

BMS COLLEGE OF ENGINEERING, BANGALORE – 560019
DEPARTMENT OF MATHEMATICS
SYLLABUS (2011 - 2012)

Course Name	Number Theory (Institutional Elective)	Course Code	11MA7IENUT
Credits	04	L – T - P	4 -0- 0
Contact hours	52 hours		

UNIT-1

Number Theory: Preliminaries: Introduction, Conjectures, Theorems and Proofs, Well-Ordering and Induction, Well-Ordering Principle, Greatest Integer Function.

Divisibility: Introduction, Divisibility, Greatest Common Divisor, Greatest Common, Least Common Multiple. **[10 hours]**

UNIT-2

Divisibility (Continued): Euclid's Algorithm, Divisor via Euclid's Algorithm **Primes:** Introduction, Primes, Prime Counting Function, Prime Number Theorem, Test of Primality by Trial Division. Sieve of Eratosthenes, Canonical factorization, Fundamental theorem of arithmetic, Determining the Canonical factorization of a natural number.

[10 hours]

UNIT-3

Congruences: Introduction, Congruences and Equivalence Relations, Linear Congruences, Linear Diophantine Equations and the Chinese Remainder Theorem, Modular Arithmetic: Fermat's Theorem, Wilson's Theorem and Fermat Numbers. Polynomial congruences, Pythagorean equations. **[11 hours]**

UNIT-4

Arithmetic Functions: Introduction, Sigma Function, Tau Function, Dirichlet Product, Dirichlet Inverse, Moebius Function, Euler's Function, Euler's Theorem, An application to Algebra.

[10 hours]

UNIT-5

Computational number theory : Introduction, Pseudoprimes, Carmichael numbers, Miller's test, Strong Pseudoprimes, Factoring: Fermat's method, Continued fraction method, Trial division, Quadratic Sieve method, Pollard p-1 method. **[11 hours]**

Text Books:

1. Beginning Number Theory by Neville Roddins-2nd Edition-Jones and Barlett Publ.-2006.
2. Elementary Number Theory by David M Burton - Tata McGraw Hill Publ.-6th Edition 2006.

Reference Books:

1. Elementary Number Theory by Gareth A.Jones and Josephine Mary Jones- –Springer-1998
2. Elementary theory of numbers by C/Y/Hslung, Allies publishers, 1992.
3. Introduction to Analytic Number Theory by Tom M Apostol, Narosa Publication, 2006.

Question Paper Pattern:

1. Each unit consists of one full question.
2. Each full question consists of two, three or four subdivisions.
3. Five full questions to be answered.
4. Internal choice in Unit 2 and Unit 3.