Semester Lecture Plan

Name of the college: Government College of Arts, Science & Commerce Sanquelim – Goa.

Name of Faculty: Vishal Vinayak Gawas	**Subject: Algebra**	
Paper code: MTC 105	**Program/Course: TY BSc**	**Division: -**
Academic year: 2024-25	**Semester: V**	**Total Lectures: 90**

Course Objectives:

1. Understand Groups, Normal groups, internal direct product, and rings.
2. Apply various concepts in Algebra to solve problems.
3. Determine the isomorphism class for a finite abelian group. Students will be able to write mathematical proofs.
4. Correlate the various concepts in Algebra and solve problems.

Course Learning Outcome: On completion of the course, the students will be able to

1. Understand Groups, Normal groups, internal direct product, and rings.
2. Apply various concepts in Algebra to solve problems.
3. Determine the isomorphism class for a finite abelian group. Students will be able to write mathematical proofs.
4. Correlate the various concepts in Algebra and solve problems.

	Lectures From:	To:	No. of lectures allotted	Topic, Subtopic to be covered	Learning outcome	ICT Tools	Reference books
July	01/07/2024	06/07/2024	6	Groups definition and elementary properties	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra

July	08/07/2024	13/07/2024	6	Finite group and subgroups; Examples	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
July	15/07/2024	20/07/2024	6	Cyclic groups; Properties of cyclic groups; Classification of subgroups of cyclic groups.	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
July	22/07/2024	27/07/2024	6	Permutation groups; Cycle notation; Properties of permutations	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
July	29/07/2024	31/07/2024	4	Isomorphisms: Definitions and examples; Cayley's Theorem	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
August	05/08/2024	10/08/2024	2	Properties of isomorphisms; Automorphism	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
August	12/08/2024	17/08/2024	6	Cosets; Properties of cosets; Lagrange's Theorem and consequences; An application of cosets to permutation group.	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra

August	19/08/2024	24/08/2024	6	Definition and examples of external direct product; Properties of external direct product; The group of units modulo n as an external direct product. Normal subgroups and factor groups	Understand Groups, Normal groups, internal direct product, and rings.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
August	26/08/2024	31/08/2024	6	Application of factor groups; Internal direct product. Definition and examples of group homomorphisms;	Determine the isomorphism class for a finite abelian group. Students will be able to write mathematical proofs.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
September	02/09/2024	05/09/2024	4	Properties of homomorphisms; First Isomorphism Theorem.	Determine the isomorphism class for a finite abelian group. Students will be able to write mathematical proofs.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
September	13/09/2024	14/09/2024	2	Fundamental Theorem of Finite Abelian Groups; Isomorphism classes of Abelian groups; Proof of Fundamental Theorem	Determine the isomorphism class for a finite abelian group. Students will be able to write mathematical proofs.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra

September	16/09/2024	21/09/2024	6	Rings; Properties of rings; Subrings; Integral domains; Examples of integral domains; Fields; Characteristics of a ring	Correlate the various concepts in Algebra and solve problems.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
September	23/09/2024	28/09/2024	6	Ideals and Factor rings; Prime ideals; maximal ideals;	Correlate the various concepts in Algebra and solve problems.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
September	30/09/2024		2	Ring homomorphisms	Correlate the various concepts in Algebra and solve problems.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
October	01/10/2024	05/10/2024	4	Properties of ring homomorphisms; Field of quotients.	Correlate the various concepts in Algebra and solve problems.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
October	07/10/2024	12/10/2024	6	Polynomial rings; The Division Algorithm and consequences.	Correlate the various concepts in Algebra and solve problems.	Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
October	14/10/2024	19/10/2024	6	Revision		Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra
October	21/10/2024		2	Revision		Chalk Board	Joseph A. Gallian, Contemporary Abstract Algebra