**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:- 1st Sem**

**Name : - Dr. Pushpander Kadian Designation: Professor**

**Subject/Paper: - Analytical Number Theory**

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| Time Period | Syllabus to be covered |
| August, 2024 | Distribution of primes, Fermat and Mersenne numbers, Farey series and some results concerning Farey series, Approximation of irrational numbers by rationals, Hurwitz theorem, Irrationality of e and π. |
| September, 2024 | The arithmetic in Zn, The group Un, Primitive roots and their existence, the group Up\*n (p odd) and U2\*n, The group of quadratic residues Qn , Quadratic residues for prime power moduli and arbitrary moduli, The algebraic structure of Un and Qn . |
| October, 2024 | Riemann Zeta Function ζ(s) and its convergence, Application to prime numbers, Diophantine equations ax + by = c, x2+y2 = z2ζ(2) and ζEuler product, Evaluation of and x4+y4 = z4 , The representation of number by two or four squares, Waring problem, Four square theorem, The numbers g(k) & G(k), Lower bounds for g(k) & G(k). |
| November, 2024 | Arithmetic functions k(n), U(n), N(n), I(n), σ(n), τ(n), φ(n), Definitions and examples of σ(n) ,τ(n), φ (n) and simple properties, Perfect numbers, Mobius inversion formula, The Mobius function. The order and average order of the function |

Dr. Pushpander Kadian,

Professor

**LESSON PLAN**

**CLASS: - B.Sc. (Major in Mathematics) SEMESTER:- 1st Sem**

**Name : - Dr. Pushpander Kadian Designation: Professor**

**Subject/Paper: - Vector Calculus**

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| Time Period | Syllabus to be covered |
| August, 2024 | Scalar and vector product of three vectors, product of four vectors. Reciprocal vectors. Vector differentiation. Scalar Valued point functions, vector valued point functions, derivative along a curve, directional derivatives, Gradient of a scalar point function, geometrical interpretation of gradient as a point function. |
| September, 2024 | Divergence and curl of vector point function, characters of Div f and Curl f as point function, examples. Gradient, divergence and curl of sums and product and their related vector identities. Laplacian operator. Orthogonal curvilinear coordinates Conditions for orthogonality fundamental triad of mutually orthogonal unit vectors. Double integral, triple integral, Double and triple integral in terms of orthogonal curvilinear coordinates, Cylindrical co-ordinates and Spherical co- ordinates. |
| October, 2024 | Line integral, independent of path, Greens theorem and problems based on Greens theorem. |
| November, 2024 | Surface integral, Stokes theorem and problems based on Stokes theorem. Gauss theorem and problems based on Gauss theorem. |

Dr. Pushpander Kadian,

Professor.

**LESSON PLAN**

**CLASS: - M.Sc. (Maths) SEMESTER:-3rd Sem**

**Name : - Dr. Pushpander Kadian Designation: Professor**

**Subject/Paper: - Analytical Number Theory**

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| Time Period | Syllabus to be covered |
| August, 2024 | Distribution of primes, Fermat and Mersenne numbers, Farey series and some results concerning Farey series, Approximation of irrational numbers by rationals, Hurwitz theorem, Irrationality of e and π. |
| September, 2024 | The arithmetic in Zn, The group Un, Primitive roots and their existence, the group Up\*n (p odd) and U2\*n, The group of quadratic residues Qn , Quadratic residues for prime power moduli and arbitrary moduli, The algebraic structure of Un and Qn . |
| October, 2024 | Riemann Zeta Function ζ(s) and its convergence, Application to prime numbers, Diophantine equations ax + by = c, x2+y2 = z2ζ(2) and ζEuler product, Evaluation of and x4+y4 = z4 , The representation of number by two or four squares, Waring problem, Four square theorem, The numbers g(k) & G(k), Lower bounds for g(k) & G(k). |
| November, 2024 | Arithmetic functions k(n), U(n), N(n), I(n), σ(n), τ(n), φ(n), Definitions and examples of σ(n) ,τ(n), φ (n) and simple properties, Perfect numbers, Mobius inversion formula, The Mobius function. The order and average order of the function |

Dr. Pushpander Kadian,

Professor