Lecture Plan

Name of the College: Government College of Arts, Science and Commerce, Sanquelim-Goa

Name of Faculty: Aaron Alphonso	**Subject:** Algebra	
Paper code: MAT - 502	**Program:** M.Sc.	**Division: -I**
Academic year: 2024-25	**Semester:** III	**Total Lectures:** 60

Course Objectives: The student will learn the basic concepts in Group Actions on a Set, Sylow Theory, Rings and Polynomial Rings.

Expected Course Outcome: On completion of the course the student will be familiar with the topics in Syllow Theory, Rings and Fields and Polynomial Rings

Student Learning Outcome: At the end of this course a student will be able to

1. Recollect and explain various concepts in Algebra
2. Prove important theorems in the course
3. Apply various concepts of Algebra to solve problems.
4. Correlate various concepts in Algebra and use them to solve problems.

Month	Lecture From	Lecture To	No. of lectures allotted	Topic, Subtopic to be covered	Exercise/ Assignment	ICT Tools	Reference books
June	18/06/2024	22/06/2024	4	Permutation Groups: Symmetric Groups, Permutation Groups, Alternating Groups, Group Actions, Orbit and Stabilizers, Caley's Theorem	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	24/06/2024	29/06/2024	4	Series of Groups: Subnormal Normal Series, Jordan Holders Theorem	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
July	01/07/2024	06/07/2024	4	Series of Groups: Jordan Holders Theorem	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote

	08/07/2024	13/07/2024	4	Syllows Theorem: Applications of Sylow Theorems, Finite Simple Groups	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	15/07/2024	20/07/2024	4	Syllows Theorem: Non simplicity Tests, The simplicity of $A5$	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	22/07/2024	27/07/2024	4	Rings and Fields: Rings, Fields, Integral Domains-definiti ons and Examples, Characteristic of Rings. Ideals and Factor Rings.	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
July August	29/07/2024	03/08/2024	4	Rings and Fields: Prime ideals and Maximal ideals,	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract

							Algebra, Dummit and Foote
August	05/08/2024	10/08/2024	4	Rings and Fields: Ring Homomorphisms , Field of Quotients of and Integral Domain.	Problem Solving	Smart Board PDF, Lapto p, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	12/08/2024	17/08/2024	4	Polynomial Rings and Factorization of Polynomials: Polynomial Rings-Notations and Terminologies, The Division Algorithm and its consequences.	Problem Solving	Smart Board PDF, Lapto p, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	19/08/2024	24/08/2024	4	Polynomial Rings and Factorization of Polynomials: Mod p Test for irreducibility over UFD.	Problem Solving	Smart Board PDF, Lapto p, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	26/08/2024	31/08/2024	4	Polynomial Rings and Factorization of Polynomials: Gauss Lemma over UFD, Eienstein Criterion, g.c.d., l.c.m., in UFD. In UFD R,	Problem Solving	Smart Board PDF, Lapto	A First Course in Abstract Algebra, Fraleigh, Contemporary

						p, Latex	Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
September	02/09/2024	07/09/2024	2	Polynomial Rings and Factorization of Polynomials: f(x) in R[x] is irreducible iff f(x) is irreduclible over the field of quotients of R	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	09/09/2024	14/09/2024	2				
	16/09/2024	21/09/2024	4	Polynomial Rings and Factorization of Polynomials: R is a UFD implies R[x] is a UFD. Divisibility in Integral Domains: Irreducibles. Primes. Unique Factorization Domains.	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
	23/09/2024	28/09/2024	4	Divisibility in Integral Domains: Principal Ideal Domains. PID implies UFD.	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote

September October	30/09/2024	05/10/2024	3	Divisibility in Integral Domains: Euclidean Domains. Euclidian Domain implies PID	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote
October	07/10/2024	12/10/2024	1	Divisibility in Integral Domains: Gaussian Integers and Fermat' s $p = a^2 + b^2$ Theorem	Problem Solving	Smart Board PDF, Laptop, Latex	A First Course in Abstract Algebra, Fraleigh, Contemporary Abstract Algebra, Gallian, Abstract Algebra, Dummit and Foote

*** Assessment Rubrics**

Component	Max Marks
ISA 1	10
ISA 2	10
ISA 3	10
ISA 4	10
Semester End Exam	20