(Master of Science) (Mathematics)
(M.Sc.) (Mathematics) Semester (II)

Course Code	PS02EMTH53	Title of the Course	Number Theory
Total Credits of the Course	04	Hours per Week	04
This course is same as PS01EMTH53 and can be offered to the students who have not taken the course PS01EMTH53.			

Course Objectives:	1. To obtain basic understanding of the theory of numbers. 2. To enhance logical thinking, reasoning, and problem solving through study of concepts like divisibility in integers, prime numbers, and congruences.

Course Content		
Unit	Description	Weightage* (%)
1.	The division algorithm, the greatest common divisor, the Euclidean algorithm, the fundamental theorem of arithmetic, infinitude of prime numbers (Euclid's proof).	25
2.	Basic properties of congruence, linear congruences and the Chinese remainder theorem, Fermat's little theorem, Wilson's theorem.	25
3.	The sum and number of divisors, the Möbius inversion formula, the greatest integer function, Euler's phi-function, Euler's theorem, some properties of the phi-function.	25
4.	Euler's criterion, Legendre's symbol: definition and its properties, evaluation of (-1|p) and (2|p), Gauss lemma, quadratic reciprocity.	25

Teaching-Learning Methodology	Classroom teaching, problem solving, independent reading

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%

3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	understand basics of modular arithmetic and number theoretic functions.
2.	write algorithms and programs based on logic and number theoretic problems.
3.	solve problems applying results like Fermat's theorem, Euler's theorem, Chinese-remainder theorem, etc.
4.	prepared for an advanced course in number theory and cryptography.

Suggested References:	
Sr. No.	References
1.	Burton David M., Elementary Number Theory, (Seventh Edition) McGraw Hill Education. 1980
2.	Hardy G. H. and Wright E. M., An Introduction to Theory of Numbers, (Sixth Edition) Oxford University Press. 2008
3.	Nivan Ivan, Zuckermann H. S. and Montgomery H. L., An Introduction to the Theory of Numbers, (Fifth Edition) John Wiley & Sons Inc. 1991
4.	Apostol Tom M., Introduction to Analytic Number Theory, Springer. 1976

On-line resources to be used if available as reference material
On-line Resources

*****