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| 1. | Title of the course | Number Theory |
| 2. | Course number | MA611L |
| 3. | Structure of credits | 3-0-0-3 |
| 4. | Offered to | PG |
| 5. | New course/modification to | Modification To MA6023/7 |
| 6. | To be offered by | Department of Mathematics and Statistics |
| 7. | To take effect from | July 2022 |
| 8. | Prerequisite | CoT |
| 9. | **Course Objective(s):** To introduce the notions of primes, divisibility and congruence relation. Using these notions to study some major results such as Chinese remainder theorem, Quadratic reciprocity law, Prime number theorem. Also to introduce some of the active areas of analytic and algebraic number theory, such as Elliptic curves and zeros of L-functions. | |
| 10. | **Course Content:** Partitions, Inclusion–exclusion principle, Pigeonhole principle, Recurrence relations, Generating functions, Primes, Divisibility and the Fundamental theorem of arithmetic, Euclidean algorithm, Congruences, Ring of integers mod n,Chinese Remainder Theorem, Fermat's Last Theorem, Hensel's lemma, Finite Fields, Arithmetic functions, Mobius inversion formula, Quadratic residues, Quadratic reciprocity law, Binary quadratic forms, Sum of two squares theorem, Continued fractions, Pell's equation, Diophantine equations, Prime Number Theorem, Bertrand's postulate, Introduction to Riemann Zeta function, Dirichlet's L-functions and Elliptic Curves. | |
| 11. | **Textbook(s):**<br>1. Ireland K, and Rosen M, *A Classical Introduction to Modern Number Theory*, Springer (2010).<br>2. Niven I, Zuckerman H S and Montgomery H L, *An Introduction to the Theory of Numbers,* Wiley (1991). | |
| 12. | **Reference(s)**<br>1. Silverman J H, A Friendly Introduction to Number Theory, Pearson, (2012).<br>2. Apostol T M, Introduction to Analytic Number Theory, Narosa, (1998).<br>3. Koshy T, Discrete Mathematics with Applications, Elsevier, (2004).<br>4. Stillwell J, Mathematics and Its History, Springer-Verlag New York, (2010).<br>5. Mott J L, Kandel A and Baker T P, Discrete Mathematics for Computer Scientists and Mathematicians, PHI Learning, (2003). | |