Department of Mathematics
Course outcome
Programme: Post-graduate

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## Course outcome: Semester- I

### Course Core(CC- 01): Abstract Algebra

CO1. Understand and apply significant amount of Abstract Algebra in cryptography

CO2. Learn the use of fundamentals of Group theory and it's applications to Robotics, Computer Vision and Graphics, making codes, 3D modeling and Animation, block designs and many more.

### Course Core(CC- 02):

CO1. Understand basics of Real Analysis and its Applications

CO2.Apply in daily wages in the economics, Wireless communication, Behavior Analysis, Software development, Stock market modelling, Fraud detection, Weather forecasting, Record keeping etc.

### Course Core(CC- 03): Linear Algebra

CO1. Learn application of Linear algebra for optimisation in the field of linear programming.

CO2 Apply to create ranking algorithms in search engines such as Google and analyse the digital signal, encoding and decoding .

CO3. Learn and apply to correct or recover the codes that have been tampered with while transmitting or processing, check the energy levels of atoms, check the distribution of microwave energy in microwave oven, for space study etc

## Course Core(CC- 04): Discrete Mathematics

CO1.Understand its use in traffic signals, colouring of map in GSM mobile phone network etc

CO2. It Understand and apply in analyzing data and problem solving, computer programing, writing algorithms, generating password etc.

## Course outcome: Semester- II

## Course Core(CC- 05): General Advanced Mathematics

CO1 Apply fuzzy technology in artificial intelligence, computer science, control engineering, decision theory, expert systems, logic, management science, operations research, robotics, and others.

Theoretical

CO2.Learn its use in facial pattern recognition, air conditioners, washing machines, vacuum cleaners, antiskid braking systems, transmission systems, control of subway systems and unmanned helicopters, knowledge-based systems for multiobjective optimization of power systems, weather forecasting systems, models for new product pricing or project risk assessment, medical diagnosis and treatment plans, and stock trading.

CO3. Apply Graph theory to find shortest path in road or a network.

CO4. Understand and learn the use of Graph theory to evaluate shortest path between two places in Google Map.

CO5.Learn the use of Graph transformation systems in rule-based in-memory manipulation of graphs. Graph databases ensure transaction-safe, persistent storing and querying of graph structured data

## Course Core(CC- 06): Complex Analysis

CO1. Understand, Analyse and Apply Complex analysis to real world problems which includes propagation of acoustic waves relevant for the design of jet

engines, development of boundary-integral techniques useful for solution of many problems arising in solid and fluid mechanics as well as conformal geometry in imaging, shape analysis and computer vision.

CO2 Understand the use of Complex analysis to solve the CPT Theory (Charge, Parity and Time Reversal), as well as in conformal field theory and in the Wick's Theorem.

CO3. Grasp the concepts of Complex variables as fundamental part of QM(Quantum Mechanics) as they appear in the Wave Equation

## Course Core(CC- 07): Differential and Integral Equation

CO1. Analyse and Solve Differential and Integral equations and apply these to modelling of real-life processes and phenomena.

CO2. Understand the various phenomena in physics, chemical technology, optimal control, finance, signal processing, etc.

## Course Core(CC- 08): Measure Theory

CO1. Grasp underlying concept of Lebesgue's measure theory to develop a fundamental tool for carrying out integration which behaves well with taking limits, and admitting a vast class of functions for which Riemann's integration theory is not applicable.

CO2. Learn to apply measure theory to the real world problems in physics, economics, finance etc.

CO3. Learn and understand its use in other branches of pure and applied mathematics, such as in the theory of (partial) differential equations, functional analysis and fractal geometry.

CO4. Understand and evaluate its role in laying mathematical foundation to probability theory and statistics.

## Course Core(CC- 09): Topology

CO1 Investigate and evaluate the role of Topology in many branches of mathematics, such as differentiable equations, dynamical systems, knot theory, and Riemann surfaces in complex analysis.

CO2.Comprehend its use in string theory in physics, and for describing the spacetime structure of universe.

CO3 Understand how it is used in Biology, Computer science, Physics, Robotics, Fiber art, Game and Puzzle.

## Course Core(CC- 10): Number Theory

CO 1. Understand and enumerate the use of Number Theory in Mathematics, in cryptography, device authentication, websites for e-commerce, coding, security systems, physics, chemistry, electronics and others.

# Course outcome: Semester- III

## Course Core(CC- 11): Functional Analysis

CO1. Recognise the role of Functional Analysis as the key foundation of cryptography.

CO 2. Identify the use of Number theory in the study of binary codes and other related concepts,.

CO3. Conceptualize its relevance in modern general purpose integer factorization algorithms work by finding small quadratic residues modulo a composite number.

CO4.;Study the root analysis of the characteristic equation for a linear functional differential equation.

## Course Core(CC- 12): Fluid Dynamics

CO1. Understand and apply the basics of Fluid Dynamics to work with partial differential equations in theory or in computation ,optimization.

CO2. Learn its use tomeasure and monitor the Earth's size and shape, geodynamic phenomena.

CO3. Determine the exact coordinates of any point on Earth and how that point will move over time.

## Course Core(CC- 13): Classical Mechanics (Rigid Dynamics)

CO2.Study and apply Rigid Dynamics to lifting of an aircraft wing.

CO3. Learn the use of Classical Mechanics in daily life situations.

CO4. Understand its role in launching of rockets and satellite.

CO5. Learn various techniques and methods like Newtonian Mechanics,Lagrangian Mechanics and Hamiltonian Mechanics.

## Course Core(CC- 14): Optimization Techniques

CO1. Evaluate its use in Weather Forecasting, bio engineering etc.

CO2. Learn the use of Optimization techniques in real life situations such as minimization of production cost and maximization of gains .

CO3. Understand its use in GPS, Airlines and other Transport systems and supply chains.

## Course Core(CC- 15): Differential Geometry

CO1. Analyse Geologic structures.

CO2. Analyse shapes in Computer Vision .

CO3. Process and analyse shapes on non- flat surfaces in Image Processing.

## Course outcome: Semester- IV

### 1. Elective Course(EC-01): Mathematical Methods

CO1. Apply partial equations to formulate the solution of, physical and other problems.

CO2. Conceptualize the methods involving functions of several variables, such as the propagation of heat or sound, fluid flow, elasticity, electrostatics, electrodynamics, etc.

CO3. Apply relevant equations to investigate bearing capacity resistance of pile foundation.

CO3. Learn the use of tensor fields to present physical laws in a clear, compact form. for the representation of vector differential operators such as gradient, divergence, and Laplacian in curvilinear coordinate systems.

### 2. Elective Course(EC-02): Advanced Topology

CO 1. Evaluate the concepts of Topology in many branches of mathematics, such as differentiable equations, dynamical systems, knot theory, and Riemann surfaces in complex analysis.

CO2. Apply Topology in various fields of Science and Technology, like applications to Biology, Robotics, GIS, Engineering, Computer Sciences.