PROGRAME NAME: **: B.Sc(H) Mathematics**
COURSE NAME : **Group Theory - II**
SEMESTER DURATION: **July to December**

Week	**Topic(s)**	**Teaching Methodology Adopted/ Continuous Internal Evaluation**
1.	Automorphism, Inner automorphism, Automorphism groups, Automorphism groups of finite ad infinite cyclic groups.	Lectures
2.	Characteristic subgroups, Commutator subgroup and its properties; Applications of factor groups to automorphism groups.	Presentations
3.	External direct products of groups and its properties, The group of units modulo n as an external direct product, Applications to data security and electric circuits.	Discussions
4.	Internal direct products, Classification of groups of order $2p$, where p is a prime.	Lectures
5.	Statement of the Fundamental theorem of finite Abelian groups, The isomorphism classes of Abelian groups.	Lectures
6.	Group actions and permutation representations.	Group discussions
7.	Stabilizers and kernels of group actions.	Lectures
8.	Groups acting on themselves by left multiplication and consequences.	Illustrations
9.	Conjugacy in Sn	Illustrations
10.	Conjugacy classes, The class equation, p-groups.	Presentations
11.	State three Sylow theorems and give their applications.	Presentations
12.	State three Sylow theorems and give their applications contd.	Presentations
13.	Finite simple groups, Nonsimplicity tests; Generalized Cayley's theorem,	Lectures
14.	Index theorem, Embedding theorem and applications; Simplicity of A_5.	Lectures

Course Objectives: The course will develop an in-depth understanding of one of the most important branch of the abstract algebra with applications to practical real-world problems. Classification of all finite Abelian groups (up to isomorphism) can be done.

Course Learning Outcomes: The course shall enable students to learn about:

i) Automorphisms for constructing new groups from the given group.
ii) External direct product applies to data security and electric circuits. 2 2 Z Z □
iii) Group actions, Sylow theorems and their applications to check nonsimplicity