اعتماد
NCAAA

T4

2020

Course Specifications

Course Title:	Abstract Algebra 1
Course Code:	222 Math
Program:	B. Sc. in Mathematics
Department:	Mathematics
College:	Science
Institution:	Jazan University

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Course Specifications

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:** **Level 4/Year 2**

4. **Pre-requisites for this course** (if any)**: 221 Math**

5. **Co-requisites for this course** (if any)**: Non**

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	**Traditional classroom**	45	100%
2	**Blended**		
3	**E-learning**		
4	**Distance learning**		
5	**Other**		

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	**Lecture**	42
2	**Laboratory/Studio**	
3	**Tutorial**	3
4	**Others** (specify)	
	Total	45

B. Course Objectives and Learning Outcomes

1. Course Description

This course is designed to provide students with

- **Group:** Definition of group and Abelian groups, Illustrative Examples, General properties of group, cyclic groups, subgroups (Theories and examples).
- **Permutations:** (S_n, o) Symmetric group of order n for any natural number n, cyclic permutation with length n.
- **Transpositions:** Even and odd permutations, Alternative group, A subgroup of Even permutations of group S_n.
- **Normal subgroups:** Cosets, Quotient group. Factor Group G / N for any normal subgroup N of G.
- **Homomorphism:** Homomorphism of groups, Basic homomorphism theorems, Isomorphism.

2. Course Main Objective

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

- Identify the basic idioms in abstract algebra.
- Development of student logical and abstract thinking.
- Development of the student's ability to deal with abstract proofs.
- Training students to solve exercises and applications.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge and Understanding**	
1.1	Distinguish mathematical concepts relevant to Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	K1
1.2	Identify background science, features and structure of mathematical problem in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	K2
1.3	Explain notations and concepts required for the solution of Mathematical problem in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	K3
2	**Skills :**	
2.1	Apply theoretical, computational or practical aspect relevant to Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	S1
2.2	Compute numerical quantities for various parameters to approximate the solution in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	S2
2.3	Apply various math rules, techniques and theorems in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	S3
2.4	Solve mathematical problem using critical thinking in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	S4
3	**Values:**	
3.1	Cultivate a mathematical attitude and nurture the interest.	V1
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2
3.3	Inculcating values and ethics in thought, expression and deed.	V3

C. Course Content

No	List of Topics	Contact Hours
1	Groups – Abelian groups-Illustrative examples.	9
2	General properties of groups,- Cyclic groups, -Subgroups	9
3	Permutations -Symmetric group of order n.	9
4	Normal subgroups – Cosets- Quotient group.	9
5	Homomorphism of groups- Basic homomorphism theorems-Isomorphism	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 and Understanding**		
1.1	Distinguish mathematical concepts relevant to Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.2	Identify background science, features and structure of mathematical problem in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain notations and concepts required for the solution of Mathematical problem in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, Web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.0	**Skills**		
2.1	Apply theoretical, computational or practical aspect relevant to Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, problem solving, web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.2	Compute numerical quantities for various parameters to approximate the solution in Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, problem solving, 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 Groups, Abelian Groups, Subgroups, Cyclic Subgroups, Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	Lectures, problem solving, web based work, Classroom discussions.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Solve mathematical problem using critical thinking in Groups, Abelian Groups, Subgroups, Cyclic Subgroups,	Lectures, problem solving, web based work, Classroom	Written exam (Problem solve, MCQ, true/false, Proof, Short

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Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	Normal Subgroups, Quotient Groups, Permutations, Homomorphism and Isomorphism, problems.	discussions.	answer), Quizzes, Assignments
3.0	**Values**		
3.1	Cultivate a mathematical attitude and nurture the interest.	Group work, problem solving, web based work	Assignments
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	Group work, problem solving, web based work	Assignments
3.3	Inculcating values and ethics in thought, expression and deed.	Group work, problem solving, web based work	Assignments

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	3	5%
2	First exam.	6	20%
3	Second exam.	12	20%
4	Homework	14	5%
5	Final exam.	16	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 assigned to a member of staff who will be available for help and academic guidance office hours at specific hours on daily basis. At least be available 8 hours per week.

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	J. B. Fraleigh, A First Course in Abstract Algebra, 6th Ed. Addison – Wesley Publishing Co. London, 1998.
Essential References Materials	– I. N. Herstein , Topics in Algebra , John Wiley and Sons,1975 . M. V. Shat and M.L. Bhave, Elements of logic and Modern algebra, Published by S. Chand and Company Ltd (1986).H.O.: Ram Nagar , New Delhi.
Electronic Materials	Web sites dedicated to Abstract Algebra.
Other Learning Materials	None.

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom, Computer lab.
Technology Resources (AV, data show, Smart Board, software, etc.)	Data show; Smart Board, Mathematics software.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Board Of Mathematics Department
Reference No.	12th Meeting Of The Board Of Mathematics Department 1441-1442
Date	14/6/1442 A. H.; 27/1/2021 A. D.