



Indraprastha College for Women University of Delhi

Work Plan for ODD SEMESTER – 2026

Course Name:	B.Sc.(H) Mathematics
Paper Title:	Ring Theory
Unique Paper Code:	2352013502
Semester:	V
Faculty:	Ritika Gulati
Year:	2026

Work Plan			
Unit No.	Learning Objective	Lecture No.	Topics to be Covered
1	To introduce fundamental theory of rings and making students understand the concept of Integral domain and fields	1,2,3	Definition and examples of rings
		4,5	Properties of rings, Subrings
		6,7,8	Integral domains and fields
		9,10	Characteristics of Ring
		11,12,13,14	Ideals, operations on ideals, ideal generated by a set and properties
		15,16	Factor rings
		17,18	Prime and maximal ideals
		19,20	PID
2	Introducing different theorems n rings	21,22	Ring homomorphism
		23	First isomorphism theorem
		24	Second isomorphism theorem
		25	Third isomorphism theorem
		26,27	Field of quotients
		28,29	Polynomial Rings
		30,31	Division Algorithm
3	Learning multiple tests to understand and to examine when the polynomial is irreducible and when not	32,33	Factorization of polynomials

		34,35	Reducibility test
		36,37,38	Some irreducibility tests
		39,40	Divisibility in integral domain
		41	Primes
		42,43	UFDE
		44,45	ED

Unit	Contents/Syllabus
I	Definition and examples of rings, Properties of rings, Subrings, Integral domains and fields, Characteristic of a ring; Ideals, operations on ideals, ideal generated by a set and properties, Factor rings, Prime ideals and maximal ideals, Principal ideal domains.
II	Definition, examples and properties of ring homomorphisms; First, second and third isomorphism theorems for rings; The field of quotients; Polynomial rings over commutative rings, Division algorithm and consequences.
III	Factorization of polynomials, Reducibility tests, Mod p Irreducibility test, Eisenstein's criterion, Unique factorization in $\mathbb{Z}[x]$; Divisibility in integral domains, Irreducible, Primes, Unique factorization domains, Euclidean domains.
S. No.	Name of Authors/Books/Publishers
1.	Gallian, Joseph. A. (2017). Contemporary Abstract Algebra (9th ed.). Cengage Learning India Private Limited, Delhi. Indian Reprint 2021.
2.	Dummit, David S. & Foote, Richard M. (2016). Abstract Algebra (3rd ed.). Student Edition. Wiley India.
3.	
4.	

Paper Components			
Credits	Lecture (L)	Tutorial (T)	Practical (P)
4	3	1	
Assessment Scheme			

S.No.	Component	Marking Scheme	Total Marks
1	Internal Assessment - Assignment - Class Test - Attendance		30
		12	
		12	
		6	
2.	Continuous Assessment (Tutorial) - Activity 1 - Activity 2 - Attendance		40
		20	
		15	
		5	
3.	Practical - Continuous Assessment - End Term Written/Practical Exam - Viva		NA
4.	End Semester Examination		90