COURSE OUTCOMES (CO) for PG Mathematics

Course Name: LINEAR ALGEBRA **Semester:1**	
CO1	Understanding linear maps and the equivalent conditions for a set of vectors to give an upper triangular operator
CO2	Study Operators on Complex and real vector spaces
CO3	Thoroughly know Cayley-Hamilton Theorem for operators on real spaces
Course Name: REAL ANALYSIS-I **Semester:1**	
CO1	Functions of Bounded Variation and Rectifiable Curves.
CO2	Riemann's condition, Comparison Theorems, Integrators of bounded variation, Sufficient conditions for the existence of Riemann-Stieltjes integrals, Differentiation under the integral sign.
CO3	The Cauchy condition for uniform convergence, Sufficient conditions for uniform convergence of a series.
CO4	Taylor's Theorem and Chain rule, Functions of three variables, Extensions and analogues, Tangent planes and normal lines to surfaces
Course Name: Differential Equations **Semester:1**	
CO1	Solving Second Order Linear Equations, Series solutions of first order differential equations
CO2	Special functions- Legendre polynomials, Bessel functions, The gamma function
CO3	First and second order partial differential equations
Course Name: TOPOLOGY-I **Semester:1**	
CO1	Continuous Functions, Equivalence of metric spaces, Complete metric spaces – Cantor's Intersection Theorem.
CO2	Definition, Examples and properties of topological spaces
CO3	Theorems on connectedness, Connected subsets of real line, Applications of Connectedness
Course Name: ABSTRACT ALGEBRA **Semester:2**	
CO1	To train the student in the domain of Abstract Algebra.
CO2	To give sufficient knowledge of the subject, which can be used by student

	for further applications in their respective domains of interest.
CO3	Nilpotent and Solvable groups, Galois Theory, splitting Fields, Normal extension, Fundamental theorem of Galois theory.
Course Name: REAL ANALYSIS-II **Semester:2**	
CO1	The General Integral, Integration of Series, Riemann and Lebesgue Integrals, The Four Derivatives, Lebesgue's Differentiation Theorem
CO2	Abstract Measure Spaces, Jensen's Inequality, The Inequalities of Holder and Minkowski, Completeness of $L^p(\mu)$
CO3	Signed Measures and the Hahn Decomposition, The Jordan Decomposition, The Radon-Nikodym Theorem and its Applications.
Course Name: TOPOLOGY-II **Semester:2**	
CO1	T_0, T_1 and T_2 – spaces, Regular spaces, Normal spaces, Separation by continuous functions.
CO2	The fundamental group and its examples
CO3	Understand the Brouwer Fixed Point Theorem
Course Name: SCIENTIFIC PROGRAMMING WITH PYTHON **Semester:2**	
CO1	Learn a powerful way to present numerical data – by drawing graphs with Python
CO2	Learn Algebra and Symbolic Math. with SymPy and Solving Calculus Problems
CO3	Attain expertise in Numerical Integration – Newton-Cotes Formulas - Trapezoidal Rule, Simpson's Rule and Simpson's 3/8 Rule
Course Name: COMPLEX ANALYSIS- I **Semester:3**	
CO1	Elementary properties and examples of analytic functions and their Power Series representation
CO2	Homotopic version of Cauchy's theorem and the open mapping theorem
CO3	The extended plane and its spherical representation, Mobius transformations, The Maximum Principle, Schwarz's Lemma
Course Name: FUNCTIONAL ANALYSIS – I **Semester:3**	
CO1	Hahn-Banach Theorem and Uniform Bounded Principle
CO2	Bounded Inverse Theorem, Spectrum of a Bounded Operator
CO3	Weak Convergence, Reflexivity, Compact Linear Maps

Course Name: OPERATIONS RESEARCH (Elective-1) Semester:3	
CO1	Transportation problems and Networks
CO2	Kuhn – Tucker Theory and Non-linear Programming
CO3	Backward and forward recursion methods in dynamic programming
Course Name: GRAPH THEORY (Elective-2) Semester:3	
CO1	Definition of isomorphism, Isomorphism as a relation, Graphs and groups, Cut-vertices, Blocks, Connectivity
CO2	Eulerian graphs, Hamilton graphs, Hamilton walks and numbers
CO3	The Four colour problem, Vertex colouring, The Ramsey number of graphs, Turan's Theorem
Course Name: COMPLEX ANALYSIS -II Semester:4	
CO1	Demonstration of Compactness and convergence in the space of analytic functions
CO2	A clear idea of Riemann Zeta function, Runge's Theorem, Simple Connectedness, Mittag Leffler's Theorem
CO3	Jensen's formula, The genus and order of an entire function, Hadamard factorization Theorem.
Course Name: FUNCTIONAL ANALYSIS– II Semester:4	
CO1	Spectrum of a compact operator, Inner Product Spaces, Orthonormal Sets
CO2	Approximation and Optimization, Projection and Riesz Representation Theorems
CO3	Spectrum and Numerical Range - Compact Self-Adjoint Operators
Course Name: CODING THEORY (Elective-3) Semester:4	
CO1	Detecting and correcting error patterns, Information rate, The effects of error detection and correction, Finding the most likely code word transmitted
CO2	Perfect codes, Hamming code, Extended codes, Golay code and extended Golay code, Red Hulles Codes.
CO3	BCH Codes, Cyclic Hamming Code, Decoding 2 error correcting BCH codes.
Course Name: ANALYTIC NUMBER THEORY (Elective-4) Semester:4	

CO1	The Fundamental Theorem of Arithmetic, Arithmetical function and Dirichlet multiplication
CO2	Congruences, Chinese Remainder Theorem, Quadratic residues, Reciprocity law and Jacobi symbol
CO3	Primitive roots, Existence and number of primitive roots, Prime Number Theorem