

**STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI**  
**COURSE PLAN June - November 2024**

**Department** : Mathematics  
**Names of the Faculty** : Dr. S. Teresa Arockiamary & Dr. S. Sarah Surya  
**Course Title** : Abstract Algebra  
**Course Code** : 23MT/PC/AA14  
**Shift** : 1

**COURSE OUTCOMES (COs)**

<b>COs</b>	<b>Description</b>	<b>CL</b>
<b>CO1</b>	Define the basic concepts used in the theory of Sylow's theorems, extension of fields, Galois groups and Ring Theory	K1
<b>CO2</b>	Demonstrate the ability to apply abstract algebraic principles to solve advanced problems	K2
<b>CO3</b>	Apply the theory of Sylow's theorems, extension of fields and Galois group in solving the problems in polynomial equations and the properties and concepts of a ring theory to solve problems related to factorization, divisibility, and prime elements.	K3
<b>CO4</b>	Analyze Sylow theorems and the theory of extension of fields and Galois groups and analyze polynomial rings and their properties, specifically focusing on polynomials over the rational field and polynomial rings over commutative rings	K4
<b>CO5</b>	Evaluate extension fields, roots of polynomials, the concept of Galois theory, and critically evaluate and compare the properties and characteristics of different rings	K5

<b>Week</b>	<b>Unit No.</b>	<b>Content</b>	<b>Cognitive Level</b>	<b>Teaching Hours</b>	<b>COs</b>	<b>Teaching Learning Methodology</b>	<b>Assessment Methods</b>
Jun 24 – 26, 2024 (Day Order 4 - 6)	1 & 2	<b>Ring Theory</b> 2.1 Euclidean Rings <b>Group Theory</b> 1.1 Counting Principle	K1- K5	1 + 3	CO1-5	Lecture  Group discussions	Questioning & interaction
Jun 27 – July 4, 2024 (Day Order 1 - 6)	1& 2	<b>Ring Theory</b> 2.1 Euclidean Rings <b>Group Theory</b> 1.2 Cauchy's Theorem 1.3 Sylow's Theorem	K1- K5	2 + 4	CO1-5	Lecture Group discussions  Presentation	Slip test  Third Component I Seminar Marks: 10 (Units 2 & 4)
July 5 – 12, 2024 (Day Order 1 - 6)	1& 2	<b>Ring Theory</b> 2.2 Unique Factorization Theorem <b>Group Theory</b> 1.3 Sylow's Theorem 1.4 Direct Products	K1- K5	2 + 4	CO1-5	Lecture Presentation  Solving problems	Questioning & interaction  Quiz
July 15 – 23, 2024 (Day Order 1 - 6)	1& 2	<b>Ring Theory</b> 2.2 Unique Factorization Theorem <b>Group Theory</b> 1.4 Direct Products 1.5 Finite Abelian Groups	K1- K5	2 + 4	CO1-5	Lecture  Solving problems	Questioning & interaction  Quiz

July 24 – 31, 2024 (Day Order 1 - 6)	1,2 & 4	<b>Ring Theory</b> 2.3 A particular Euclidean ring <b>Group Theory</b> 1.5 Finite Abelian Groups <b>Fields</b> 4.1 Extension Fields	K1- K5	2 + 4	CO1-5	Lecture Group discussions  Solving problems	Group work  Quiz
Aug 1 – 5, 2024 (Day Order 1 - 3)	2 & 4	<b>Ring Theory</b> 2.3 A particular Euclidean ring <b>Fields</b> 4.1 Extension Fields	K1- K5	1 + 1	CO1-5	Lecture  Presentation	Slip test  Questioning
Aug 6 – 10, 2024	<b>C.A. Test - I(Unit 1 &amp; part of Unit 2)</b>						
Aug 12 – 14, 2024 (Day Order 4-6)	2 & 4	<b>Ring Theory</b> 2.4 Fermat's Theorem <b>Fields</b> 4.2 Roots of Polynomials	K1- K5	1 + 3	CO1-5	Lecture  Presentation	Questioning & interaction Quiz
Aug 16 – 23, 2024 (Day Order 1-6)	2 & 4	<b>Ring Theory</b> 2.4 Fermat's Theorem <b>Fields</b> 4.2 Roots of Polynomials (contd.)	K1- K5	2 + 4	CO1-5	Lecture Presentation  Solving problems	Questioning & interaction  Slip test
Aug 27 – Sep 3, 2024 (Day Order 1-6)	3 & 4	<b>Ring Theory (contd.)</b> 3.1 Polynomial Rings <b>Fields</b> 4.3 More about Roots	K1- K5	2 + 4	CO1-5	Lecture Presentation  Solving problems	Questioning & interaction  Slip test

Sep 4 – 11, 2024 (Day Order 1-6)	3,4 & 5	<b>Ring Theory (contd.)</b> 3.1 Polynomial Rings <b>Fields</b> 4.3 More about Roots <b>Fields (contd.)</b> 5.1 The Elements of Galois Theory	K1- K5	2 + 4	CO1-5	Lecture  Solving problems	Third Component II Test (Problems in Unit 1 & 3) Marks: 20  Group work
Sep 12 - 20, 2024 (Day Order 1-6)	3 & 5	<b>Ring Theory (contd.)</b> 3.2 Polynomials over the Rational Field <b>Fields (contd.)</b> 5.1 The Elements of Galois Theory	K1- K5	2 + 4	CO1-5	Lecture Group discussions  Solving problems	Questioning & interaction  Group work
Sep 23 - 26, 2024 (Day Order 1-4)	3 & 5	<b>Ring Theory (contd.)</b> 3.2 Polynomials over the Rational Field <b>Fields (contd.)</b> 5.2 Solvability by Radicals	K1- K5	2 + 2	CO1-5	Lecture Group discussions  Solving problems	Slip test  Group work
Sep 27 – Oct 3, 2024	<b>C.A. Test - II (Unit 4 &amp; part of units 3 &amp; 5)</b>						
Oct 4 – 5, 2024 (Day 5 & 6)	5	<b>Fields (contd.)</b> 5.2 Solvability by Radicals	K1- K5	2	CO1-5	Lecture  Solving problems	Third Component III Quiz (Sections 5.1, 5.2) Marks: 20
Oct 7 - 15, 2024 (Day Order 1 to 6)	3 & 5	<b>Ring Theory (contd.)</b> 3.3 Polynomial Rings over Commutative Rings <b>Fields (contd.)</b> 5.3 Galois Groups over the Rationals	K1- K5	2 + 4	CO1-5	Lecture Group discussions  Solving problems	Questioning & interaction  Quiz

<p>Oct 16 - 22, 2024 (Day Order 1 to 6)</p>	<p>3 &amp; 5</p>	<p><b>Ring Theory (contd.)</b> 3.3 Polynomial Rings over Commutative Rings <b>Fields (contd.)</b> 5.3 Galois Groups over the Rationals</p>	<p>K1- K5</p>	<p>2 + 4</p>	<p>CO1-5</p>	<p>Lecture Group discussions  Solving problems</p>	<p>Questioning &amp; interaction  Slip test</p>
<p>Oct 23 - 24, 2024 (Day Order 1 to 2)</p>	<p><b>REVISION</b></p>						