# Lecture Plan

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

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| **Name of Faculty:** Aaron Alphonso | **Subject:** Galois Theory | |
| **Paper code:** MAT-610 | **Program:** M.Sc. | **Division: -** |
| **Academic year:** 2024-25 | **Semester:** III | **Total Lectures:** 60 |

**Course Objectives:** The student will learn the basic concepts in Field Extensions and Galois Theory

**Expected Course Outcome:** On completion of the course the student will be familiar with the topics in Field Extensions and Galois Theory.

**Student Learning Outcome:** Student will be able to

1. Recollect and explain various concepts in Advanced Algebra
2. Prove important theorems in the course
3. Apply various concepts of Advanced Algebra to solve problems.
4. Correlate various concepts in Advanced 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 |
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| June | 18/06/2024 | 22/06/2024 | 4 | Extension of Fields: Field extensions, Field of rational functions | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 24/06/2024 | 29/06/2024 | 4 | Extension of Fields: Simple extension, Algebraic extension, Transcendental extension, Construction by straight edge and compass, Constructible numbers. | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| July | 01/07/2024 | 06/07/2024 | 4 | Tutorial Session | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 08/07/2024 | 13/07/2024 | 4 | Automorphism group: Automorphisms of fields, Galois groups, Galois groups of finite fields, Galois group of Cyclotomic extensions. Galois group of a polynomial. | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 15/07/2024 | 20/07/2024 | 4 | Galois Theory: Symmetric rational functions, Galois group of field of rational function in n variable | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 22/07/2024 | 27/07/2024 | 4 | Galois Theory: Symmetric rational functions | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |

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| July<br>August | 29/07/2024 | 03/08/2024 | 4 | Galois Theory: Galois group of field of rational function in n variable | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| August | 05/08/2024 | 10/08/2024 | 4 | Galois Theory: Normal Extension | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 12/08/2024 | 17/08/2024 | 4 | Galois Theory: Fundamental Theorem of Galois theory. | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 19/08/2024 | 24/08/2024 | 4 | Tutorial Session | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 26/08/2024 | 31/08/2024 | 4 | Finite Fields, Composite Extensions | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| September | 02/09/2024 | 07/09/2024 | 2 | Simple Extensions,<br>Cyclotomic Extensions | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 09/09/2024 | 14/09/2024 | 2 | Simple Extensions. Galois Group of Polynomials | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 16/09/2024 | 21/09/2024 | 4 | **Solvability:** Solvable groups,<br>Insolvability of A5 | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| | 23/09/2024 | 28/09/2024 | 4 | **Solvability:** Solvability of polynomials,<br>Insolvability of quintics | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |
| September<br>October | 30/09/2024 | 05/10/2024 | 4 | **Solvability:** Examples of insolvable | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |

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| October | 07/10/2024 | 12/10/2024 | 2 | Revision | Exercises on topics covered | Latex, Smart Board | Abstract Algebra by David S. Dummit and Richard M. Foote |

*** Assessment Rubrics**

| Component | Max Marks |
|---|---|
| ISA 1 | 20 |
| ISA 2 | 20 |
| ISA 3 | 20 |
| Semester End Exam | 40 |