***Course instructor: Sadaf Younas***

***Program(semester): BS(3rd)***

***Subject: Mathematics-III***

***Department: Physics***

**Mid term syllabus**

• **Week I**

Algebra of matrices, determinants, matrix of a linear transformation, row and column operations, rank, inverse of a matrices, orthogonal transformation.

Exercise

• **Week II**

Solution of homogeneous and non- homogeneous equations. Related Questions.

Eigen value problem with physical significance**.** Examples

• **Week III**

Number system, natural number, integers, rational numbers, real numbers, complex numbers(Assiynment)

De-Morvie’s theorem with applications.

• **Week IV**

Hyperbolic and logarithmic functions.

Introduction to number theory including divisibility, the Euclidean algorithm,

• **Week V**

GCD and LCM of 2 integers + Examples + Assignment

• **Week VI**

Fundamental theorem of arithmetic(UFT) + Examples + Assignment

• **Week VII**

Properties of prime number.

Congruences with applications. +Examples

• **Week VIII**

Arithmetic functions.

Quadratic residues. +Examples

Revision

**Teaching book:**

•Selected topics from this book.

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•Elementary theory of numbers by Prof.S.MANZUR HUSSAIN.(BSC course book)

**Final term syllabus**

• **Week I**

Basic axioms of a group with examples, subgroups, order of a group +Examples

• **Week II**

Subgroups generated by subset of a group, system of generators+Examples

• **Week III**

Cyclic groups, cosets, cycles, lengths of cycles, Lagrange’s theorem+Examples

• **Week IV**

Introduction to permutations, even and odd permutations, transpositions, symmetric group, alternating groups+Examples

• **Week V**

Rings, fields(definitions and examples).

• **Week VI**

Vectors spaces, subspaces, linear dependence and independence. +Examples

• **Week VII**

Linear span of a subset of a vector space, bases and dimensions of a vector space. +Examples

• **Week VIII**

Revision

**Teaching material:**

Group theory notes written by **Prof.Dr.Ghulam Mustafa**  head of Mathematics department.

**Sample paper for mid term**

**Total marks:30**

Q.1. Ten MCQ’s (1 marks for each). **10**

Q.2. Five short Question (2 marks for each). **10**

Q.3. Two Long Question (5 marks for each). **10**

**Sample paper for final term**

**Total marks:50**

Q.1. Twenty MCQ’s (1 marks for each). **20**

Q.2. Seven short Question (2 marks for each). **14**

Q.3. Two Long Question (8 marks for each). **16**