Prerequisites: Basic Knowledge in Set theory and Real Analysis at Undergraduate level	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	To prepare the students to understand the meaning of a topology and to study various other concepts of Topological spaces.
Course Outcome(s)	Understanding continuity in general settings, Understand Open bases and open sub bases, Weak topologies , the function algebras; Discuss Tychonoff's theorem, locally compact spaces, Compactness of metric spaces and Ascoli's theorem; Distinguish Urysohn's lemma and the Tietze extension theorem; Discuss connected spaces, the components of a space and Totally disconnected spaces; Study Stone-Weierstrass theorems and its applications

Syllabus:

Topological Spaces, Basis for a topology, Subspace topology, Closed sets and Limit points, Continuous Functions, Product Topology, Quotient Topology. Connected spaces, Connected subspaces of the Real line, Components and Local Connectedness, Path connectedness, Compact spaces, compactification, Limit-point compactness, Local compactness.

Countability and Separation axioms, Urysohn Lemma, Urysohn Metrization Theorem, Tietze Extension Theorem, Tychonoff Theorem.

Text books:

1. J.R. Munkres, Topology, 2nd Ed., Pearson Education India, 2001.

References:

1. K.D. Joshi, Introduction to General Topology, New Age International, New Delhi, 2000. 2. J. Dugundji, Topology, Allyn and Bacon Inc. 1966.
3. J.L. Kelley, General Topology, Van Nostrand, 1955.
4. M.G. Murdeswar, General Topology, New Age International, 1990.
5. G. F. Simmons, Introduction to Topology and Modern Analysis, McGraw-Hill, 1963.

Code:MAT5201: Algebra Prerequisites: Algebra.	L	T	P	Credit
	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	Gain knowledge in fields in the theory of numbers, groups, Rings, UFD, PID ED Modules, Splitting fields and Galois theory.
Course Outcome(s)	Understanding abstract structures such as groups, rings, etc and algebraic constructions; Understand the concepts of direct product of

	groups, normal subgroups, and factor groups; Describe the structure of finite Abelian group; Use Sylow's theorems to describe the structure of certain finite groups; Explain the notion of an extension of a field; Describe the structure of finite fields, Use Galois theory to analyze the solvability of polynomials, Produce rigorous proofs of propositions/theorems arising in the context of abstract algebra.

Syllabus:

Rings - definition, basic concepts and examples. UFDs, PIDs, Euclidean domains, Gausss Lemma. The Eisenstein criterion, examples and applications. Gaussian primes. Algebraic integers.

Integers in quadratic fields. Rings of polynomials, Factorization of polynomials over a field, Non-commutative examples, Homomorphism and factor rings. Prime and Maximal ideals.

Modules: Definitions and Examples, Direct sums, Free Modules, Quotient Module, Homeomorphisms, Module over PIDs. Introduction to Extension Fields, Algebraic Extensions, Geometric Constructions, Finite Fields, Automorphisms of Fields, The Isomorphism Extension Theorem, Splitting Fields, Separable Extensions, Galois Theory, Illustration of Galois Theory, Insolvability of the Quintic.

Text books:

1. John B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, 2002.
2. M. Artin: Algebra, Prentice Hall, 1991.

References:

1. Thomas W. Hungerford, Algebra, Springer, 2003.
2. John B. Fraleigh, A First Course in Abstract Algebra, 7th Edition, 2002.
3. Joseph Gallian, Contemporary Abstract Algebra, 7th Edition, Cengage Learning,

2009. 4. D.M. Burton, A First Course in rings and ideals, Addison-Wesley, 1970.
5. C. Musili, Introduction to Rings and Modules, Narosa Publishing House, 2001.

Code:MAT5202: Complex Analysis Prerequisites: fundamental Ideas and theorems about Complex plane power series residues	L	T	P	Credit
	4	1	0	4

Course Category	Core
Course Type	Theory
Course Objective	The objective of this course is to introduce the fundamental ideas of the functions of complex variables and developing a clear understanding of the fundamental concepts of Complex Analysis such as analytic functions, complex integrals and a range of skills which will allow students to work effectively with the concepts.