INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
भारतीय प्रौद्योगिकी संस्थान तिरुपति
Yerpedu-Venkatagiri Road, Yerpedu Post, Tirupati District, Andhra Pradesh - 517 619

1.	Title of the course	Groups and Rings
2.	Course number	MA518L
3.	Structure of credits (L-T-P-C)	3-0-0-3
4.	New course/modification to	Modified with MA515L/ALGEBRA
5.	To be offered by	Mathematics and Statistics
6.	Prerequisite	None
7.	**Course Objective(s):** To discuss the notion of a group. To classify the groups of small order. To define the notion of a ring and discuss various kinds of rings, including Euclidean domains, unique factorisation domains and principal ideal domains.	
8.	**Course Content:** Groups: review of basic group theory, normal subgroups, quotient groups, homomorphism theorems, group actions with examples, Cayley's theorem, class equation and its applications, Sylow's theorems, simplicity of alternating groups, direct products, semidirect product, structure theorem for finite abelian groups, classification of groups of order up to 15, p-groups, solvable groups, nilpotent groups, Rings: review of basic ring theory, properties of ideals, prime and maximal ideals, Zorn's lemma and existence of maximal ideals, quotient rings, Chinese remainder theorem, field of fractions and integral domains, Euclidean domain, principal ideal domain (PID), unique factorization domain (UFD), irreducibility criterion, primes in Z[i] and Fermat's two-square theorem.	
9.	**Textbook(s):** 1. Dummit D S and Foote R M, Abstract Algebra, 3rd Edition, Wiley (2003). 2. Gallian J A, Contemporary Abstract Algebra, 9th Edition, Brooks/Cole (2016).	
10.	**Reference(s):** 1. Lang S, Algebra, 3rd Edition, Springer-Verlag (2005). 2. Herstein I N, Topics in Algebra, 2nd Edition, Wiley (2006). 3. Hungerford T A, Algebra, Springer (2003). 4. Artin M, Algebra, 2nd Edition, Pearson (2010).	