact Hours
1.	Topological space	7
2.	Accumulation points (Limit points) and the derived set, Closed sets and Closure of set.	6
3.	Interior, Exterior and Boundary set.	5
4.	Neighbourhoods and Neighbourhood systems	5
5.	Subspace Topology and relative Topology	5
6.	Bases and subbases	5
7.	Continuity and Topological Equivalent, Open and Closed functions.	5
8.	Homeomorphism and Topological properties, Connected and Compact space	7
	Total	45

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Homework and Quiz	3	5
2.	First exam	6	20
3.	Homework and Quiz	10	5
4.	Second exam	12	20
5.	Final exam	15	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	S. Lipschutz(1965), General Topology, Schaum's Outline Series
Supportive References	- B. Mendelson(1990), A Introduction to Topology, Dover Publications, Inc., New York. - Paul E.long (1971), A Introduction to General Topology, Charles E Menil Publishing Company. - J. R. Munkres(1977), Topology: A first Course, Prentice- Hall. - C. W. Patty(1993), Foundation of Topology , PWS-Kent Publishing
Electronic Materials	Web sites dedicated to Topology available on the internet
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom, Computer lab.
Technology equipment (projector, smart board, software)	Data show; Smart Board, Mathematics software.
Other equipment (depending on the nature of the specialty)	

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Effectiveness of students assessment	Students, Program assessment committee	Direct/ Indirect
Quality of learning resources	Instructor	Direct/Indirect
The extent to which CLOs have been achieved	Students, Faculty members	Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	**Board Of Mathematics Department**
REFERENCE NO.	**2417**
DATE	**29/03/1446 A. H.; 2/10/2024 A. D.**