Course Type	Course Code	Name of Course	L	T	P	Credit
DC	**NMCC514**	Advanced Algebra	3	1	0	4

Course Objective

- Advanced Algebra plays an important role in the Computer science and Electrical Communications as well as in mathematics itself. Consequently, it becomes more and more desirable to introduce the student to the field theory at an early stage of study.

Learning Outcomes

- Advanced Algebra is an abstract branch of mathematics that originated from set theory. The main outcome of this course is to develop the capacity for mathematical reasoning through analyzing, proving and explaining concepts from field extensions and Galois theory.

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	Review of Ring Theory, irreducibility criteria, Guass Lemma, and Einstein Criteria. Fields, Characteristic and prime subfields, Field extensions, Finite, algebraic and finitely generated field extensions.	10L+2T	The main outcome of unit I is to develop the idea of ring theory and field extension.
2	Classical ruler and compass constructions, Splitting fields and normal extensions, algebraic closures. Finite fields, Cyclotomic fields, Separable and inseparable extensions.	8L+3T	The main outcome of this unit is to develop the idea of different field extension and constructions of numbers.
3	Galois groups, Fundamental Theorem of Galois Theory, Composite extensions, Examples (including cyclotomic extensions and extensions of finite fields).	8L+3T	Learning outcome: From this unit we can learn the Galois theory, fixed field and Galois groups.
4	Norm, trace and discriminate. Solvability by radicals, Galois' Theorem on solvability.	8L+3T	The main outcome of this unit is to discuss the idea of solvability and cyclic extensions.
5	Cyclic extensions, Abelian extensions, Polynomials with Galois groups Sn. Transcendental extensions.	8L+3T	Cyclic extensions, Abelian extensions, Polynomials
Total		**42L+14T**	

Text Books:

1. D.S. Dummit and R. M. Foote, Abstract Algebra, 2nd Edition, John Wiley, 2002.

Reference Books:

1. M. Artin, Algebra, Prentice Hall of India, 1994.
2. J.A. Gallian, Contemporary Abstract Algebra, 4th Edition, Narosa, 1999.