THEORY OF NUMBERS

UNIT I

Introduction – Divisibility – Primes – The Binomial Theorem – Congruences – Euler's totient - Fermat's, Euler's and Wilson's Theorems – Solutions of congruences – The Chinese Remainder theorem.

UNIT II

Techniques of numerical calculations – Public key cryptography – Prime power Moduli – Primitive roots and Power Residues –Congruences of degree two.

UNIT III

Number theory from an Algebraic Viewpoint – Groups, rings and fields – Quadratic Residues- The Legendre symbol (a/r) where r is an odd prime – Quadratic Reciprocity – The Jacobi Symbol (P/q) where q is an odd positive integer

UNIT IV

Binary Quadratic Forms – Equivalence and Reduction of Binary Quadratic Forms – Sums of three squares – Positive Definite Binary Quadratic forms – Greatest integer Function – Arithmetic Functions – The Mobius Inversion Formula – Recurrence Functions – Combinatorial number theory

UNIT V

Diophantine Equations – The equation ax+by=c – Simultaneous Linear Diophantine Equations – Pythagorean Triangles – Assorted examples

TEXT BOOK(S)

[1] Ivan Niven, Herbert S, Zuckerman and Hugh L, Montgomery, An Introduction to the Theory of Numbers, Fifth edn., John Wiley & Sons Inc, 2004

UNIT I   Chapter 1 and Chapter 2 : Sections 2.1 to 2.3
UNIT II   Chapter 2 : Sections 2.4 to 2.9
UNIT III   Chapter 2 : Sections 2.10, 2.11 and Chapter 3: Sections 3.1 to 3.3
UNIT IV   Chapter 3 : Sections 3.4 to 3.7 and Chapter 4
UNIT V   Chapter 5 : Sections 5.1 to 5.4

REFERENCE(S)

[1] David M. Burton, Elementary Number Theory, W.M.C. Brown Publishers, Dubuque, Lawa, 1989.
[2] George Andrews, Theory of Numbers.
[3] Fundamentals of Number Theory, William.J. Leveque, Addison-Wesley Publishing Company, Phillipines, 1977.