Indraprastha College for Women
University of Delhi

Course Name:	B.A. Programme
Paper Title:	Abstract Algebra
Unique Paper Code:	
Semester:	IV
Faculty(s):	Ms. Sunita Marwaha
Year:	2024

Work Plan

Unit No.	Learning Objective	Lecture No.	Topics to be Covered
I	Modular arithmetic, fundamental theory of groups, rings, integral domains and fields.	1	Modular arithmetic
		2	Definition and examples of groups
		3	Definition and examples of groups
		4	Elementary properties of groups
		5	Elementary properties of groups
		6	Order of a group
		7	Order of an element of a group
		8	Subgroups and its examples
		9	Subgroup tests
		10	Subgroup tests
		11	Center of a group
		12	Centralizer of an element of a group
II	Symmetry group of a plane figure and basic concepts of cyclic groups.	13	Cyclic groups and its properties
		14	Cyclic groups and its properties
		15	Generators of a cyclic group
		16	Generators of a cyclic group
		17	Group of symmetries
		18	Permutation groups

		19	Cyclic decomposition of permutations and its properties
		20	Even and odd permutations
		21	Even and odd permutations
		22	The Alternating group
		23	The Alternating group
		24	The Alternating group
		25	Cosets and Lagrange's theorem
		26	Cosets and Lagrange's theorem
		27	Definition and examples of normal subgroup
		28	Quotient groups
		29	Group homomorphisms and properties.
		30	Group homomorphisms and properties.
III	Cosets of a group and its properties	31	Definition and examples of rings
	Lagrange's theorem and quotient groups.	32	Definition and examples of rings
		33	Properties of rings
		34	Subrings
		35	Integral domains
		36	Integral domains
		37	fields, ideals and factor rings
		38	fields, ideals and factor rings
		39	fields, ideals and factor rings
		40	Characteristic of a ring
		41	Characteristic of a ring
		42	Characteristic of a ring
		43	Ring homomorphisms and properties.
		44	Ring homomorphisms and properties.
		45	Ring homomorphisms and properties.

Syllabus		
Unit	**Contents**	**Contac t Hours**
I	**Introduction to Groups** Modular arithmetic; Definition and examples of groups, Elementary properties of groups, Order of a group and order of an element of a group; Subgroups and its	12

	examples, Subgroup tests; Center of a group and centralizer of an element of a group.	
II	**Cyclic Groups, Permutation Groups and Lagrange's Theorem** Cyclic groups and its properties, Generators of a cyclic group; Group of symmetries; Permutation groups, Cyclic decomposition of permutations and its properties, Even and odd permutations and the alternating group; Cosets and Lagrange's theorem; Definition and examples of normal subgroups, Quotient groups; Group homomorphisms and properties.	18
III	**Rings, Integral Domains and Fields** Definition, examples and properties of rings, subrings, integral domains, fields, ideals and factor rings; Characteristic of a ring; Ring homomorphisms and properties.	15
	Total	**45**

Text Books/Suggested Readings:

S. No.	**Name of Authors/Books/Publishers**	**Year of Publication/ Repr int**
1.	Gallian, Joseph. A. Contemporary Abstract Algebra (9th ed.). Cengage Learning India Private Limited, Delhi. Indian Reprint.	2021
2.	Beachy, John A., & Blair, William D. Abstract Algebra (3rd ed.). Waveland Press.	2006

	Paper Components		
Credits	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**
4	**3**	**1**	**0**

Assessment Scheme

S.No.	**Component**	**Marking Scheme**	**Total Marks**
1	Internal Assessment		**30**
	● Assignment/Quiz/Project/ Presentation	12	
	● Class Test	12	
	● Attendance	6	
3.	Practical		NA
	● Continuous Assessment	NA	
	● End Term Written/Practical Exam	NA	
	● Viva	NA	

4.	End Semester Examination	90