

NEHRU MEMORIAL COLLEGE (AUTONOMOUS)

**NATIONALLY ACCREDITED WITH "A" GRADE BY NAAC
PUTHANAMPATTI, TRICHY – 621007**



DEPARTMENT OF MATHEMATICS

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COURSE OUTCOME (COS)

Name of the Course	Course Outcomes
CCI - Calculus	CO 1: Acquire the concept of successive differentiation, maxima and Minima Functions. CO 2: Apply the concepts of Beta and Gamma functions to multiple Integrals. CO 3: Use reduction formula to evaluate integrals. CO 4: Evaluate radius of curvature, evolutes and involutes.
CC II – Trigonometry and Algebra	CO 1: Acquire the knowledge of circular function. CO 2: Give illustration of Eigen value and Eigen vector, symmetric, Orthogonal and unitary matrix. CO 3: Apply the concepts of theory of equations and inequalities.
CC III- Differential Equations and its Applications	CO 1: Acquire the knowledge of the first order ODE and PDE. CO 2: Solve the problems choosing the most suitable method. CO 3: Model the real world scenarios using ODE, PDE. CO 4: Sense the essential difference between ODE and PDE.

<p>CC IV- Laplace Transforms & Summatio n of series</p>	<p>CO 1: Acquire the knowledge of transforms and series. CO 2: Understand the concept of Laplace transforms and its properties. CO 3: Apply the method of finding the solution of differential equation. CO 4: Evaluate the summation of power series.</p>
<p>SKBC I -MS Office</p>	<p>CO1: Gain the basic knowledge of Microsoft Office. CO2: Understand the ethical issues in saving word processing Documents. CO 3: Apply designs to enhance the looks of the presentation. CO 4: Analyze the use of Microsoft word, Excel and Power point.</p>
<p>CC- V- Analytical Solid Geometry</p>	<p>CO 1: Recollect the basic concept of equation of a plane, straight line the Sphere and binomial, exponential and logarithmic series. CO 2: Understand about the concept of forming a plane of a equation and to find angle between the plane and line, co-planer lines, volume of tetrahedron. CO 3: Get the clear idea to form an equation of a sphere passing through a given circle, intersection of two spheres is a circle and the equation of the tangent plane. CO 4: Demonstrate the binomial theorem for a rational index, applications, summation of series and recurring series.</p>

<p>AC – IV- Probability Theory</p>	<p>CO 1: Gain the knowledge of random variable and probability Distributions.</p> <p>CO 2: Understand the basic concepts of discrete and continuous distributions and their properties.</p> <p>CO 3: Apply the various distributions suitably to real life problems.</p> <p>CO 4: Compute expectations, variance and other higher order moments of the distributions.</p>
<p>AC – V – Statistical Methods</p>	<p>CO 1: Acquire the knowledge of correlation, regression and sampling Distributions.</p> <p>CO 2: Understand the necessity of various techniques for robust statistical inference.</p> <p>CO 3: Apply the concept of estimation to the parameter of sampling distributions.</p> <p>CO 4: Evaluate expectation, variance, mgfs, Characteristic functions and estimators.</p>
<p>SKBC II- SCILAB</p>	<p>CO 1: Gain knowledge about implementation of simple mathematical functions / equations in numerical computing environment.</p> <p>CO 2: Understand the need for simulation /implementation for the Verification of mathematical functions.</p> <p>CO 3: Apply simple mathematical functions and operations on using plots.</p> <p>CO 4: Analyze various SCILAB command.</p>

<p>CC VI - Vector Calculus, Fourier Series & Fourier Transforms</p>	<p>CO 1: Acquire the concept of the vector differentiation, vector Integration, Fourier series and Fourier Transforms.</p> <p>CO 2: Understand the practical utility of gradient, divergent & curl.</p> <p>CO 3: Apply the divergence, curl and scalar potential to real life Problems.</p> <p>CO 4: Evaluate the multiple integrals and Fourier series for periodic Function and Fourier Transforms for a periodic function.</p>
<p>Numerical Methods</p>	<p>CO 1: Gain the knowledge of solving an algebraic or transcendental Equation using an appropriate Numerical Methods.</p> <p>CO 2: Understand the mathematical concepts underlying the Numerical Methods.</p> <p>CO 3: Apply Numerical Methods to obtain approximate solutions to Mathematical problems.</p> <p>CO 4: Analyze the accuracy of common Numerical Methods.</p> <p>CO 5: Evaluate a derivative at a value using an appropriate Numerical Methods.</p>
<p>AC VI-R Programmi ng Lab</p>	<p>CO 1: Gain knowledge about different data types and different data structures in R.</p> <p>CO 2: Understand basic regular expressions in R</p> <p>CO 3: Apply the various graphics in R for data visualization.</p> <p>CO 4: Analyze the uses of R for descriptive statistics and inferential statistics.</p>

<p>NMEC - I Quantitative Aptitude- I</p>	<p>CO 1: Acquire the meaning of HCF and LCM of numbers.</p> <p>CO 2: Understand the concepts of odd man out & series.</p> <p>CO 3: Analyze the concepts of ratio & proportion.</p> <p>CO 4: Apply the concepts of profit & loss in real life problems.</p>
<p>CC VIII- Modern Algebra</p>	<p>CO 1: Gain the knowledge about concepts of sets, mapping, relations and some basic definition of groups & subgroups.</p> <p>CO 2: Understand the importance of algebraic properties with regard to working within various number systems.</p> <p>CO 3: Apply the results from group theory to study the properties of rings and fields and to possess the ability to work within their algebraic structure.</p> <p>CO 4: Analyze the concepts of homomorphism and isomorphism for groups, rings and field.</p>
<p>CC - IX- Real Analysis-I</p>	<p>CO 1: Acquire the knowledge of basic concepts of real analysis, sets, functions, mathematical induction and completeness property.</p> <p>CO 2: Understand the concept of continuity, convergent sequence, subsequence and divergent sequence.</p> <p>CO 3: Obtain the limit of various functions.</p> <p>CO 4: Analyze the extension of limit concepts.</p>

<p align="center">CC X- Mechanics</p>	<p>CO 1: Acquire the knowledge of forces acting at point and equilibrium of three forces acting on a rigid body.</p> <p>CO 2: Understand types of forces, moments and frictions.</p> <p>CO 3: Apply the laws of impact to steady collision of bodies</p> <p>CO 4: Evaluate the differential equation of central orbit, and pedal – equations.</p>
<p align="center">CC XI - Graph Theory</p>	<p>CO 1: Acquire the knowledge of the fundamental concepts in graph theory.</p> <p>CO 2: Understand the concept of cut points, bridges and blocks.</p> <p>CO 3: Apply the concept of Eulerian graph and Hamiltonian graph.</p> <p>CO 4: Evaluate the problems involving vertex connectivity and edge connectivity.</p> <p>CO 5: Analyze the concept of Factorization.</p>
<p align="center">NMECII- Quantitati ve Aptitude- II</p>	<p>CO 1: Gain the knowledge of basic algebraic formulas.</p> <p>CO 2: Understand the formulation of problem quantitatively and using appropriate arithmetical and statistical methods to solve the problems.</p> <p>CO 3: Apply the concept of time and work on real life problems.</p> <p>CO 4: Analyze the problem on trains with solved examples.</p>

<p>CC – XII - Real Analysis-II</p>	<p>CO 1: Gain knowledge about the basic properties of Riemann integral.</p> <p>CO 2: Understand the differentiability of real functions and its related theorems.</p> <p>CO 3: Apply chain rule and inverse function theorem.</p> <p>CO 4: Evaluate the properties of derivatives.</p> <p>CO 5: Analyze the advanced concepts of real analysis.</p>
<p>CC – XIII- Complex Analysis</p>	<p>CO 1: Acquire knowledge about continuity and differentiability of complex functions.</p> <p>CO 2: Understand Taylor’s and Laurent’s expansion of simple functions.</p> <p>CO 3: Apply the methods of complex analysis to evaluate definite integrals and limit of infinite series.</p> <p>CO 4: Study the nature of singularities and evaluate residues.</p> <p>CO 5: Analyze the applications of Complex Analysis.</p>
<p>CC XIV - Discrete Mathemati cs</p>	<p>CO 1: Acquire knowledge to write an argument using logical notation.</p> <p>CO 2: Understand the basic principles of sets and operations in sets.</p> <p>CO 3: Apply the rules of inference and methods of proof including direct and indirect proof form, proof by contradiction and mathematical induction.</p> <p>CO 4: Analyze logic sentence in terms of predicates, quantifiers and logical connectives.</p> <p>CO 5: Evaluate Boolean functions and simplify expression using the properties of Boolean Algebra.</p>

<p>CC-XV - Mathematical Modeling</p>	<p>CO 1: Acquire the knowledge of model through graphs.</p> <p>CO 2: Understand the concept of mathematical modeling through ordinary differential equations.</p> <p>CO 3: Apply some models on basic theory of linear difference equations.</p> <p>CO 4: Analyze and frame mathematical models using ordinary differential equation.</p>
<p>EC I - Programming in 'C' with lab</p>	<p>CO 1: Acquire the knowledge of the structure of C programming language and its development.</p> <p>CO 2: Understand the structured programming language C</p> <p>CO 3: Apply the concepts of point and array.</p> <p>CO 4: Analyze the use of structured programming in numerical problem solving.</p>
<p>Fuzzy Theory</p>	<p>CO 1: The knowledge of important basics of fuzzy set theory.</p> <p>CO 2: Understand the basic mathematical elements of the theory of fuzzy sets.</p> <p>CO 3: Apply fuzzy logic to control theory.</p> <p>CO 4: Analyze statistical logic method.</p> <p>CO 5: Evaluate fuzzy statistical applications.</p>
<p>Operation Research</p>	<p>CO 1: Gain the knowledge of scientific approaches to decision – making.</p> <p>CO 2: Understand the mathematical tools that are needed to solve optimization problems.</p> <p>CO 3: Apply the concepts of simplex method and its extensions to dual simplex algorithm.</p> <p>CO 4: Analyze the general non linear programming problems.</p>

	CO 5: Evaluate critical path and optimized cost using CPM and PERT to project scheduling and controlling problems.
Astronomy	<p>CO 1: Gain the knowledge to use mathematics to perform calculations on earth and/ or space science problems.</p> <p>CO 2: Understand the use of our galaxy to contrast and compare it with other galaxies as to type, content, age, luminosity, motion and size.</p> <p>CO 3: Apply the principle findings, common applications, current problems, fundamental techniques and underlying theory of the astronomy.</p> <p>CO 4: Analyze the size, age structure and motion of the universe over all using cosmological models.</p>
CC XIV- Object Oriented Programmi ng in C++ with Lab	<p>CO 1: Gain knowledge about the structure and model of the C++ programming language.</p> <p>CO 2: Understand C++ programming language by using various programming techniques.</p> <p>CO 3: Apply C++ programs to solve simple problems. develop some software based on mathematics problems in the C++ programming language.</p> <p>CO 4: Evaluate user requirements for software functionality required to decide whether the C++ programming language can meet user requirements.</p> <p>CO 5: Analyze the uses of certain techniques by implementing them in the C++ programming language to solve the given problem.</p>

Number Theory	<p>CO 1: Gain the knowledge to find quotients and remainders from integer division.</p> <p>CO 2: Understand the definitions of congruence, residue classes and least residues.</p> <p>CO 3: Apply Euclid's algorithm and backwards substitution.</p> <p>CO 4: Analyze hypothesis and conclusions of mathematical statements (or) analyze learning methods and techniques used in number theory.</p> <p>CO 5: Evaluate multiplicative inverse, modulo n and use to solve linear congruence.</p>
EXC I – GIMP Lab	<p>CO 1: Gain the knowledge about the basic elements of most photo Editing programmes including tools, layers and saving concepts.</p> <p>CO 2: Understand the use of the selection tools in GIMP.</p> <p>CO 3: Apply animated images using an improved layers method.</p> <p>CO 4: Analyze the use of transformation tools in GIMP.</p>

Allied Mathematics

AC-I Allied Mathematics- I	<p>CO 1: Recollect basic concepts of Binomial, Exponential series, matrices.</p> <p>CO 2: Understanding the concepts of the characteristic equation and its applications in matrices.</p> <p>CO 3: Apply the integral concepts to extend the study of multiple integrals.</p> <p>CO 4: Express the given series in Fourier form</p>
AC II -Allied Mathematics II	<p>CO 1: Recollect basic concepts of Differentiation and Trigonometry.</p> <p>CO 2: Understanding about the concept of successive derivatives, Leibnitz's theorem, Jacobians and curvature and maxima and minima of a function of two variables.</p> <p>CO 3: Get an idea about trigonometric functions $\sin^n\theta$, $\cos^n\theta$, expansion of $\cos n\theta$ and $\sin n\theta$ in powers of $\sin\theta$ and $\cos\theta$, Hyperbolic functions and Inverse Hyperbolic functions.</p> <p>CO 4: Solving the polynomial equations using interpolating methods: Newton's forward, backward and Lagrange's methods.</p>

<p style="text-align: center;">AC-III Allied Mathematics- III</p>	<p>CO 1: Remember the basic concepts of Differential Equations, Integration and Vector.</p> <p>CO 2: Understanding about the concept of Formation of differential equations and solving the partial differential equations.</p> <p>CO 3: Get an idea about the Laplace transforms and apply the differential equations.</p> <p>CO 4: Get an idea about the Laplace transforms and apply the differential equations.</p>
<p style="text-align: center;">AC I - Basic Mathematics</p>	<p>CO 1: Recollect the basic concepts of matrices and differentiation.</p> <p>CO 2: Understand the concepts about fundamental of ODE and characteristic equation of a linear transformation and Cayley Hamilton theorem.</p> <p>CO 3: Solving the differential equations when the RHS is of the type e^{kx}, $\sin kx$, $\cos kx$, x^k, e^{ax}.</p> <p>CO 4: Demonstrate the Laplace transform and the apply the differential equation and Fourier series, finding Fourier constants for periodic function with period 2π and half range Fourier series with period π.</p>

<p style="text-align: center;">AC-II- Operations Research</p>	<p>CO 1: Understand linear programs from standard business problems.</p> <p>CO 2: Construct a project network and apply program evaluation review technique and critical path management.</p> <p>CO 3: Apply the fundamental concept of sequencing problem.</p> <p>CO 4: Solve the problems using PERT and CPM methods.</p>
<p style="text-align: center;">ACIII- Numerical and Statistical Methods</p>	<p>CO 1: Understands different methods to solve the non-linear equations</p> <p>CO 2: Acquire the knowledge of regression analysis</p> <p>CO 3: Apply various methods to solve various integrals</p> <p>CO 4: Apply various methods to solve various integrals</p>
<p style="text-align: center;">AC I- Statistical Methods</p>	<p>CO 1: Acquire the concepts of Mean, Median and Standard deviation</p> <p>CO 2: Understand the knowledge of Skewness and Kurtosis, Correlation and Regression Analysis</p> <p>CO 3: Apply the knowledge of axiomatic approach to independent events</p> <p>CO 4: Evaluate the Binomial, Poisson and Normal Distribution</p>

<p style="text-align: center;">AC II- Operations Research for Computer Applications</p>	<p>CO 1: Convert standard business problems into linear programs.</p> <p>CO 2: Solve linear programming problems by Graphical solution, Simplex and Big-M method.</p> <p>CO 3: Apply the fundamental concept of sequencing problem.</p> <p>CO 4: Evaluate the PERT and CPM.</p>
<p style="text-align: center;">Algebra and Calculus</p>	<p>CO 1: Understand the concepts of types of matrices, successive differentiation, integration and Laplace transform.</p> <p>CO 2: Find the Eigen values and vectors, Leibnitz's theorem and its application.</p> <p>CO 3: Apply the concepts of Laplace transforms of e^{at}, $\cos at$, $\sin at$, t^n and integration by parts and its properties.</p> <p>CO 4: Solve the second order differential equation of the type e^{kx}, $\sin kx$, $\cos kx$, x^k, $e^{ax} X$.</p>
<p style="text-align: center;">Operation Research</p>	<p>CO 1: Understand linear programs from standard business problems.</p> <p>CO 2: Construct a project network and apply program evaluation review technique and critical path management.</p> <p>CO 3: Apply the fundamental concept of sequencing problem.</p> <p>CO 4: Solve the problems using PERT and CPM methods.</p>