

<b>Course Code</b>	MTH502
<b>Course Name</b>	Number Theory
<b>Credits</b>	4
<b>Course Offered to</b>	UG
<b>Course Description</b>	This course is an elementary introduction to number theory with no algebraic prerequisites. Topics covered include primes, congruences, quadratic reciprocity, diophantine equations, Arithmetic functions, Lagrange's four-squares theorem and partitions.

Pre-requisites		
Pre-requisite (Mandatory)	Pre-requisite (Desirable)	Pre-requisite(other)
Nil	Nil	

\*Please insert more rows if required

Post Conditions*(For suggestions on verbs please refer the second sheet)							
CO1	CO2	CO3	CO4	CO5	CO6	CO7	CO8
To be able to write down formal Mathematical proofs	To be able to explain elementary results on distributions of prime numbers	To be able to apply number-theoretic techniques to simplify computations.	To be able to describe properties of some special number-theoretic functions and their growth rates	To be able to explain properties of numbers of some special forms	To be able to describe complete solutions of some special Diophantine equations and to be able to explain insolvability of some special non-linear Diophantine equations	To be able to explain the proof of Lagrange's four squares theorem	To be able to explain basic theory of partitions

Weekly Lecture Plan			
Week Number	Lecture Topic	COs Met	Assignment/Labs/Tutorial

1	Divisibility: basic definition, properties, prime numbers, some results on distribution of primes.	CO1 and CO2	Tutorial 1
2	Congruences, Complete and reduced residue systems, theorems of Fermat, Euler & Wilson, application to RSA cryptosystem. Linear congruences and Chinese Remainder Theorem.	CO1 and CO3	Tutorial 2
3	Primitive roots and indices	CO1 and CO3	Tutorial 3
4	Quadratic congruences, and Quadratic Reciprocity law	CO1 and CO3	Tutorial 4
5	Arithmetical functions: examples, with some properties and their rate of growth.	CO1 and CO4	Tutorial 5
6	Numbers of special form: Perfect numbers; Mersenne Primes and Amicable numbers; Fermat's numbers; Fibonacci numbers.	CO1, CO3 and CO5	Tutorial 6

6	Diophantine equations: linear and quadratic, some general equations.	CO1 and CO6	Tutorial 7
7	Representation of integers as sums of squares.	CO1 and CO7	Tutorial 8
8	Partition: basic properties	CO1 and CO8	Tutorial 9

\*Please insert more rows if required

Weekly Lab Plan			
Week Number	Laboratory Exercise	COs Met	Platform (Hardware/Software)

\*Please insert more rows if required

Assessment Plan	
Type of Evaluation	Grade
Midsem	30
Quizzes	30
Major	40

\*Please insert more row for other type of Evaluation

Resource Material	
Type	Title
Textbook	1. David M. Burton, Elementary Number Theory, Tata McGraw Hill.
	2. Niven, Zuckerman and Montgomery, An introduction to the theory of
	3. Hardy and Wright, An introduction to the theory of numbers, Oxford
	4. Tom M. Apostol, Introduction to Analytic Number Theory, Springer.
	5. Alan Baker, A Concise Introduction to the Theory of Numbers, Cambridge University Press.