



Course Specification

— (Bachelor)

Course Title: Group theory

Course Code: 2023106-3

Program: Mathematics Program.

Department: Department of Mathematics and Statistics

College: Faculty of science

Institution: Taif university

Version: 1

Last Revision Date: 20/05/2023 *Pick Revision Date.*



Table of Contents

A. General information about the course:	3
B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods	4
C. Course Content	5
D. Students Assessment Activities	6
E. Learning Resources and Facilities	6
F. Assessment of Course Quality	7
G. Specification Approval	7





A. General information about the course:

1. Course Identification

1. Credit hours: 3h (3,0,0)

2. Course type

- A. University College Department Track Others
- B. Required Elective

3. Level/year at which this course is offered: (5th level, 3rd year)

4. Course general Description:

The main objective of this course is studying: Groups, Subgroup, Permutation groups, Cyclic groups. Order of elements in groups. Cosets, Lagrange's theorem, Normal subgroup, Factor Groups. Homomorphism of groups. Fundamental isomorphism theorems, and Automorphisms.

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

Set Theory (2022106-3)

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

None

7. Course Main Objective(s):

The student will be taught as follows:

1. Introducing some more sophisticated concepts and results of group theory as an essential part of general mathematical culture and as a basis for further study of more advanced mathematics.
2. Demonstrating comprehension and understanding in the topic of foundations of Group Theory.

2. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	3Hr /Week	100
2	E-learning		
3	Hybrid <ul style="list-style-type: none"> • Traditional classroom • E-learning 		
4	Distance learning		



3. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	45
2.	Laboratory/Studio	
3.	Field	
4.	Tutorial	
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	Recognize fundamentals of algebraic systems with one operation like semigroups, monoids and group.	K2	<ul style="list-style-type: none"> Lectures Group discussions ` 	<ul style="list-style-type: none"> Quizzes Assignments
1.2	Identify the mathematical properties of cyclic groups, permutation group and subgroups.	K2	<ul style="list-style-type: none"> Lectures Group discussions ` 	<ul style="list-style-type: none"> Exams Assignments
...				
2.0	Skills			
2.1	Apply appropriate properties of the group theory to prove some principles, theorems and some formulas on finite groups.	S2	<ul style="list-style-type: none"> Interactive classes Group discussions ` 	<ul style="list-style-type: none"> Quizzes Assignments
2.2	Plan some properties of finite groups and order of an element in a group in solving various problems related to mathematical sciences or in postgraduate studies.	S2	<ul style="list-style-type: none"> Lectures Group discussions ` 	<ul style="list-style-type: none"> Exams Quizzes
2.3	Explain the type of given	S2	<ul style="list-style-type: none"> Lectures 	<ul style="list-style-type: none"> Exams



Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
	groups (abelian or not).		<ul style="list-style-type: none"> Self-learning through the website` 	<ul style="list-style-type: none"> Quizzes Assignments
3.0	Values, autonomy, and responsibility			
3.1	Work effectively within groups and independently.	V1	<ul style="list-style-type: none"> Projects 	<ul style="list-style-type: none"> Through the oral presentation of the projects

C. Course Content

No	List of Topics	Contact Hours
1.	Mathematical systems with one operation (algebraic system, semigroup, monoid, group), basic properties of a group, examples and theorems,	3
2.	Subgroups, properties of subgroups, examples and theorems,	3
3.	Permutation groups,	3
4.	Cyclic groups, order of an element in a group, order of a group, examples and theorems,	3
5.	Cyclic groups, order of an element in a group, order of a group, examples and theorems	3
6.	Cosets, Lagrange's theorem, normal subgroup, factor group,	3
7.	First Midterm exam	3
8.	Cosets, Lagrange's theorem, normal subgroup, factor group,	3
9.	Cosets, Lagrange's theorem, normal subgroup, factor group,	3
10.	Homomorphism and isomorphism of groups,	3
11.	Homomorphism and isomorphism of groups,	3
12.	Homomorphism and isomorphism of groups,	3
13.	Second Midterm exam	3
14.	Fundamental isomorphism theorems, Automorphisms,	3
15.	Fundamental isomorphism theorems, Automorphisms,	3

Total		45





D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Quizzes	Continuous Evaluation	10 %
2.	Assignments, report	Continuous Evaluation	10 %
3.	Midterm 1 Exam	8-9	15%
4.	Midterm 2 Exam	12-13	15%
5.	Final Exam	15-16	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	W. Keith Nicholson, Introduction to Abstract Algebra, 4th Edition, John Wiley & Sons., 2012
Supportive References	1- John B. Fraleigh, A first course in abstract algebra, 7th Edition, Reading, Mass.: Addison-Wesley Pub. Co., c2015. 2- M. Samhaan and F. El-Zakeer, Theory of Group, 1427H. (Arabic Book).
Electronic Materials	https://www.youtube.com/watch?v=OzNfAQYstyE&list=PLp5QO1iuiUkNtvLwjssJYyQ3WbS9S8s2V
Other Learning Materials	Presentations sent to students via blackboard

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Lecture halls, containing white boards, and electronic monitors - The seats fit the number of students - Laboratories equipped with suitable numbers of computers
Technology equipment (Projector, smart board, software)	Data Show
Other equipment (Depending on the nature of the specialty)	Wi-Fi internet connections



F. Assessment of Course Quality

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

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

Assessment Methods (Direct, Indirect)

G. Specification Approval

COUNCIL /COMMITTEE	Department Council
REFERENCE NO.	4
DATE	October 2023

قسم الرياضيات والإحصاء
Mathematics and Statistics
Department

