

## ALGEBRA-II

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
II	21CPMA2A	Core	Hrs/week	Hrs/Sem	Hrs/week	Hrs/Sem	0	4
			5	75	5	75		

### COURSE OBJECTIVES

The students will be able to

- Study the concept of Field Extension, Roots of Polynomial, Galois Theory and Finite Fields.
- Understand Division Rings, Solvability by Radical and to develop computational skill in Abstract Algebra

### COURSE OUTCOMES:

On the successful completion of the course, the students will be able to

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Introduce the concept of Extension Fields and Transcendence of $e$ .	K3
CO2	Explain the relation between Roots of polynomials	K2
CO3	Construct the Elements of Galois Theory	K3
CO4	Discuss and understand the Wedderburn's Theorem on Finite Division Rings	K2
CO5	Analyze the concept of Solvability by Radicals, Integral Quaternion's and the Four Square Theorem.	K4

*Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.*

### MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	M	S	M
CO2	M	S	M	M	S	M
CO3	S	S	M	S	M	S
CO4	M	M	S	S	M	S
CO5	M	S	S	M	S	S

S- Strong; M-Medium; L-Low

**UNIT- I: FIELDS****18 Hours**Extension Fields – Transcendence of  $e$  – Roots of Polynomials.**Chapter 5: Section 5.1 - 5.3.****UNIT-II: POLYNOMIALS****18 Hours**

More About Roots – Elements of Galois Theory.

**Chapter 5: Section 5.5 and 5.6****UNIT-III: SOLVABILITY AND EXTENSION FIELDS****18 Hours**

Solvability by Radicals – Galois Groups over the Rationals.

**Chapter 5: Section 5.7 and 5.8****UNIT- IV: FINITE FIELDS****18 Hours**

Finite fields – Wedderburn's Theorem on Finite Division Rings.

**Chapter 7: Section 7.1 and 7.2****UNIT- V: SELECTED TOPICS****18 Hours**

A Theorem of Frobenius – Integral Quaternions and the Four – Square Theorem.

**Chapter 7: Section 7.3 and 7.4****DISTRIBUTION OF MARKS: THEORY 90% AND PROBLEMS 10%****TEXT BOOK:**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	I.N.Herstein	Topics in Algebra ( II Edition)	Wiley India Pvt. Ltd.	2017

**REFERENCE BOOKS:**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	M. Artin	Algebra	Prentice Hall of India	1991
2.	P.B.Bhattachara, S.K.Jain, and S.R.Nagpaul	Basic Abstract Algebra	Cambridge University.	1997

**WEB SOURCES:**

1. [http://lib1.org/\\_ads/680A08FE3A43250BF4683E477AB1997A](http://lib1.org/_ads/680A08FE3A43250BF4683E477AB1997A)
2. [http://lib1.org/\\_ads/8F9FA5C07895D22659815E5D415E3C84](http://lib1.org/_ads/8F9FA5C07895D22659815E5D415E3C84)

**TEACHING METHODOLOGY**

1. Class room Teaching
2. Assignments
3. Seminars
4. Discussions
- 5 .PPT Presentations

**SYLLABUS DESIGNER:**

1. Mrs.B.Sarala, Assistant Professor of Mathematics.
2. Ms.R.Ramya, Assistant Professor of Mathematics.