

DEPARTMENT OF MATHEMATICS (UG)

COURSE OUTCOMES

SEMESTER - I

DIFFERENTIAL EQUATIONS

CO#	Course Outcome
CO1	Analyze real world scenarios to recognize when ordinary differential equations(ODEs) or system of ODEs are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multi approaches, judge if the results are reasonable and then interpret and clearly communicate the results. (K4)
CO2	Construct ODEs and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation. (K3)
CO3	Apply ODEs and systems of ODEs in various situations and use correct mathematical terminology, notation and symbolic process in order to engage in work, study and conversation on topics involving ODEs and system of ODEs with colleagues in the field of Mathematics, Science or Engineering. (K3)

SEMESTER - II

SOLID GEOMETRY

CO#	Course Outcome
CO1	Determine geometrical terminology for angles, triangles, quadrilaterals and circles. (K3)
CO2	Calculate angles using a protractor. (K3)
CO3	Apply geometrical results to determine unknown angles. (K4)
CO4	Calculate line and rotational symmetries. (K3)
CO5	Calculate the areas of triangles quadrilaterals and circles and shapes based on these. (K3)

SEMESTER - III

ABSTRACT ALGEBRA

CO#	Course Outcome
C01	Assess properties implied by the definitions of groups and rings. (K5)
C02	Classify various canonical types of groups(including cyclic groups and groups of permutations). (K4)
C03	Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups. (K4)
C04	Analyze and demonstrate examples of ideals and quotient rings. (K4)
C05	Apply the concepts of isomorphism and homomorphism for groups and rings. (K3)
C06	Compare rigorous proofs of propositions arising in the context of abstract algebra. (K3)

SEMESTER -IV

REAL ANALYSIS

CO#	Course Outcome
C01	Describe the real line as a complete, ordered field. (K2)
C02	Determine the basic topological properties of subsets of the real numbers. (K3)
C03	Apply the definitions of convergence to sequences, series and functions. (K3)
C04	Determine the continuity, differentiability and integrability of functions defined on subsets of the real line. (K3)
C05	Apply the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis. (K3)
C06	Produce rigorous proofs of results that arise in the context of real analysis. (K3)

SEMESTER - V

RING THEORY & VECTOR CALCULUS

CO#	Course Outcome
C01	Assess properties implied by the definitions of rings. (K5)
C02	Analyze and demonstrate examples of ideals and quotient rings. (K4)
C03	Discuss the various integral domain in ring. (K2)
C04	Compute the concepts of isomorphism and homomorphism for rings. (K3)
C05	Compute rigorous proofs of propositions arising in the context of rings. (K3)
C06	Discuss the Scalar and vector valued functions of 2 and 3 variables and surfaces, and in turn the geometry of surfaces. (K2)
C07	Calculate gradient vector fields and constructing potentials. (K3)
C08	Calculate integral curves of vector fields and solving differential equations to find such curves. (K3)
C09	The differential ideas of divergence, curl, and the Laplacian along with their physical interpretations, using differential forms or tensors to represent derivative operations. (K3)
C010	Apply the integral ideas of the functions defined including line, surface and volume integrals – both derivation and calculation in rectangular, cylindrical and spherical coordinate systems. (K3)

SEMESTER - V

LINEAR ALGEBRA

CO#	Course Outcome
C01	Solve systems of linear equations. (K3)
C02	Analyze vectors in \mathbb{R}^n geometrically and algebraically. (K4)
C03	Apply the concepts of the terms span, linear independence, basis and dimension to various vector spaces and subspaces. (K4)
C04	Apply matrix algebra and the related matrices to linear transformations. (K3)
C05	Compute and use determinants. (K3)
C06	Compute the use eigen vectors and eigen values. (K3)
C07	Determine and use orthogonality. (K3)

SEMESTER -VI

NUMERICAL ANALYSIS (ELECTIVE)

CO#	Course Outcome
C01	Apply numerical methods for approximating the solution of problems of continuous mathematics. (K3)
C02	Analyze the error incumbent in any such numerical approximation. (K4)
C03	Apply a variety of numerical algorithms using appropriate technology. (K3)
C04	Compare the viability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation and approximation, numerical differentiation and integration, solution of linear systems. (K4)

SEMESTER -VI

ADVANCED NUMERICAL ANALYSIS - 8A (CLUSTER ELECTIVE)

CO#	Course Outcome
C01	Apply basic numerical methods and the theory behind them, related to numerical differentiation, numerical integration and solving. (K3)
C02	Apply Least Squares Method to curve fit data using several types of curves (straight line, second degree parabola, power curve, exponential curve). (K3)
C03	Solve the selected class of differential equations using Taylor, Picards, Euler's, Runge Kutta, Adams and Milne's. (K3)

SEMESTER -VI

SPECIAL FUNCTIONS - 8B (CLUSTER ELECTIVE)

CO#	Course Outcome
CO1	Apply integral calculus and special functions of various problem and to know the application of some basic mathematical methods via all these special functions. (K3)
CO2	Classify and explain the functions of different types of differential equations. (K2)
CO3	Interpret purpose and functions of the gamma and beta functions. (K2)
CO4	Apply the gamma function, beta function and special functions to evaluate different types of integral calculus problems. (K3)

SEMESTER -VI

PROJECT WORK

CO#	Course Outcome
CO	Design and develop projects in Mathematics to inspire the students to study the fascinating areas of mathematics with the deep understanding. Further it provides knowledge to the students in analyzing mathematical solutions to certain problems. (K6)