

UNIVERSITY OF MADRAS
M.Sc. DEGREE PROGRAMME IN MATHEMATICS
 SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Course		ALGEBRA II					
Paper Number		CORE IV					
Category	Core	Year	I	Credits	5	Course Code	428C2A
		Semester	II				
Instructional Hours per week	Lecture		Tutorial		Lab Practice	Total	
	5		1		--	6	
Pre-requisite		Algebraic Structures					
Objectives of the Course		To study field extension, roots of polynomials, Galois Theory, finite fields, division rings, solvability by radicals and to develop computational skill in abstract algebra.					
Course Outline		UNIT-I :Extension fields – Transcendence of e. Chapter 5: Section 5.1 and 5.2					
		UNIT-II : Roots or Polynomials.- More about roots Chapter 5: Sections 5.3 and 5.5					
		UNIT-III : Elements of Galois theory. Chapter 5 : Section 5.6					
		UNIT-IV : Finite fields - Wedderburn's theorem on finite division rings. Chapter 7: Sections 7.1 and 7.2 (Theorem 7.2.1 only)					
		UNIT-V :Solvability by radicals - A theorem of Frobenius - Integral Quaternions and the Four - Square theorem. Chapter 5: Section 5.7 (omit Lemma 5.7.1, Lemma 5.7.2 and Theorem 5.7.1) Chapter 7 : Sections 7.3 and 7.4					
Extended Professional Component (is a part of internal component only, Not to be included in the External Examination question paper)		Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)					
Skills acquired from this course		Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill					
Recommended Text		I.N. Herstein. <i>Topics in Algebra</i> (II Edition) Wiley Eastern Limited, New Delhi, 1975.					

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Reference Books	1. M.Artin, <i>Algebra</i> , Prentice Hall of India, 1991. 2. P.B.Bhattacharya, S.K.Jain, and S.R.Nagpaul, <i>Basic Abstract Algebra</i> (II Edition) Cambridge University Press, 1997. (Indian Edition) 3. I.S.Luther and I.B.S.Passi, <i>Algebra</i> , Vol. I –Groups(1996); Vol. II <i>Rings</i> , Narosa Publishing House , New Delhi, 1999 4. D.S.Malik, J.N. Mordeson and M.K.Sen, <i>Fundamental of Abstract Algebra</i> , McGraw Hill (International Edition), New York. 1997. 5. N.Jacobson, <i>Basic Algebra</i> , Vol. I & II Hindustan Publishing Company, New Delhi.
Website and e-Learning Source	http://mathforum.org , http://ocw.mit.edu/ocwweb/Mathematics , http://www.opensource.org , www.algebra.com

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO1: Prove theorems applying algebraic ways of thinking.

CLO2: Connect groups with graphs and understanding about Hamiltonian graphs.

CLO3: Compose clear and accurate proofs using the concepts of Galois Theory.

CLO4: Bring out insight into Abstract Algebra with focus on axiomatic theories.

CLO5: Demonstrate knowledge and understanding of fundamental concepts including extension fields, Algebraic extensions, Finite fields, Class equations and Sylow's theorem.

	POs						PSOs		
	1	2	3	4	5	6	1	2	3
CLO1	3	1	3	2	3	3	3	2	1
CLO2	2	1	3	1	3	3	3	2	1
CLO3	3	2	3	1	3	3	3	2	1
CLO4	1	2	3	2	3	3	3	2	1
CLO5	3	1	2	3	3	3	3	2	1