

Subject Code: 1SC2040401

Subject Title: NUMBER THEORY

Course Objective:

- This is an introductory course in Number Theory which provide a working knowledge of the basic definitions, theorems and algorithm of the fundamental theorem of arithmetic, the Chinese remainder theorem, Legendre Symbol and its properties, the Fermat's Last theorem described detail in the syllabus.

Teaching scheme (hours) per week		credit		Theory Marks		Practical Marks		Total
Theory	Tutorial	Theory	Tutorial	University Assessment	Cont. Assessment	University Assessment	Cont. Assessment	
4	1	4	1	60	40	-	-	100

Subject Contents			
Unit. No	Topic	Total Hours	Weight (%)
1	Divisibility, G.C.D., Primes, the fundamental theorem of arithmetic, the Euclidean algorithm, The greatest integer function, the Mobius function μ , the Euler function ϕ , the divisor functions σ_k for $k \geq 0$ integer, properties of these functions, multiplicative functions, Mobius inversion formula.	18	25
2	Congruence, complete residue systems, Linear Congruence, reduced residue systems, Euler–Fermat theorem, the Chinese remainder theorem, The exponents of a number mod m , primitive roots.	18	25
3	Quadratic residues, Legendre Symbol and its properties, Gauss' Lemma, the quadratic reciprocity law, the Jacobi Symbol.	18	25
4	Diophantine Equations $ax + by = c$ and its positive solutions, the equation $X^2 + Y^2 = Z^2$, the equation $X^4 + Y^4 = Z^2$ and the equation $X^4 + Y^4 = Z^4$, sum of squares, the Fermat's Last theorem.	18	25

Course Outcome:

On successful completion of the course,

- Students shall be able to solve real life problem using various results of Number theory.

Note: The course is roughly covered by the book, entitled “Elementary Number Theory”, 2nd edition, by David M. Burton (Wm. C. Brown Publishers, 1989).

List of References:

- Niven and H. Zukerman “An introduction to the theory of Numbers” 3rd edition, Wiley Eastern University Edition, New Delhi, 1985.
- T. M. Apostol, “Introduction to Analytic Number Theorem”, Springer studt edition, 1995.
- Baker Alan, “A concise Introduction to the theory of Numbers”, Cambridge, University, press, 1984.
- Rose H. E., “A course in number theory”, Oxford University Press, 1988.
- Shapiro, Harold, “Introduction to the theory of Numbers”, John Wiley and Sons, 1983.
- Hardy, G. H. and E. M. Wright “An Introduction to the theory of Numbers”, 5th edition, Oxford University Press, 1975.
- T. Nagell “Introduction to Number Theory”, 2nd edition, chelsea, 1984.