Outline Syllabus for Number Theory, spring 2014

Instructor: Mr. Naeem Saleem

Office: Hall S3-39 R#06

E-mail: naeem.saleem@umt.edu.pk

Course Code: MA-211

Course Title: Number Theory

Module Rating: 3 Cr. Hours

1. Prime Numbers
* The sieve of eratostheness
* Perfect numbers, Mersenne primes, Fermat numbers
* Theorems related to prime numbers
1. Divisibility
* Divisibility of primes
* Divisbility of primes
* The Euclidean algorithm, The equation άx + by = c
1. Congruence’s
* Divisibility tests
* Linear congruence’s, Techniques for solving άx = b(mod m)
* The Chinese remainder theorem
* Finding the day of the week
1. Numerical functions
* Sigma and tau functions, Fermat and Mersenne numbers, the Euler and Möbius functions.
1. Congruence equations
* Chinese Remainder Theorem, linear congruence’s, theorems of
* Euler, Fermat and Wilson, RSA cryptographic encoding, polynomial
* congruences, quadratic residues and reciprocity.
* Advance Topics$ \left\{\begin{array}{c}The real and complex numbers\\Rational and irrational numbers, primitive roots.\\Diophantine equations\\Pythagorean triples, sums of squares\end{array}\right.$

Recommended Books

**1.** Adler, Andrew, Cory, John E. The Theory of Numbers, Jones and Barttlet Publishers, Boston, 1995. (Text Book)

**2.** Kenneth, H. Rosen, Elementary Number Theory and Its Applications Pearson Addison Wesley Publishers, Boston, 2005

**3.** Tom M, Apostol, Introduction to Analytic Number, Springer, New York, 1980.

**4.** Burton, D.M. Elementary Number Theory McGraw Hill, 2000.

1. Elementary Number Theory by Vanden Eynden **(Text Book)**

**Office Hours during semester 2014**

**Tuesday 12:00-1:20, 2:40-5:00.**

**Thursday 12:00-1:20, 2:40-5:00.**

**Friday 10:00-12:00.**