

B.Sc. Mathematics

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO1: Demonstrate ability to adapt to a rapidly changing environment by having learned and applied new skills and new competencies.

PEO2: Solve the complex problems in the field of Mathematics with an understanding of the Societal, legal and cultural impacts of the solution.

PEO3: Progressively adopt and learn continuously through ICT module.

PEO4: Form a part of member in a team with right attitudes

PROGRAMME OUTCOMES (PO)

PO1: Provide platforms to learn Physics, Chemistry and Mathematics theories, concepts and practical skills with appropriate knowledge.

PO2: Assimilate the knowledge on understanding the nature and ability to link the facts to observe and discover scientific laws.

PO3: Create new skills and tools to obtain possible solutions in comprehension of the physical science problems incorporating mathematical modeling and theories.

PO4: Enhancement of critical thinking, problem solving skills, digitally efficient and making effective working professionals to suit for science, technical and research field.

PO5: Making best suitable personalities to serve for nation and society with ethical awareness and reasoning ability.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1: Graduates will be exposed to a wide range of modern mathematical ideas from pure and applied mathematics.

PSO2: Students will understand the mathematical and technical knowledge that provides a solid foundation for extended learning.

PSO3: Students will obtain mathematical and quantitative skills to solve the real life problems.

PSO4: Understanding the concepts of core and allied areas of mathematics that provides a strong foundation for the systematic development of learning process.

PSO5: Students will identify, formulate and analyze mathematical problems in reaching sustained conclusions.

Course Title : Core1: Classical Algebra**Course Code : 20UMA1C01****Course Outcomes (CO)**

| | | |
|-----|--|----|
| CO1 | Finding the roots of polynomial functions. | K1 |
| CO2 | Classifying convergence and divergence of series. | K2 |
| CO3 | Applying the Binomial theorem, Exponential theorem, logarithmic theorem to find the summation of series. | K3 |
| CO4 | Analyzing the nature of the roots of the equations. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | S | S | S | | S | S | S | S | S |
| CO2 | S | S | S | S | S | | S | S | S | S | S |
| CO3 | S | S | S | M | M | | S | M | S | M | M |
| CO4 | S | S | S | M | L | | M | S | M | S | L |

S – Strong; M – Medium; L - Low

Course Title : Core2: Calculus**Course Code : 20UMA1C02****Course Outcomes (CO)**

| | | |
|-----|--|---------|
| CO1 | Remembering the formulas in differentiation and integration. | K1 |
| CO2 | Interpret the definite integral geometrically as the area under a curve. | K2 & K3 |
| CO3 | Apply the concept of definite integral to solve various kinds of problems. | K3 |
| CO4 | Analyze the values of the derivative at a point algebraically. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | L | | M | S | M | S | M |
| CO2 | S | S | S | S | M | | S | S | S | S | M |
| CO3 | S | S | S | S | M | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L – Low

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

| | | |
|-----|--|--------|
| CO1 | acquire knowledge on gravitation, thermodynamics, relativity, optics and electricity and magnetism | K1 |
| CO2 | understand various laws of thermodynamics, working of thermal devices, liquefaction of gases and superconductivity | K2 |
| CO3 | know the importance of special and general theory of relativity | K1,K2 |
| CO4 | calculate the wavelength of light, specific rotation and angular width | K3, K4 |
| CO5 | handle the sensitive galvanometers and magnetometers | K3 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;

| | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | PO1 | PO2 | PO3 | PO4 | PO5 |
|-----|------|------|------|------|------|--|-----|-----|-----|-----|-----|
| CO1 | S | S | M | S | M | | S | S | M | M | M |
| CO2 | M | S | S | M | M | | M | S | M | M | M |
| CO3 | S | S | M | S | L | | S | S | S | S | M |
| CO4 | M | M | S | S | M | | S | M | S | S | S |
| CO5 | M | M | M | S | M | | M | S | S | M | S |

S - Strong; M - Medium; L - Low

Course Title : Core 3: Differential Equations and Laplace Transforms

Course Code : 20UMA2C03

Course Outcomes (CO)

| | | |
|-----|---|---------|
| CO1 | Recalling the concept of first order linear differential equations. | K1 |
| CO2 | Understanding the concept of first order higher degree ordinary differential equations | K2 |
| CO3 | Solving Linear partial differential equations by using the Lagrange's method. | K3 & K4 |
| CO4 | Analyzing the concepts of Laplace transforms and inverse Laplace transforms to solve ODE with constant and variable coefficients. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | M | L | M | M | L | | M | S | M | S | M |
| CO2 | S | M | M | S | S | | S | M | S | S | M |
| CO3 | S | S | S | M | M | | M | S | M | M | S |
| CO4 | M | M | S | S | S | | S | M | S | L | S |

S – Strong; M – Medium; L - Low

Course Title : Core 4 : Trigonometry, Vector Calculus and Fourier Series

Course Code :

20UMA2C04

Course Outcomes (CO)

| | | |
|-----|---|----|
| CO1 | Understanding the hyperbolic and inverse hyperbolic functions. | K1 |
| CO2 | Illustrating the Fourier co-efficient for periodic functions. | K2 |
| CO3 | Applying the differential operator to find gradient, divergence and curl. | K3 |
| CO4 | Examining the multiple integrals by applying Gauss divergence theorem, Stoke's theorem and Green's theorem. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | S | | M | S | M | S | S |
| CO2 | S | M | S | S | M | | S | M | S | S | M |
| CO3 | S | S | L | S | M | | S | S | M | S | S |
| CO4 | M | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L – Low

COURSE OUTCOMES (CO)

By the end of the course, the students will be able to

| | | |
|-----|---|--------|
| CO1 | acquaint with different atomic models | K1 |
| CO2 | elucidate various theories, models, energy, expression associated with nucleus and nuclear forces | K2 |
| CO3 | explain the principle of quantum physics and behavior of matter waves | K2,K3 |
| CO4 | comprehend the working of various modes of transistors and simple circuits | K1, k2 |
| CO5 | Work with the basic digital circuits using logic gates and design logic circuits by employing Boolean algebra and Karnaugh maps | K3, k4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;

| | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | PO1 | PO2 | PO3 | PO4 | PO5 |
|-----|------|------|------|------|------|--|-----|-----|-----|-----|-----|
| CO1 | S | M | S | S | S | | S | S | M | S | M |
| CO2 | S | M | M | S | M | | S | S | M | M | M |
| CO3 | S | M | S | S | M | | S | M | M | M | M |
| CO4 | S | S | M | S | M | | S | M | M | S | M |
| CO5 | S | S | S | S | S | | S | M | S | S | M |

S - Strong; M - Medium; L – Low

COURSE OUTCOMES (CO)

At the end of the course, the students will be able to

| | | |
|-----|--|-------|
| CO1 | calibrate the voltmeter and ammeter to know the sensitivity of the device. | K3 |
| CO2 | obtain the refractive Index of different transparent materials. | K3 |
| CO3 | verify the output characteristics of certain analog electronic devices and check some of its applications. | K3,K4 |
| CO4 | construct the circuit and verifying the truth tables of basic logic gates. | K3,K4 |
| CO5 | handle instruments independently and measure precisely. | K2,K3 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze;

MAPPING

| | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | | PO1 | PO2 | PO3 | PO4 | PO5 |
|-----|------|------|------|------|------|--|-----|-----|-----|-----|-----|
| CO1 | S | S | M | S | M | | S | M | S | S | S |
| CO2 | M | S | S | S | M | | M | M | S | S | S |
| CO3 | M | S | M | S | S | | S | M | S | S | S |
| CO4 | S | S | M | S | S | | M | S | S | S | S |
| CO5 | S | S | M | S | S | | M | S | S | S | S |

S - Strong; M - Medium; L - Low

Course Title : Core 5 : Analytical Geometry of 2D& 3D

Course Code : 20UMA3C05

Course Outcomes (CO)

| | | |
|-----|--|--------|
| CO1 | Remembering the equation of a line that passes through a given point which is parallel or perpendicular to a given line. | K1 |
| CO2 | Understanding the results based on the properties of a sphere. | K2 |
| CO3 | Identifying conic sections. | K1& K3 |
| CO4 | Analyzing the concepts of geometry. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | M | | M | S | M | S | M |
| CO2 | S | S | S | S | M | | S | S | S | S | M |
| CO3 | S | S | S | S | L | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L – Low

Course Title : Core 6: Statics

Course Code : 20UMA3C06

Course Outcomes (CO)

| | | |
|-----|--|-------|
| CO1 | Remembering the notions of friction and equilibrium of strings and deploy them in solving the problems. | K1&K3 |
| CO2 | Understanding the concepts of forces and moments. | K2 |
| CO3 | Applying the concepts of forces in finding the resultant of any number of forces. | K3 |
| CO4 | Analyzing the basics of coplanar forces and equilibrium of forces acting on a rigid body and solving the problems. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | S | S | M | | S | S | S | S | S |
| CO2 | S | S | S | S | M | | S | S | S | S | M |
| CO3 | S | S | S | S | M | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L - Low

Course Title : Allied 3: Mathematical Statistics I Course Code : 20UMA3AL3

Course Outcomes (CO)

| | | |
|-----|--|--------|
| CO1 | Remembering the concepts of probability and random variables | K1 |
| CO2 | Understanding the properties of some distributions. | K2 |
| CO3 | Finding mean, median, mode, moments and moment generating functions of Binomial, Poisson and Normal distributions. | K1&K3 |
| CO4 | Analyzing how correlation is used to identify the relationships between variables and how regression analysis is used to predict outcomes. | K3 &K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | M | M | L | | M | M | S | M | L |
| CO2 | S | S | S | M | M | | S | M | S | S | S |
| CO3 | S | S | S | S | M | | M | S | M | S | M |
| CO4 | S | S | S | M | S | | S | S | S | S | M |

S – Strong; M – Medium; L - Low

Course Title : Core 7: Dynamics

Course Code : 20UMA4C07

Course Outcomes (CO)

| | | |
|------------|--|--------|
| CO1 | Remembering the concepts of motion of a particle and projectile in different angles. | K1 |
| CO2 | Understanding the notions of impact between two smooth spheres in different ways. | K2 |
| CO3 | Applying the concept of simple harmonic motions in composition of two bodies in different directions. | K3 |
| CO4 | Distinguishing between the pedal equations of well-known curves and solving two-fold problems in central orbits. | K2 &K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | M | S | M | | S | S | S | S | M |
| CO2 | S | S | S | S | M | | S | S | S | S | M |
| CO3 | S | S | M | S | M | | S | S | M | M | S |
| CO4 | S | S | S | S | M | | S | M | S | S | M |

S – Strong; M – Medium; L - Low

Course Title : Core 8: Numerical Methods**Course Code : 20UMA4C08****Course Outcomes (CO)**

| | | |
|-----|---|-------|
| CO1 | Derive numerical methods for approximating the solution of the problems of algebraic and transcendental equations, ordinary differential equations. | K1 |
| CO2 | Implement a variety of numerical algorithms using appropriate technology | K2&K3 |
| CO3 | Get practical knowledge of polynomial interpolation, also numerical algorithms are used in C++ for solving scientific problems | K3 |
| CO4 | Solve the ordinary differential equations by using the methods like Euler's, Runge Kutta, Modified Euler and Improved Euler | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 – Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | L | M | M | | M | S | M | S | M |
| CO2 | S | S | S | S | M | | S | S | S | S | M |
| CO3 | S | S | S | M | M | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L - Low

Course Title : Allied 4: Mathematical Statistics II**Course Code : 20UMA4AL4****Course Outcomes (CO)**

| | | |
|-----|--|---------|
| CO1 | Finding the derivations of t , χ^2 and F distributions. | K1 |
| CO2 | Explaining the procedure for testing of hypothesis and sampling of attributes. | K2 |
| CO3 | Applying the concepts of various distributions in real time situations. | K2 & K3 |
| CO4 | Analyzing one - way and two – way classifications and design of experiments. | K3 & K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | L | | S | M | M | L | M |
| CO2 | S | S | S | S | M | | S | M | S | S | M |
| CO3 | S | S | S | S | M | | S | S | S | M | M |
| CO4 | S | S | S | M | S | | S | S | M | S | M |

S – Strong; M – Medium; L - Low

Course Title : Core 9 : Modern Algebra**Course Code : 20UMA5C09****Course Outcomes (CO)**

| | | |
|-----|--|----|
| CO1 | Finding whether a given abstract structure is a group or a ring. | K1 |
| CO2 | Understanding the elementary concepts of rings and fields. | K2 |
| CO3 | Applying the concepts of homomorphism and isomorphism for comparing the algebraic features of mathematical systems in groups, rings and fields | K3 |
| CO4 | Examining the results from group theory to study the properties of rings and fields. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | S | S | S | | S | S | S | S | S |
| CO2 | S | S | S | S | S | | S | S | S | S | S |
| CO3 | S | S | S | M | M | | S | S | M | S | M |
| CO4 | S | S | S | L | M | | S | S | L | S | S |

S – Strong; M – Medium; L - Low

Course Title : Core 10 : Real Analysis – I**Course Code : 20UMA5C10****Course Outcomes (CO)**

| | | |
|-----|---|---------|
| CO1 | Remembering the basic properties in the field of real numbers. | K1 |
| CO2 | Understanding the concepts of continuity, convergent sequences and metric spaces. | K2 & K3 |
| CO3 | Applying the concept of point set topology in related theorems | K3 |
| CO4 | Analyzing the compactness and to classify the continuity of a function with its limits. | K4 |

K1-Remember, K2-Understand, K3-Apply, K4-Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | M | S | M | S | M | | S | M | M | M | M |
| CO2 | S | S | S | S | S | | S | S | S | M | M |
| CO3 | S | S | M | S | S | | S | S | S | S | L |
| CO4 | S | S | S | S | S | | S | S | S | S | M |

S- Strong, M- Medium, L- Low

Course Title : Core 11: Complex Analysis**Course Code : 20UMA5C11****Course Outcomes (CO)**

| | | |
|-----|---|----|
| CO1 | Defining continuity, differentiability and analyticity of a complex valued function which helps the students to acquire deeper knowledge. | K1 |
| CO2 | Showing the condition(s) for a complex valued function to be analytic and/or harmonic. | K2 |
| CO3 | Developing the concept of sequences and series with respect to the complex number system. | K3 |
| CO4 | Analyzing complex integration, Cauchy's integral formulae and Cauchy's fundamental theorem. | K4 |

K1- Remember; K2-Understand; K3-Apply; K4-Analyse

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | M | S | M | S | M | | M | M | M | M | L |
| CO2 | S | S | S | S | S | | S | S | S | S | M |
| CO3 | S | S | S | S | S | | S | S | S | S | M |
| CO4 | S | S | S | S | S | | S | S | S | S | M |

S-Strong; M-Medium; L-Low

Course Title : Core 12 – Discrete Mathematics**Course Code : 20UMA5C12****Course Outcomes (CO)**

| | | |
|-----|---|----|
| CO1 | Acquire knowledge about the basic concepts of Discrete Mathematics and its applications | K1 |
| CO2 | Apply logically valid forms of arguments to avoid logical errors by studying mathematical logic | K2 |
| CO3 | Understand abstract algebra, posets, lattices, Boolean algebra and their applications in the field of engineering and computer science. | K3 |
| CO4 | Define the basic definitions of graph theory and a knowledge about types of graphs including isomorphic graphs, homeomorphic graphs, Eulerian graphs and Hamiltonian graphs | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | L | | M | S | M | S | M |
| CO2 | S | S | M | S | M | | S | S | S | S | M |
| CO3 | S | S | S | S | M | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L - Low

Course Title : Core 13: Operations Research – I Course Code : 20UMA5C13

Course Outcomes (CO)

| | | |
|-----|---|----|
| CO1 | Remembering the concept of linear programming problem using Simplex Method. | K1 |
| CO2 | Applying the notions of linear programming in solving transportation problems and assignment Problem. | K3 |
| CO3 | Understanding the rules for sequencing problems. | K2 |
| CO4 | Analyzing the concepts of dynamic programming. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | S | M | S | | M | S | M | S | M |
| CO2 | S | L | S | S | M | | S | S | S | M | M |
| CO3 | S | S | S | L | M | | S | S | M | S | S |
| CO4 | M | S | S | S | S | | S | L | M | S | M |

S – Strong; M – Medium; L – Low

Course Title : Elective: Web Programming Course Code : 20UMA5EL1

Course Outcomes:

On completion of this Course, the student will be able to

| CO Number | CO Statement | Knowledge level |
|-----------|---|-----------------|
| CO1 | Know the basic concepts of HTML | K1 |
| CO2 | Know the various HTML properties | K1 |
| CO3 | Understanding the form designing using HTML | K2 |
| CO4 | Know the concepts of XML applications | K1 |

K1-Remember; K2-Understand; K3-Apply; K4 - Analyze

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | L | L | L | L | L | S | S | M | M | L |
| CO2 | L | S | M | L | L | S | S | M | M | L |
| CO3 | L | S | M | S | L | S | S | M | S | L |
| CO4 | L | S | L | S | M | S | S | S | S | M |

S–Strong; M–Medium; L -Low

Course Title : Core 14 - Linear Algebra**Course Code : 20UMA6C14****Course Outcomes (CO)**

| | | |
|-----|--|----|
| CO1 | Recalling the basic concepts of matrices, rank of a matrix. | K1 |
| CO2 | Understanding the basic ideas of vector spaces and the concepts of linear span, linear independence, basis, dimension. | K2 |
| CO3 | Applying the principles of matrix algebra to linear transformations. | K3 |
| CO4 | Examining whether the given set of vectors is linearly dependent or independent. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | S | S | S | | S | S | S | S | S |
| CO2 | S | S | S | M | L | | S | S | S | M | S |
| CO3 | S | S | M | S | S | | S | S | S | S | L |
| CO4 | S | S | S | S | S | | S | M | S | S | S |

S – Strong; M – Medium; L - Low

Course Title : Core 15 - Real Analysis II**Course Code : 20UMA6C15****Course Outcomes (CO)**

| | | |
|-----|---|----|
| CO1 | Remembering the concept of derivatives, bounded variations. | K1 |
| CO2 | Understanding the concept of connectedness. | K2 |
| CO3 | Applying the differentiability of real functions. | K3 |
| CO4 | Analyzing the Riemann integrals to a finite sum. | K4 |

K1-Remember, K2-understand, K3-Apply, K4-Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | M | S | M | S | M | | S | M | M | M | M |
| CO2 | S | S | S | S | M | | S | S | M | S | M |
| CO3 | S | S | S | S | S | | S | S | S | S | M |
| CO4 | S | S | S | S | S | | S | S | S | S | L |

S- Strong, M- Medium, L- Low

Course Title : Core 16– Special Functions**Course Code : 20UMA6C16****Course Outcomes (CO)**

| | | |
|-----|--|----|
| CO1 | Remembering the concept of special functions. | K1 |
| CO2 | Understanding the applications of hyper geometric functions. | K2 |
| CO3 | Using the solution of Bessel's equation in solving science and engineering problems. | K3 |
| CO4 | Analyzing the use of Hermite's polynomial. | K4 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | S | M | S | M | | S | S | S | S | M |
| CO2 | S | S | M | S | M | | S | S | S | S | M |
| CO3 | S | S | M | S | S | | S | S | M | S | S |
| CO4 | S | S | M | S | S | | S | S | M | S | M |

S – Strong; M – Medium; L – Low

Course Title : Core 17: Operations Research II**Course Code : 20UMA6C17****Course Outcomes (CO)**

| | | |
|-----|---|----|
| CO1 | Applying the maximin and minimax principles in game theory. | K1 |
| CO2 | Analyzing the classifications of queueing models. | K4 |
| CO3 | Applying the concept of inventory control and replacement techniques in business. | K2 |
| CO4 | Examining the concept of traffic intensity in real life problems. | K3 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | S | S | M | | M | M | S | S | M |
| CO2 | S | L | S | M | M | | S | S | M | S | M |
| CO3 | M | S | S | S | M | | S | M | S | M | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L - Low

Course Title : Core 18: Number Theory**Course Code : 20UMA6C18****Course Outcomes(CO)**

| | | |
|-----|---|-------|
| CO1 | Recall the theory of integers from a list of axioms. | K1 |
| CO2 | Classify the problems to solve using the learned principles and theorem. | K2&K3 |
| CO3 | Explaining various divisibility tests and apply them in real life problems. | K4 |
| CO4 | Apply number theory algorithms and procedures to basic problems in mathematics. | K3 |

K1 - Remember; K2 - Understand; K3 - Apply; K4 - Analyze

| | PO1 | PO2 | PO3 | PO4 | PO5 | | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|--|------|------|------|------|------|
| CO1 | S | M | M | M | L | | M | S | M | S | M |
| CO2 | S | S | S | M | M | | S | S | S | S | M |
| CO3 | S | S | S | S | M | | S | S | M | S | S |
| CO4 | S | S | S | S | M | | S | S | M | S | M |

S – Strong; M – Medium; L – Low

Course Title : ELECTIVE: INTRODUCTION TO C**Course Code : 20UMA6EL2****Course outcomes**

On the successful completion of the course, students will be able to

| CO Number | CO Statement | Knowledge level |
|-----------|---|-----------------|
| CO1 | Understand the concepts of C programming | K2 |
| CO2 | Know the concepts of Operators and Expression | K1 |
| CO3 | Understand the various Decision making and branching techniques | K2 |
| CO4 | Know the Concepts of arrays and structures | K1 |

K1-Remember; K2-Understand; K3-Apply; K4 - Analyze

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO 2 | PSO3 | PSO 4 | PSO 5 |
|-----|-----|-----|-----|-----|-----|------|----------|------|----------|----------|
| CO1 | L | L | S | L | L | M | M | L | M | M |
| CO2 | L | L | S | L | L | M | M | L | M | M |
| CO3 | L | M | S | M | L | M | M | M | S | S |
| CO4 | L | M | S | M | L | M | M | L | M | M |

S-Strong; M-Medium; L-Low

Course Title : ELECTIVE PRACTICAL: WEB PROGRAMMING AND C

Course Code : 20UMA6EP1

Course outcomes

On the successful completion of the course, students will be able to


| CO Number | CO Statement | Knowledge level |
|-----------|--|-----------------|
| CO1 | Understand the fundamental programming concepts | K2 |
| CO3 | Apply the concepts to find solution for the problems | K3 |
| CO4 | Design and develop the simple application. | K4 |
| CO4 | Know the basic concepts of HTML | K1 |

K1-Remember; K2-Understand; K3-Apply; K4 - Analyze

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 |
|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | M | L | M | M | L | L | M | M | M | L |
| CO2 | M | L | M | S | L | M | M | S | M | L |
| CO3 | M | L | M | S | L | M | M | S | S | M |
| CO4 | M | L | M | M | L | M | M | M | M | M |

S-Strong; M-Medium; L -Low




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