



# Course Specification

— (Postgraduate)

<b>Course Title:</b> Algebraic Topology
<b>Course Code:</b> 202522-3
<b>Program:</b> Master of Pure Mathematics
<b>Department:</b> Mathematics and Statistics
<b>College:</b> Sciences
<b>Institution:</b> Taif University
<b>Version:</b> 1
<b>Last Revision Date:</b> 20/05/2023



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## A. General information about the course:

### 1. Course Identification:

1. Credit hours: (3)

2. Course type

A.  University  College  Department  Track

B.  Required  Elective

3. Level/year at which this course is offered: ( .....)

4. Course general Description:

Topological prerequisites – Group theory prerequisites – Homotopy – Homotopy Groups – Covering Spaces – Euler and Betti numbers – CW-Complexes – Singular Homology – Applications of Homology Groups.

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

General Topology (2024101-3)

6. Pre-requirements for this course (if any):

7. Course Main Objective(s):

1. Study topological prerequisites and Study Group theory prerequisites
2. Study Homotopy
3. Study Homotopy Groups
4. Study Covering Spaces
5. Study Euler and Betti numbers
6. Study CW-Complexes
7. Study Singular Homology
8. Study Applications of Homology Groups.

### 2. Teaching Mode: (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	100%





No	Mode of Instruction	Contact Hours	Percentage
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> <li>• Traditional classroom</li> <li>• E-learning</li> </ul>		
4	Distance learning		

### 3. Contact Hours: (based on the academic semester)

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

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

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and understanding</b>			
1.1	<b>Recognize</b> topological perquisites and Group theory perquisites.	K1	Lectures, discussion group	Exams, Quizzes, Assignments
1.2	<b>Describe</b> Homotopy	K3	Lectures, discussion group	Exams, Quizzes, Assignments
<b>2.0</b>	<b>Skills</b>			
2.1	<b>Apply</b> the recognitions of the Homotopy to find Covering Spaces	S1	Lectures, discussion group	Exams, Quizzes, Assignments, report
2.2	<b>Demonstrate</b> the Euler and Betti numbers	S5	Lectures, discussion group	Exams, Quizzes, Assignments, report
<b>3.0</b>	<b>Values, autonomy, and responsibility</b>			
3.1	<b>Participate</b> effectively within groups and independently.	V1	Collaborative Learning Self-learning	Scientific activity





Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
3.2	<b>Give</b> responsibility for learning importance and continuing personal and professional development.	V2	Lectures	Assignments

### C. Course Content:

No	List of Topics	Contact Hours
1.	Topological prerequisites and Group theory prerequisites	8
2.	Homotopy	4
3.	Homotopy Groups	7
4.	Covering Spaces	4
5.	Euler and Betti numbers	7
6.	CW-Complexes	4
7.	Singular Homology	7
8.	Applications of Homology Groups	4
<b>Total</b>		<b>45</b>

### D. Students Assessment Activities:

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	<b>Quizzes and Home Works</b>	<b>Continues</b>	<b>10 %</b>
2.	<b>Midterm exam</b>	<b>6<sup>th</sup> -7<sup>th</sup></b>	<b>20%</b>
3.	<b>Final exam</b>	<b>16<sup>th</sup></b>	<b>70%</b>
...			

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

### E. Learning Resources and Facilities:

#### 1. References and Learning Resources:

<b>Essential References</b>	Allen Hatcher, Algebraic Topology, 2017. (Online-Book) <b><a href="http://www.math.cornell.edu/~hatcher">http://www.math.cornell.edu/~hatcher</a></b>
<b>Supportive References</b>	<b>Tammo Dieck, Algebraic Topology, European</b>





	<b>Mathematical Society, 2008</b>
<b>Electronic Materials</b>	YouTube Lecturers, Algebraic Topology by Pierre Albin, <a href="https://youtu.be/XxFGokyYo6g">https://youtu.be/XxFGokyYo6g</a>
<b>Other Learning Materials</b>	

## 2. Educational and Research Facilities and Equipment Required:

Items	Resources
<b>facilities</b> (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	<b>Classrooms</b>
<b>Technology equipment</b> (Projector, smart board, software)	<b>data show, Blackboard</b>
<b>Other equipment</b> (Depending on the nature of the specialty)	<b>None</b>

## F. Assessment of Course Quality:

Assessment Areas/Issues	Assessor	Assessment Methods
<b>Effectiveness of teaching</b>	Students, Program Leader	Direct& Indirect
<b>Effectiveness of students assessment</b>	Faculty, Program Leader	Direct
<b>Quality of learning resources</b>	Students, Faculty	Indirect
<b>The extent to which CLOs have been achieved</b>	Faculty	Direct& Indirect
<b>Other</b>		

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

**Assessment Methods** (Direct, Indirect)

## G. Specification Approval Data:

<b>COUNCIL /COMMITTEE</b>	Department Council
<b>REFERENCE NO.</b>	
<b>DATE</b>	October 2023

