



# Mary Matha Arts & Science College

Mananthavady, Wayanad, Kerala

Re-accredited by NAAC with B++ Grade, CGPA 2.85 (III Cycle)

**Education for total liberation**

## COURSE OUTCOMES

<b>Sl. No.</b>	<b>PROGRAMMES</b>
1.	MATHEMATICS
2.	SOCIAL SCIENCE
3.	FUNCTIONAL ENGLISH
4.	COMMERCE
5.	CHEMISTRY
6.	COMPUTER SCIENCE
7.	PHYSICS
8.	ZOOLOGY
9.	COMMON COURSES IN ENGLISH
10.	COMMON COURSES IN MALAYALAM
11.	COMMON COURSES IN HINDI



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## B.SC. MATHEMATICS

### COURSE OUTCOMES

#### **CORE COURSE 1: 1B01MAT SET THEORY, DIFFERENTIAL CALCULUS AND NUMERICAL METHODS**

**CO1:** Understand Relations and Functions

**CO2:** Understand limit of a function, limit laws, continuity, Inverse functions and their derivatives

**CO3:** Understand successive differentiation and Leibnitz theorem

**CO4:** Understand functions of several variables, limit and continuity, partial derivatives, chain rule, homogeneous functions and Euler's theorem on homogeneous functions

**CO5:** Understand bisection method, Regula-falsi method and Newton-Raphson method to solve algebraic and transcendental equations

#### **CORE COURSE 2: 2B02MAT INTEGRAL CALCULUS AND LOGIC**

**CO1:** Understand Hyperbolic functions

**CO2:** Understand Reduction formulae for trigonometric functions and evaluation of definite integrals  $\int_0^{\frac{\pi}{2}} \sin^n x dx$ ,  $\int_0^{\frac{\pi}{2}} \cos^n x dx$  and  $\int_0^{\frac{\pi}{2}} \sin^v x \cos^q x dx$ .

**CO3:** Understand Polar coordinates

**CO4:** Understand Double integrals in Cartesian and polar form.

**CO5:** Understand triple integrals in rectangular, cylindrical and spherical co-ordinates

**CO6:** Understand Substitution in multiple integrals

**CO7:** Understand Numerical integration: Trapezoidal rule, Simpson's 1/3rd rule

**CO8:** Understand Logic and methods of proofs

**CO9:** Understand Propositional functions, truth set and Negation of quantified statements

#### **CORE COURSE 3: 3B03MAT ANALYTIC GEOMETRY AND APPLICATIONS OF DERIVATIVES**

**CO1:** Understand cartesian equation of conics, eccentricity, polar equations for a conic, lines, circles

**CO2:** Understand Tangents, Normals and Asymptotes

**CO3:** Understand Curvature, Radius of curvature, Centre of Curvature, Circle of curvature and Evolutes of Cartesian and polar curves,

**CO4:** Understand Rolle's Theorem, Lagrange's Mean Value Theorem, Cauchy's Mean Value Theorem and Taylors Theorem



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**CO5:** Understand extreme values of functions, monotonic functions, first derivative test, concavity and curve sketching

**CO6:** Understand Indeterminate forms

## **CORE COURSE 4: 4B04MAT NUMBER THEORY AND APPLICATIONS OF INTEGRALS**

**CO1:** Understand Division algorithm, Greatest common Divisor, Euclidean Algorithm, Diophantine equation  $ax+by=c$ .

**CO2:** Understand Primes and their distribution, fundamental theorem of arithmetic, the sieve of Eratosthenes

**CO3:** Understand Basic properties of congruence

**CO4:** Understand Picard's little theorem, Wilson's theorem and Euler's theorem

**CO5:** Understand Substitution and the area between curves, Arc length, Areas and length in polar co-ordinates

**CO6:** Understand Volumes using cross sections, volumes using cylindrical shells and areas of surfaces of revolution

## **CORE COURSE 5: B05MAT SET THEORY, THEORY OF EQUATIONS AND COMPLEX NUMBERS**

**CO1:** Understand finite and infinite sets, Countable and Uncountable sets, Cantor's theorem.

**CO2:** Understand Roots of equations, Relations connecting the roots and coefficients of an equation, Transformation of equations, The cubic equation, Character and position of roots of an equation.

**CO3:** Understand Descartes' rule of signs, De Gua's Rule, Limits to the roots of an equation, Rational roots of equations, Newton's method of divisors, Symmetric functions of roots of an equation, Symmetric functions involving only the difference of the roots of  $f(x)=0$ , Equations whose roots are symmetric functions of  $\alpha, \beta, \gamma$ .

**CO4:** Understand Reciprocal equations.

**CO5:** Understand Cubic equation, Equation whose roots are the squares of the difference of the roots, Character of the Roots, Cardan's Solution

**CO6:** Understand Roots of complex numbers, General form of De Moivre's theorem, the  $n$ th roots of unity, the  $n$ th roots of  $-1$ , Factors of  $x^n - 1$  and  $x^n + 1$ , the imaginary cube roots of unity

**CO7:** Understand polar form of complex numbers, powers and roots.



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## **CORE COURSE 6: 5B06MAT REAL ANALYSIS I**

**CO1:** Understand Algebraic Properties, Order Properties and Absolute values of  $\mathbb{R}$ . Understand the Completeness Property of  $\mathbb{R}$  and its applications to derive Archimedean Property and Density theorem.

**CO2:** Understand intervals in the real line.

**CO3:** Understand Sequences and their Limits, Limit Theorems, Monotone Sequences.

**CO4:** Understand Subsequences and the Bolzano-Weierstrass Theorem, The Cauchy Criterion.

**CO5:** Understand Infinite Series, Absolute Convergence.

**CO6:** Understand Comparison test, Root test, Ratio test, Integral test and Raabe's test for Absolute convergence.

**CO7:** Understand Alternating series test, Dirichlet's test and Abel's test for Non Absolute convergence.

**CO8:** Understand Continuous Functions, composition of continuous functions and continuous functions on intervals.

## **CORE COURSE 7: 5B07MAT ABSTRACT ALGEBRA**

**CO1:** Understand definition and elementary properties of Groups, Subgroups and Cyclic groups

**CO2:** Understand Groups of Permutations, orbits, Alternating groups and theorem of Lagrange

**CO3:** Understand group homomorphisms, factor Groups

**CO4:** Understand Fundamental Homomorphism Theorems

**CO5:** Understand definition and properties of rings and fields

**CO6:** Understand Ring homomorphisms and isomorphisms

**CO7:** Understand zero divisors, integral domains, characteristic of a ring and their properties

## **CORE COURSE 8: 5B08MAT DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS**

**CO1:** Understand Separable ODEs, Exact ODEs, Linear ODEs, Bernoulli equation and methods to solve these ODEs

**CO2:** Understand the theorem of Existence and Uniqueness of solutions of first and second order ODEs

**CO3:** Understand Homogeneous Linear ODEs of Second Order and solve homogeneous linear ODEs of second order with constant coefficients and Euler-Cauchy equation

**CO4:** Understand Nonhomogeneous ODEs and solve by variation of parameters



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**CO5:** Understand Laplace Transform and inverse Laplace Transformation

**CO6:** Understand The first and The second shifting theorems and their applications

**CO7:** Understand the methods to find Laplace transforms of derivatives and integrals of functions

**CO8:** Understand the method of differentiating and integrating Laplace transform

**CO9:** Solve ordinary differential equations and integral equations using Laplace transform

## **CORE COURSE 9: 5B09MAT VECTOR CALCULUS**

**CO1:** Understand lines and planes in space

**CO2:** Understand curves in space, their tangents, normal, curvature, tangential and normal curvature of acceleration

**CO3:** Understand Directional derivatives and gradient vectors, tangent planes and differentials. Solve extreme value problems using Lagrange multipliers

**CO4:** Understand Partial derivatives with constrained variables and Taylor's formula for two variables

**CO5:** Understand Line integrals. Solve for work, circulation and flux using line integrals

**CO6:** Understand path independence conservative fields and potential functions

**CO7:** Understand Green's theorem and solve problems using Green's theorem

**CO8:** Understand Surface area and surface integrals

**CO9:** Understand Stoke's theorem and solve problems using Stoke's theorem

**CO10:** Understand Divergence theorem and solve problems using Divergence theorem

## **CORE COURSE 10: 6B10MAT REAL ANALYSIS II**

**CO1:** Understand Uniform Continuity, Monotone and Inverse Functions

**CO2:** Understand Riemann Integral and Riemann-integrable Functions

**CO3:** Understand Fundamental Theorem of Calculus

**CO4:** Understand Improper Integrals

**CO5:** Understand Beta and Gamma Functions and their properties.

**CO6:** Understand Transformations of Gamma Function and Duplication formula

**CO7:** Understand Pointwise and Uniform Convergence of sequence of functions and Interchange of Limits

**CO8:** Understand Series of Functions

**CO9:** Understand the concept of Metric Spaces

## **CORE COURSE 11: 6B11MAT COMPLEX ANALYSIS**

**CO1:** Understand Analytic Function, Cauchy–Riemann Equations. Laplace's Equation.



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**CO2:** Understand Exponential Function, Trigonometric Functions, Hyperbolic Functions, Logarithmic functions and General Power of complex numbers

**CO3:** Understand line integral in the complex plane, Cauchy's integral theorem, Cauchy's integral formula and derivatives of analytic functions

**CO4:** Understand convergence of Sequences and Series of complex functions

**CO5:** Understand power series, functions given by power series, Taylor series, Maclaurin's Series and Laurent Series

**CO6:** Understand singularities and zeros of complex functions

**CO7:** Understand residue integration method and integrate real integrals

## **CORE COURSE 12: 6B12MAT NUMERICAL METHODS, FOURIER SERIES AND PARTIAL DIFFERENTIAL EQUATIONS**

**CO1:** Understand Interpolation techniques: Interpolation with unevenly spaced points, Lagrange interpolation, Newton's divided differences interpolation, Finite difference operators and finite differences, Newton's interpolation formulae and Central difference interpolation.

**CO2:** Understand Numerical differentiation using difference formulae

**CO3:** Understand Picard's method, Solution by Taylor series method, Euler method and Runge-Kutta methods.

**CO4:** Understand Fourier Series: Arbitrary period, Even and Odd Functions, Half-Range Expansions and Fourier Integrals.

**CO5:** Understand Partial Differential equations, Solution by Separating Variables.

**CO6:** Understand the use of Fourier Series in solving PDE: D'Alembert's Solution of the Wave Equation. Characteristics and solving Heat Equation by Fourier Series.

**CO7:** Understand Laplacian in Polar Coordinates

## **CORE COURSE 13: 6B13MAT LINEAR ALGEBRA**

**CO1:** Understand the concept of Vector spaces, subspaces, linear combinations and system of equations.

**CO2:** Understand the concept of Linear Dependence and Linear Independence, Bases and Dimension, Maximal Linearly Independent Subsets and solves problems.

**CO3:** Understand the concept of Linear Transformations, Null Spaces, and Ranges, The Matrix Representation of a Linear Transformation

**CO4:** Understand Rank of a matrix, Elementary transformations of a matrix, Invariance of rank through elementary transformations, Normal form, Elementary matrices.

**CO5:** Understand the concept System of linear homogeneous equations Null space and nullity of matrix, Range of a matrix, Systems of linear non homogeneous equations.

**CO6:** Understand Eigen values, Eigen vectors, Properties of Eigen values, Cayley-Hamilton theorem.



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## **DISCIPLINE SPECIFIC ELECTIVE COURSE 1: 6B14AMAT GRAPH THEORY**

**CO1:** Understand a graph, subgraph, different types of graphs and their properties

**CO2:** Understand and represent graph as matrix

**CO3:** Understand a path, cycle, trees, bridges and their properties

**CO4:** Understand cut vertices and connectivity of graphs

**CO5:** Understand Eulerian graphs, Hamiltonian graphs, The Chinese Postman Problem and The Travelling Salesman Problem

**CO6:** Understand planar graphs, Euler's formula, The Platonic bodies and Kuratowski's Theorem

**CO7:** Model real world problems using the concept of graphs

**CO8:** Solve real world problems using the concept of graphs

## **DISCIPLINE SPECIFIC ELECTIVE COURSE 2: 6B14BMAT: OPERATIONS RESEARCH**

**CO1:** Understand convex sets, convex functions, their properties, local and global extrema and quadratic forms

**CO2:** Understand LPP, formulate and solve using graphical method

**CO3:** Understand General LPP, canonical and standard forms of LPP

**CO4:** Understand simplex method and solve LPP

**CO5:** Understand basic solution, degenerate solution, basic feasible solution, optimum basic feasible solution, fundamental properties of solution and simplex method

**CO6:** Understand primal-dual pair, formulation of dual and duality theorems

**CO7:** Understand LP formulation of transportation problem and its solution

**CO8:** Understand Mathematical formulation of Assignment problem and Hungarian Assignment method

**CO9:** Understand problem of sequencing, Processing 'n' jobs through '2' machines, Processing 'n' jobs through 'k' machines

**CO10:** Understand basic terms in Game theory, The Maximin-Minimax Principle, Solution of game with saddle point, Solution of 2x2 game without saddle point, Graphic solution of 2xn and mx2 games and Arithmetic method for nxn Games.

## **DISCIPLINE SPECIFIC ELECTIVE COURSE 3: 6B14CMAT CRYPTOGRAPHY**

**CO1:** Understand Simple Cryptosystems namely, The Shift Cipher, The Substitution Cipher, The Affine Cipher, The Vigenere Cipher, The Hill Cipher, The Permutation Cipher and Stream Ciphers



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**CO2:** Understand basics of Shannon's Theory, Elementary Probability Theory, Perfect Secrecy, Entropy, Huffman Encodings and Entropy, Properties of Entropy, Spurious Keys and unicity Distance, Product Cryptosystems.

**CO3:** Understand The Euclidean Algorithm, The Chinese Remainder Theorem

**CO4:** Understand Legendre and Jacobi Symbols and quadratic residues

**CO5:** Understand The RSA System and Factoring (25 Hours): Introduction to Public-key Cryptography, The RSA Cryptosystem, Implementing RSA, Primality Testing, The Solovay-Strassen Algorithm, The Miller Rabin Algorithm, Square roots modulo  $n$ .

## **DISCIPLINE SPECIFIC ELECTIVE COURSE 4: 6B14DMAT FUZZY MATHEMATICS**

**CO1:** Understand Fuzzy Subsets, L-fuzzy Sets, Visual representation of a Fuzzy Subset, Operations on Fuzzy Subsets, Empty Fuzzy Subset 0

**CO2:** Understand Universal Fuzzy Subset, Disjoint Fuzzy Subsets, Disjunctive Sum

**CO3:** Understand  $\alpha$  Level Set, Properties of Fuzzy Subsets of a Set, Algebraic Product and Sum of Two Fuzzy Subsets, Properties Satisfied by Addition and Product

**CO4:** Understand Cartesian Product of Fuzzy Subsets

**CO5:** Understand Fuzzy Relations, Binary Fuzzy Relations, Binary Relations on a Single Set, Fuzzy Equivalence Relations

**CO6:** Understand Fuzzy Subgroup, Fuzzy Subgroupoids

**CO7:** Understand The Lattice of Fuzzy Subgroups, Fuzzy Subgroup, Fuzzy Subrings

## **DISCIPLINE SPECIFIC ELECTIVE COURSE 5: 6B14EMAT PROGRAMMING IN PYTHON**

**CO1:** Understand the basics of Python Variables, Indentation in Python, Input, Output and Import Functions Operators

**CO2:** Understand Python programming for numbers, dictionaries and Mathematical functions

**CO3:** understand Flow control, if, if..else, if,else , Loops- for loop, range Function, while, Section 3.3 Nested Loop, Break and continue Statements in python.

**CO4:** Understand Data visualization- The Matplot lib Module, plotting mathematical functions, Famous Curves, 2D plot using colors, Mesh grids, 3D plots using Python

**CO5:** Understand Python Programming for solving equations using Newton-Raphson's method, bisection Method, Method of false position, Trapezoidal rule of numerical integration Simpson's Three Eighth rule of numerical integration, Euler's modification method to solve first order differential equation, Runge-Kutta method of order 4, Lagrange's Method for Interpolation.





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## **GENERIC ELECTIVE COURSE 1: 5D01MAT - HISTORY OF MATHEMATICS**

**CO1:** Understand the history of Early Number Systems and Symbols.

**CO2:** Understand the history of Mathematics in Early Civilizations.

**CO3:** Understand the history of the Beginnings of Greek Mathematics

**CO4:** Understand the Euclidean Geometry, Euclid's Foundation for Geometry, Euclid's Proof of the Pythagorean Theorem

**CO5:** Understand Infinity of Primes, Measurement of the Earth, Archimedes, The Ancient World's Genius, contributions of Hardy and Ramanujan, Examination, The Rejuvenation of English Mathematics

## **GENERIC ELECTIVE COURSE 2: 5D02MAT - QUANTITATIVE ARITHMETIC AND REASONING**

**CO1:** Understand average, Problems on ages, Profit and loss and solves problems

**CO2:** Understand Profit and loss, Ratio and proportion, Chain rule

**CO3:** Comprehend Time and work, Time and distance and solves problems

**CO4:** Comprehend Problems on trains, Boats and streams, Calendar, Clocks

## **GENERIC ELECTIVE COURSE 3: 5D03MAT - LINEAR PROGRAMMING**

**CO1:** Understand General linear programming problem – canonical and standard forms of L.P.P, Solutions and fundamental properties of solutions of LPP.

**CO2:** Understand Graphical solution method, Simplex method, Duality in linear programming, Formulating a dual problem.

**CO3:** Understand General transportation problem, the transportation tables, Loops in transportation table and solves transportation problem

**CO4:** Understand Degeneracy in transportation problem, Transportation algorithm (MODI method) and solves problems

## **GENERIC ELECTIVE COURSE 4: 5D04MAT - GRAPH THEORY**

**CO1:** Understand how to transform daily life problems into Graph Theoretical (Mathematical) Models

**CO2:** Understand the evolution of Graph Theory as a subject

**CO3:** Understand the representation of Chinese Postman Problem, Marriage Problem, Travelling Salesman Problem and Personnel Assignment Problem

**CO4:** Understand the concepts of planar graphs and Jordan curve

**CO5:** Comprehend Problem of colouring maps and Graph Colouring



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## GENERIC ELECTIVE COURSE 5: 5D05MAT - BUSINESS MATHEMATICS

**CO1:** Understand the concept of Limit and continuity, methods of finding limits definition, Differentiation- rules of differentiation, Parametric function logarithmic differentiation.

**CO2:** Understand the Successive differentiation, Local maximum and local minimum and solves problems

**CO3:** Understand the Rules of integration, Some standard results, Consumer's surplus, Producer's surplus, Consumer's surplus

**CO4:** Understand rate of interest, Continuous compounding, Compound interest, Present value, interest and discount, Rate of discount, Equation of value, Depreciation and solves problems

### COMPLEMENTARY COURSES

#### STATISTICS

#### COMPLEMENTARY ELECTIVE COURSE I: 1C01STA BASIC STATISTICS

**CO1:** understand the different types of data.

**CO2:** compute various measures of central tendency, measures of variation.

**CO3:** analyse the relationship between two variables.

**CO4:** acquire knowledge in time series data and compute various index numbers.

#### COMPLEMENTARY ELECTIVE COURSE II: 2C02STA PROBABILITY THEORY AND RANDOM VARIABLES

CO 1: evaluate the probability of events.

CO 2: understand the concept of random variables with examples in real life

**CO3:** calculate the probability distribution of discrete and continuous random variables.

CO 4: understand the change of variable technique.

#### COMPLEMENTARY ELECTIVE COURSE III: 3C03STA PROBABILITY DISTRIBUTIONS

**CO1:** compute mathematical expectation of a random variable.

**CO2:** familiarize with different discrete probability distribution associated with real life situations.

**CO3:** understand the characteristics of different continuous distributions.

**CO4:** identify the appropriate probability model that can be used

#### COMPLEMENTARY ELECTIVE COURSE IV: 4C04STA STATISTICAL INFERENCE

CO 1: understand the uses of Chebychev's Inequality and Central Limit Theorem.

CO 2: apply various method of estimation



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CO 3: understand the concept of testing statistical hypotheses and its importance in real life situation

CO 4: apply ANOVA

## **COMPLEMENTARY COURSES**

### **COMPUTER SCIENCE**

#### **COMPLEMENTARY ELECTIVE COURSE I: 1C01CSC INTRODUCTION TO COMPUTERS AND PROGRAMMING**

**CO1:** Familiarize with the hardware components of a digital computer

**CO2:** Understand the basic idea of how data is represented in computers

**CO3:** Familiarize with types of software

**CO4:** Ability to design algorithmic solutions to problems

#### **COMPLEMENTARY ELECTIVE COURSE II: 2C02CSC PROGRAMMING IN C**

**CO1:** Understand the building blocks of C programming language

**CO2:** Familiarize with program control structures in C

**CO3:** Learn procedural programming using functions

**CO4:** Understand user defined data types

#### **COMPLEMENTARY ELECTIVE COURSE III: 3C03CSC WEB TECHNOLOGY WITH DATABASE MANAGEMENT SYSTEM**

**CO1:** Develop skills to design a web page using HTML

**CO2:** Understand HTML Forms and CSS Styling

**CO3:** Develop skills to develop database and retrieve data using SQL

**CO4:** Learn basics of server-side programming with PHP

#### **COMPLEMENTARY ELECTIVE COURSE IV: 4C04CSC COMPUTATION USING PYTHON**

**CO1:** Learn Python for expressing computation

**CO2:** Familiarize with functions and modules in python

**CO3:** Understand object-oriented programming concepts

**CO4:** Learn the techniques for data visualization in python

#### **COMPLEMENTARY ELECTIVE COURSE V: 4C05CSC LAB 1 – PROGRAMMING IN C, WEB PROGRAMMING AND PYTHON PROGRAMMING**

**CO1:** Achieve skills to use C language for problem solving

**CO2:** Understand SQL and basic web programming

**CO3:** Achieve skills to use Python for problem solving



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## B.A. SOCIAL SCIENCE - ECONOMICS

### COURSE OUTCOME

#### **CORE COURSE -1: 1B01SSE INTRODUCTION TO SOCIAL SCIENCE**

**CO1:** Get a conceptual understanding of the various approaches in social sciences

**CO2:** Understand the philosophy of social science as a discipline and its significance in addressing contemporary issues at various levels.

**CO3:** Understand the philosophy of social science as a discipline and its significance in addressing contemporary issues at various levels.

**CO4:** Grasp the philosophy of critical perspectives in social sciences.

#### **CORE COURSE -2: 2B02SSE MATHEMATICAL METHODS FOR ECONOMICS**

**CO1:** Equip with the basics of mathematical tools and their application for better understanding and interpretation of economic theory.

**CO2:** Understand the mathematical concepts that are used in the study of economics at UG level.

**CO3:** Acquire skills in applying mathematical concepts that are indispensable for in depth study of theoretical as well as empirical economics.

#### **CORE COURSE -3: 3B03SSE DEVELOPMENT OF ECONOMIC IDEAS**

**CO1:** Conceptualize the economic philosophy in a historical perspective

**CO2:** Develop heterogeneous and critical thinking in economics

**CO3:** Identify & evaluate the major ideas associated with each group of thinkers studied,



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and thereby better comprehend the origins of contemporary theory.

## **CORE COURSE -4: 3B04SSE QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS**

**CO1:** Understand the basic quantitative statistical methods used for descriptive and inferential statistics.

**CO2:** Use statistical tools (correlation & regression) and interpret

**CO3:** Analyse data and draw inferences and conclusions.

## **CORE COURSE -5: 4B05SSE MICRO ECONOMIC THEORY**

**CO1:** Understand the conceptual foundations of microeconomics essential for further theoretical exercises and for dealing with real life economic issues

**CO2:** Understand the basics of demand and analyze how consumers behave in a market setting in the light of theories of consumer behaviour and choice

**CO3:** Enhance the understanding on production and cost of production.

**CO4:** Evaluate the dynamics of various commodity and input markets

## **CORE COURSE -6: 4B06SSE MACRO ECONOMIC THEORY**

**CO1:** Develop an introductory understanding of macroeconomic variables, concepts, topics and their role in addressing macroeconomic problems.

**CO2:** Identify and compare diverse thoughts and perspectives on the working of an economy.

**CO3:** Analyse the role of fiscal and monetary policy for stabilizing the economy, via, controlling inflation, promoting full employment and facilitating economic growth.

**CO4:** Integrate critical thinking and research inquisitiveness to their learning.

## **CORE COURSE -7: 5B07SSE INTERNATIONAL ECONOMICS**

**CO1:** Discuss and explain contemporary and day-to-day international economic policy issues based on theory and empirical evidence.

**CO2:** Understand the models of international trade to undertake advanced studies in international trade theory.



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**CO3:** Understand the institutional framework within which the different countries interact among each other.

**CO4:** Evaluate the trends in international trade protectionism measures.

## **CORE COURSE -8: 5B08SSE PUBLIC ECONOMICS**

**CO1:** Understand the economics of government expenditure and taxation

**CO2:** Describe the effects of taxation on production, distribution and economic stability, and to understand the role of public expenditure in a developing country

**CO3:** Comprehend project reports and journal articles that make use of the concepts and methods learnt in this course.

**CO4:** Analyse policy challenges and learn to find solutions to these challenges

## **CORE COURSE -9: 5B09SSE HETERODOX ECONOMICS**

**CO1:** Familiarise different perspectives of economic thought and to develop a holistic understanding of economic theory and policy.

**CO2:** Enhance and diversify their knowledge profile and get opportunities to pursue higher studies and research in heterodox economics.

## **CORE COURSE -10: 5B10SSE RESEARCH METHODOLOGY OF SOCIAL SCIENCES**

**CO1:** Get an initiation to the field of academic research.

**CO2:** Bridge the gap between theory and empirics and familiarize with the use and importance of data in research

**CO3:** Imbibe the importance of scientific research in economics based on academic honesty, integrity and ethics

**CO4:** Acquire skills in handling statistical software.

## **CORE COURSE -11: 5B11SSE BASIC ECONOMETRICS**

**CO1:** Acquire knowledge regarding the concepts and language of econometrics through a comprehensive introduction to basic econometric concepts, methodology and techniques of analysis.

**CO2:** Analyse real data with the help of econometric tools.



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**CO3:** Develop analytical skills substantially by undertaking econometric analysis.

## **CORE COURSE -12: 6B12SSE CENTRAL THEMES IN INDIAN ECONOMY**

**CO1:** Understand the features, basic structure and working of Indian economy

**CO2:** Identify the strategic drivers in the development of Indian Economy.

**CO3:** Analyse the qualitative and quantitative data relating to various economic issues and policies.

**CO4:** Comprehend and critically appraise the current problems and policies relating to Indian economy.

## **CORE COURSE -13: 6B13SSE DEVELOPMENT ECONOMICS**

**CO1:** Understand the development trajectories and basic concepts of economic development in a multidimensional perspective.

**CO2:** Acquire knowledge about the dynamics of development.

**CO3:** Examine the core issues and theories in economic development and growth.

## **CORE COURSE -14: 6B14SSE ENVIRONMENTAL ECONOMICS**

**CO1:** Understand the concepts of ecosystem, biodiversity, and conservation methods.

**CO2:** Understand the economic incentives to improve and conserve the environment.

**CO3:** Examine international environmental problems, disaster management, mitigation, and adaptation measures.

**CO4:** Evaluate environmental valuation, environmental policy and sustainable development efforts.

## **CORE COURSE -15: 6B15SSE GENDER AND DEVELOPMENT**

**CO1:** Get conceptual clarity related to the term gender and development.

**CO2:** Understand gender difference in economic participation in India and Kerala.

**CO3:** Familiarise international initiatives related to women and development.

**CO4:** Conceptualize the household production unit in a theoretical framework.



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## **CORE COURSE -16: 6B16SSE PROJECT**

**CO1:** Execute the preliminary steps and processes involved in scientific academic research

**CO2:** Develop an attitude towards evidence based social science research

## **GENERIC ELECTIVE COURSE -1: 5D01SSE BASICS OF ECONOMICS**

**CO1:** understand the basic concepts of economics in everyday life

**CO2:** evaluate major economic issues in and around them

## **GENERIC ELECTIVE COURSE II: 5D02SSE DEVELOPMENT ISSUES OF INDIAN ECONOMY**

**CO1:** develop a comprehensive perspective on the development issues confronted by Indian economy.

**CO2:** apply economic theories and concepts for understanding contemporary development issues.

## **GENERIC ELECTIVE COURSE III: 5D03SSE KERALA ECONOMY**

**CO1:** understand the structural changes in Kerala Economy.

**CO2:** evaluate the developmental issues of Kerala Economy.

## **GENERIC ELECTIVE COURSE IV: 5D04SSE FUNDAMENTALS OF BUDGET**

**CO1:** understand budget and the basic concepts, apart from budgetary procedures

**CO2:** acquire basic knowledge about the sources of revenue and expenditure of the government.

## **GENERIC ELECTIVE COURSE V: 5D05SSE INDIAN ECONOMY IN THE POST REFORM PERIOD**

**CO1:** understand the structural changes in the Indian economy during the post reform period.

**CO2:** evaluate the impact of the New Economic Policies on the various sectors of the economy.





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## COMPLEMENTARY ELECTIVE COURSE

### POLITICAL SCIENCE

#### **COMPLEMENTARY ELECTIVE COURSE 01: 1C01POL - PRINCIPLES OF POLITICAL SCIENCE**

**CO1:** Provide to the students an overview of the nature of politics and government.

**CO2:** Enable the students to understand the function of institutional structures and how they drive individual and organizational behaviors.

**CO3:** Students will be able to work with the approaches and theories used by political scientists to understand political phenomena.

**CO4:** Students will be able to analyze current political situations.

#### **COMPLEMENTARY ELECTIVE COURSE 02: 2C02POL- INTRODUCTION TO INDIAN POLITICAL SYSTEM**

**CO1:** Students will have a thorough understanding of the structure and various provisions of the constitution.

**CO2:** Enable students to understand the function of different constitutional bodies and Institutions.

**CO3:** Students will be able to evaluate the working of the political system.

**CO4:** Empower the students with skills necessary for a good citizen in a democracy.

## COMPLEMENTARY ELECTIVE COURSE

### HISTORY

#### **COMPLEMENTARY COURSE 03: 3C03 HIS - A ECONOMIC HISTORY OF MODERN INDIA (1793-1947)**

**CO1:** demonstrate comprehensive understanding of colonialism and economic changes that took place under colonial rule

**CO2:** explain the nature of industrialization in India and how it acted as impetus to national movement

**CO3:** analyze the impact of British colonialism on Indian economy

**CO4:** develop a critical approach to discuss the exploitative nature of colonial and



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capitalist economic policies

## **COMPLEMENTARY COURSE 04: 4C04HIS - A ENVIRONMENTAL HISTORY OF INDIA**

**CO1:** Understand the concept of environment and importance of environmental history

**CO2:** Explain human interactions with environment and depletion of natural resources

**CO3:** Assess the dynamic role of environmental movements in India

**CO4:** Develop an attitude and awareness to protect the natural environment of the country

## **B.A. FUNCTIONAL ENGLISH**

### **COURSE OUTCOMES**

#### **CORE COURSE I: 1B01FNG ESSENTIAL GRAMMAR FOR FUNCTIONAL ENGLISH**

**CO1:** Understand the function of grammatical items used in spoken / written language

**CO2:** Understand language rules, structure and usage.

**CO3:** Understand the relationship between the form and function of grammatical categories

**CO4:** Acquire the linguistic and communicative competence required in various social, academic & employment situations.

#### **CORE COURSE II: 2B02FNG APPLIED PHONETICS**

**CO1:** Understand the functioning of the English sound system

**CO2:** Develop the ability to adjust their ways of articulation to suit the sound system of English and overcome the influence of the native language on their English pronunciation.

**CO3:** Understand the differences in pronunciation between different varieties of English

**CO4:** Improve listening skills for better understanding and production of speech sounds



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**CO5:** Develop a neutral accent to speak English with national and international intelligibility

**CO6:** Know the basics of oral communication and develop pronunciation for performing some of the most common communicative functions.

**CO7:** Understand the telephone as a mode of communication and to prepare them to handle telephone calls.

## **CORE COURSE III:3B03FNG INTRODUCTION TO ENGLISH LITERATURE I**

**CO1:** Develop an understanding of the English literary history till the Neo Classical Age.

**CO2:** Understand the key terms and movements associated with English literature.

**CO3:** Acquire a basic idea about the various genres and sub-genres in Literature.

**CO4:** Acquire an in-depth understanding of a few of the major works written by the writers till the Neo-classical age.

## **CORE COURSE IV: 3B04FNG WRITING SKILLS**

**CO1:** understand and effectively apply the steps in the writing process.

**CO2:** construct unified, coherent and adequately developed paragraphs

**CO3:** identify various writing styles

**CO4:** apply various techniques of writing

**CO5:** Learn to edit and proofread

## **CORE COURSE V: 4B05FNG INTRODUCTION TO ENGLISH LITERATURE II**

**CO1:** Develop an understanding of English literary history from the Romantic Age to the Contemporary Age

**CO2:** Understand the key terms associated with English literature.

**CO3:** Understand the major movements, periods and writers.



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**CO4:** Acquire an in-depth understanding of a few of the major works written from the romantic Age till the Contemporary Age.

## **CORE COURSE VI: 4B06FNG ORAL COMMUNICATION PRACTICE**

**CO1:** Develop confidence to respond in English in situations where English is important

**CO2:** Develop listening and comprehension skills in the English language.

**CO3:** Acquire speech skills necessary for confident and intelligent participation in Group Discussions and extempore speeches

**CO4:** Learn skills related to teamwork and take up team leader roles in society as well as in future workplaces.

## **CORE COURSE VII: 5B07FNG INTRODUCTION TO LINGUISTICS**

**CO1:** Develop an awareness of the structural organization of language at different levels of expression

**CO2:** Understand the basic concepts of Linguistics and the relationship between the structure and functions of language items

**CO3:** Understand the various levels of linguistic analysis (Phonology, morphology, Syntax and Semantics)

**CO4:** Acquire a historical perspective of the development of language

**CO5:** Apply linguistics to different areas of activities like discourse analysis, media, ELT, NLP and literary criticism etc.

## **CORE COURSE VIII: 5B08FNG INTRODUCTION TO LITERARY THEORY AND CRITICISM**

**CO1:** Evaluate literary subjects from divergent critical stances, of both traditional and advanced thinkers and theorists to get a view of the stages of evolution in the field of criticism.

**CO2:** Understand the historical, socio-cultural, psychological and philosophical concerns that infuse critical thought and to broaden their academic view of the subject.

**CO3:** Acquire foundational analytic knowledge and skills for handling literary works.

**CO4:** Understand the connections between literature and theory have with the human



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condition, thereby affirming their impact on students as social beings.

## **CORE COURSE IX: 5B09FNG INDIAN WRITING IN ENGLISH**

**CO1:** Trace the development of Indian Writing in English

**CO2:** Explain the Indianness in Indian Literature

**CO3:** Read and appreciate Indian Literature

**CO4:** Analyze the strengths and constraints of Indian English as a literary medium

## **CORE COURSE X: 5B10FNG INTRODUCTION TO THEATER STUDIES**

**CO1:** Develop knowledge of theater history and dramatic literature

**CO2:** Acquire the ability of appreciation and aesthetic sense for theater arts and different genres of drama

**CO3:** Analyze, interpret and evaluate dramatic literature and theatrical productions

**CO4:** Understand the terms connected to theater/drama

## **CORE COURSE XI: 5B11FNG METHODOLOGY OF LANGUAGE AND LITERATURE**

**CO1:** Develop the ability to distinguish between humanities and other fields of study and understand the specific nature and purpose of studies in humanities.

**CO2:** Learn the nature and functions of language in human understanding, literature and culture.

**CO3:** Comprehend the role of literature in representing human reality, and understand the processes of cultural formation and cultural practices.

**CO4:** Acquire the taste, knowledge and skills for finding research problems and solutions, and learn the craft of academic writing and research.

## **CORE COURSE XII: 6B12FNG INTRODUCTION TO MEDIA STUDIES**

**CO1:** Analyze and evaluate media content critically

**CO2:** Understand the dialectical/dialogical relationship between society and media

**CO3:** Understand media functions and operations in the socio-historical contexts



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**CO4:** Acquire skills related to mass-media, social media, advertising and communication.

## **CORE COURSE XIII: 6B13FNG TRANSLATION STUDIES**

**CO1:** Understand the basic theories and functions of translation

**CO2:** Develop skills in translating literary and non-literary texts with a special focus on the functional aspects of translation

**CO3:** Understand translation skills to render texts from Malayalam/Hindi into English and vice versa

**CO4:** Analyze different approaches to translation and grasp its importance in the literary field

## **CORE COURSE XIV: 6B14FNG ENGLISH LANGUAGE TEACHING**

**CO1:** Understand the nature of language and the theories language acquisition and learning.

**CO2:** Develop an insight of the methods and approaches of teaching English.

**CO3:** Develop the skills of teaching language and literary discourses.

**CO4:** understand the importance and application of instructional materials and evaluation

## **CORE COURSE XV: 6B15FNG FILM STUDIES**

**CO1:** Appreciate film as an art form.

**CO2:** Understand the nature of representation on screen and how class, race, ethnicity and sexuality are represented.

**CO3:** Analyze films and produce informed and thorough close readings of films.

**CO4:** Understand how film connects with history, politics, technology, psychology and performance.

## **CORE COURSE XVI: 6B16FNG PROJECT**

**CO1:** Identify themes and ideas and document them in appropriate text formats.

**CO2:** Apply the knowledge and skills acquired during the course of study in organizing ideas and documenting them using accepted writing conventions.



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**CO3:** Explore areas and subjects of choice across disciplines maintaining the inter-Disciplinary / multifocal character of Functional English.

**CO4:** Write a paper that conforms to accepted standards of grammar, spelling, punctuation etc., with appropriate selection of fonts and correct use of MLA style

## **COMPLEMENTARY ELECTIVE COURSE: 3C01FNG INTRODUCTION TO WORLD LITERATURE– PART I**

**CO1:** Develop a general understanding of literary works across various cultural, national and linguistic boundaries

**CO2:** Develop an insight into the complex inter relationship among different literary and cultural traditions

**CO3:** Acquire the literary sensibility and critical acumen to read and appreciate literary texts of different genres

**CO4:** Demonstrate the ability to write reviews, write ups and critical comments on literary texts

## **COMPLEMENTARY ELECTIVE COURSE II: 4C02FNG INTRODUCTION TO WORLD LITERATURE-PART II**

**CO 1:** Develop a general understanding of literary works across various cultural, national and linguistic boundaries

**CO2:** Develop an insight into the complex inter relationship among different literary and cultural traditions

**CO3:** Acquire the literary sensibility and critical acumen to read and appreciate literary texts of different genres

**CO4:** Demonstrate the ability to write reviews, write ups and critical comments on literary texts

## **GENERIC ELECTIVE COURSE 1:5D 01FNG BASIC ENGLISH USE**

**CO 1:** Develop Listening, Speaking, Reading and Writing skills

**CO2:** Acquire overall communication efficiency.

**CO3:** Comprehend all kinds of English Language discourses.



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**CO4:** Learn to use English Language effectively

## **GENERIC ELECTIVE COURSE II: 5D02FNG BASICS OF ADVERTISING**

**CO1:** Identify the role of advertising within the marketing communication mix

**CO2:** Analyze advertisements in terms of creativity and execution

**CO3:** Develop knowledge of advertising its scope and opportunities

**CO4:** Create advertising objectives and put together a plan to meet these objectives

## **GENERIC ELECTIVE COURSE III: 5D03FNG ENGLISH FOR CAREERS**

**CO 1:** Make the students competent in their job-seeking, job-getting, and job-holding needs.

**CO2:** Develop communicative skills, which will enable the students to prepare for a career.

**CO3:** Equip the students in oral and written communication to enhance their academic and professional use of language.

**CO4:** Train them in making effective presentations.

## **GENERIC ELECTIVE COURSE IV: 5D04FNG ENGLISH FOR COMPETITIVE EXAMINATIONS**

**CO1:** Detect confusing words and spellings in English

**CO2:** Identify various vocabulary types in English

**CO3:** Construct correct and meaningful sentences

**CO4:** Produce coherent and cohesive paragraphs

**CO5:** Improve reading comprehension skills of the students

## **GENERIC ELECTIVE COURSE V: 5D05FNG FILM STUDIES**

**CO1:** Appreciate film as an art form.

**CO2:** Understand how film connects with history and politics,

**CO3:** Understand the major movements and masters in film history.





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**CO4:** Produce informed and thorough close readings of films

## **COMPLEMENTARY COURSES**

### **JOURNALISM**

#### **COMPLEMENTARY ELECTIVE COURSE I: 1C01JNL INTRODUCTION TO MASS COMMUNICATION**

**CO1:** Understanding the basic idea of Communication Theories, Models and their History.

**CO2:** Attain the capacity of identifying the suitable media platform for the transaction of ideas.

**CO3:** Creatively engage with innovative trends and traditional trajectories simultaneously.

#### **COMPLEMENTARY ELECTIVE COURSE II: 2C02JNL PRINT MEDIA PRACTICES**

**CO1:** Introduction to the world of news and Journalism and understanding of basic concepts

**CO2:** Learning the art of reporting and editing through theoretical and practical engagement

**CO3:** Objective understanding of the way in which world affairs are presented and to inculcate creative thinking in content making

**CO4:** Building avenues to think laterally about print media journalism in the digital age.

## **COMPLEMENTARY COURSES**

### **POLITICAL SCIENCE**

#### **COMPLEMENTARY ELECTIVE COURSE III: 3C05 POL INTRODUCTION TO POLITICAL SCIENCE**

**CO1:** Provide to the students an overview of the nature of politics and government

**CO2:** Enable the students to understand the function of institutional structures and how



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they drive individual and organizational behaviors

**CO3:** Students will be able to work with the approaches and theories used by political scientists to understand political phenomena

**CO4:** Students will be able to analyze current political situations

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C06 POL FOUNDATIONS OF INDIAN POLITICAL SYSTEM**

**CO1:** Students will have a thorough understanding of the structure and various provisions of the constitution

**CO2:** Enable students to understand the function of different constitutional bodies and institutions

**CO3:** Students will be able to evaluate the working of the political system **CO4:** Empower the students with skills necessary for a good citizen in a democracy

### **B.COM**

### **COURSE OUTCOMES**

#### **CORE COURSE I: 1B01 COM - MANAGEMENT CONCEPTS AND PRINCIPLES**

**CO1:-** Understand the evolution of management thoughts, concept of management, scope and its functions.

**CO2:-** Familiarize with current management practices.

**CO3:-** Understand the importance of ethics in business.

**CO4:-** Acquire knowledge and capability to develop ethical practices for effective management.

**CO5:-** Describe the emerging trends in management.

#### **CORE COURSE II : 2B02 COM - FUNCTIONAL APPLICATIONS OF MANAGEMENT**

**CO1:** Describe nature and scope of financial management and the elements in the management of finance

**CO2:** Enumerate marketing management and its different aspects



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**CO3:** Explain Human Resources Management and the activities involved in it

**CO4:** Understand the modern global marketing trends and its challenges

## **CORE COURSE III : 3B03 COM - ADVANCED ACCOUNTING**

**CO1.** Understand the theoretical and practical knowledge of the basics of accounting.

**CO2.** Acquire the knowledge of accounting for royalty, Consignment and Hire Purchase

**CO3.** Imbibe the accounting concepts of Inland Branch Business.

**CO4.** Comprehend the procedure for determining profit and financial position from incomplete records.

## **CORE COURSE V : 4B05 COM - CORPORATE ACCOUNTING**

**CO1:** Understand the mode of presentation and understanding of financial reporting .

**CO2:** Learn the accounting procedure for recording transaction relating to the issue and redemption of shares and debentures.

**CO3:** Imbibe the techniques of recording transactions in respect of amalgamation, reconstruction and liquidation of companies..

**CO4:** Understand the concept of IFRS and Ind AS

## **CORE COURSE VII: 5B07 COM - BUSINESS RESEARCH METHODOLOGY**

**CO1:** Understand the fundamental aspects of research in business

**CO2:** Identify and define research problem

**CO3:** Formulate research plan

**CO4:** Understand various methods of collecting data

**CO5:** Prepare research report themselves

## **CORE COURSE VIII : 5B08 COM - INCOME TAX LAW AND PRACTICE**

**CO1:** Define the basic concepts in Income tax, explain its evolution

**CO2:** Determine the residence and incidence of Tax



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**CO3:** Understand the incomes exempt from tax of an individual

**CO4:** Compute income under different heads of income

## **CORE COURSE IX: 5B09 COM - COST ACCOUNTING**

**CO1:** Explain the nature, scope, objectives and limitations of costing

**CO2:** Identify the elements of cost and describe the methods of their ascertainment and control

**CO3:** Explain the various methods of costing and their suitability for different industries

**CO4:** Ascertain the cost of production of products and jobs

## **CORE COURSE X : 5B10 COM - BANKING PRINCIPLES AND OPERATIONS**

**CO1:** Explain banking and describe the different types of banks and the functions of commercial bank

**CO2:** Narrate the role of RBI in the credit control, promotion and regulation of monetary System

**CO3:** Describe the relationship between banker and customer and the procedure for opening and operating the account

**CO4 :** Understand the modern trends and technology used in banking

## **CORE COURSE XII : 6B12 COM - FINANCIAL MARKETS AND SERVICES**

**CO1:** Understand the financial system and its constituents

**CO2:** Familiarise with the activities taking place in the financial markets

**CO3:** Appraise the various financial services available in the financial markets

**CO4:** acquire knowledge about financial derivatives and their features

## **CORE COURSE XIII : 6B13 COM - MANAGEMENT ACCOUNTING**

**CO1.** Understand the fundamental concepts of management accounting.

**CO2.** Acquire analytical skills associated with the interpretation of accounting reports



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**CO3.** Apply management accounting concepts in real life situations.

**CO4.** Develop judgmental skills associated with the use of accounting information in decision making.

**CO5.** Understand the use of marginal costing and budgetary control to plan and control cost and profit.

## **CORE COURSE XIV: 6B14 COM - AUDITING AND CORPORATE GOVERNANCE**

**CO1:** Understand the term auditing, its concept, principles, procedures and requirements needed for Auditing in accordance with current legal requirements and professional Standards.

**CO2:** Familiarize with the various aspects of audit consisting of internal check, vouching, verification and valuation of assets and liabilities

**CO3:** Understand the appointment, rights, duties and the liabilities of an auditor.

**CO4:** Explain the concept of Corporate Governance and its aspects

## **CORE COURSE XV: 6B15 COM - INCOME TAX AND GST**

**CO1:** Compute total income and determine the tax liability of an individual and partnership firm, company and cooperative society

**CO2:** Describe the income tax authorities, their powers and assessment procedure

**CO3:** Explain the procedure regarding deduction of tax at source, advance tax, refund, penalties and prosecution

**CO4:** Describe Goods and Service Tax, its levy and collection

## **CORE COURSE XVII: 6B17 COM - PROJECT**

**CO1:** Understand the method of carrying out a project

**CO2:** Undertake project work independently

## **CORE COURSES IN THE ELECTIVE STREAM**



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## **ELECTIVE STREAM II – COMPUTER APPLICATION**

### **CORE COURSE IV : COMPUTER APPLICATION I – 3B04 COM - INTRODUCTION TO COMPUTERS AND NETWORKS**

**CO1:** Understand about computer, peripherals, software and operating system

**CO2:** Understand the importance of IT in the modern world and recent development in IT

**CO3:** Develop WebPages for business

### **CORE COURSE VI : 4B06 COM - COMPUTER APPLICATION II – DATABASE MANAGEMENT SYSTEM**

**CO1:** Familiarize with the concepts of database management

**CO2:** Handle the database for business firms.

**CO3:** Develop knowledge in Access and SOL

### **CORE COURSE XI : COMPUTER APPLICATION III – 5B11 COM - INFORMATION TECHNOLOGY FOR BUSINESS**

**CO1:** Understand the role of information technology in business

**CO2:** Acquire knowledge in E-Commerce and its application

**CO3:** Acquire knowledge in information systems and Enterprise Resource Planning

**CO4:** Manage the office activities with the help of spreadsheet software

### **CORE COURSE XVI : COMPUTER APPLICATION IV – 6B16 COM - ACCOUNTING PACKAGES - TALLY**

**CO1:** Acquire knowledge in the accounting package Tally

**CO2:** Understand the method of creating accounts and vouchers in tally.

**CO3:** Able to prepare financial statements by using Tally

**CO4:** Help students develop skill in preparing financial statements in Tally.

**CO5:** Perform treatment of GST and TDS by using Tally

## **GENERAL AWARENESS COURSES**

### **GENERAL AWARENESS COURSE I : 1A11 COM - BUSINESS STATISTICS AND**



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## **BASIC**

### **NUMERICAL SKILLS**

**CO1:** Define statistics and explain its importance, scope, applications and limitations

**CO2:** Understand the basic knowledge of statistical techniques, which are applicable to business.

**CO3:** understand basic concepts in mathematics, which are applied in the managerial decision making.

**CO4:** Develop the basic mathematical skill needed for analyzing numeric problems related to business

### **GENERAL AWARENESS COURSE II : 3A12 COM - ENTREPRENEURSHIP DEVELOPMENT**

**CO1:** Identify the characteristics of an entrepreneur

**CO2:** describe the importance of entrepreneurs in the economic development of a nation

**CO3:** identify the different types of entrepreneurs

**CO4:** to strengthen their skill and quality as an entrepreneur

### **GENERAL AWARENESS COURSE III : 4A13 COM - GENERAL INFORMATICS SKILLS**

**CO1:** Explain the Fundamentals of Computers the use of computers in day to day application

**CO2:** Up to date and expand the basic informatics skills necessary in the emerging knowledge society

**CO3:** Effectively utilize the digital knowledge resources for their studies

**CO4:** State the areas where IT can be used effectively

**CO5:** Perform accounting by using the appropriate accounting packages

### **GENERAL AWARENESS COURSE IV : 4A14 COM - ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT**

**CO1:** Understand the components of environment and need for the protection of



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environment

**CO2:** Understand the effect of pollution on environment and the ways of protecting the environment

**CO3:** Explain the social issues relating to environmental pollution

**CO4:** Clearly understand the various environmental hazards and the ways of managing disaster.

## **COMPLEMENTARY ELECTIVE COURSES**

### **COMPLEMENTARY COURSE I: 2C01 COM - QUANTITATIVE TECHNIQUE FOR BUSINESS DECISIONS**

**CO1:-** Acquaint with the basic statistical tools, which can be applied in business and economic situations.

**CO2:-** Develop knowledge in quantitative techniques, which help in tackling various problems for modern business.

**CO3:-** Understand and solve problems in probability, correlation and regression.

**CO4:-** Understand the effect of trend and seasonal variations on business.

**CO5:-** Familiarize with the testing of hypotheses.

### **COMPLEMENTARY COURSE II: 3C02 COM - BUSINESS REGULATORY FRAMEWORK**

**CO1:** Understand the nature of contracts and the essential elements of a valid contract

**CO2:** Explain the difference between a valid contract and a void contract

**CO3:** Understand the breach of contract and remedies available for a breach of contract

**CO4:** Understand various kinds of special contracts like indemnity, guarantee, bailment and agency contract

### **COMPLEMENTARY COURSE III: 3C03 COM - BUSINESS ECONOMICS**

**CO1:** Understand the concept of economics and its use in business





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**CO2:** Understand the concept of demand, elasticity and demand forecasting

**CO3:** Understand production function and law of production

**CO4:** Understand the methods of determining price of a product

**CO5:** Explain the methods of computing national income.

**CO6:** Conceive the developmental issues of Indian economy and Kerala economy

## **COMPLEMENTARY COURSE IV: 4C04 COM - CORPORATE LAW AND BUSINESS REGULATIONS**

**CO1:** Understand the provisions of Companies Act 2013

**CO2:** Describe the procedure for the formation, registration and winding up of the company

**CO3:** Explain various kinds of companies and the authorities of companies in India

**CO4:** Understand the management and administration of Companies

### **B.SC. CHEMISTRY** **COURSE OUTCOMES**

## **CORE COURSE 1: 1B01CHE - THEORETICAL AND INORGANIC CHEMISTRY**

**CO1:** Correlate the structure and behavior of atom

**CO2:** Differentiate the various chemical interactions in molecules through bonding concepts

**CO3:** Analyze and interpret the gradation in the properties of elements in the periodic table

**CO4:** Predict the nuclear transmutations

**CO5:** identify the role of radioactive materials in different applications

## **CORE COURSE 3: 2B03CHE - ANALYTICAL AND INORGANIC CHEMISTRY – I**

**CO1:** Determine the error, standard deviation and relative standard deviation of analytical data.

**CO2:** Understand statistical treatment of analytical data and the principles underlying volumetric titrations.



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**CO3:** Understand basic principles behind selective precipitation of cation.

**CO4:** Summarize the characteristics of s- and p- block elements

**CO5:** Compare the various concepts of acids and bases

## **CORE COURSE 4: 3B04CHE/PCH - ORGANIC CHEMISTRY – I**

**CO1:** Explain the types of electron displacement in organic molecules and predict the properties of molecules based on electron displacement effect

**CO2:** Distinguish aromatic, anti aromatic and nonaromatic compounds and ions and analyse the mechanistic details of aromatic electrophilic substitution

**CO3:** Classify stereo isomers, understand the property of chirality, apply CIP rules to recognize the configuration and explain the stability of conformations drawing energy profile diagram

**CO4:** Explain the mechanism of polymerization, synthesis and application of industrially important Polymers

**CO5:** Explain the classification and the methods of preparation of important dyes

**CO6:** Illustrate the preparative methods and synthetic applications of important synthetic reagents

## **CORE COURSE 6: 4B06CHE/PCH - ORGANIC CHEMISTRY – II**

**CO1:** Describe mechanisms for substitution and elimination reactions, and predict the effect of nucleophile, leaving group, and solvent on the relative rates of SN1 versus SN2 reactions, and E1 versus E2 reactions, as well as on the relative rates of substitution versus elimination.

**CO2:** Explain Chugaev and Cope eliminations and E1CB mechanism

**CO3:** Illustrate the preparative methods and important properties of Hydrocarbons, halogen compounds, Hydroxy compounds and Carbonyl Compounds

**CO4:** Explain the mechanism of important name reactions including rearrangements involving hydroxyl and Carbonyl functional groups

**CO4:** Explain the mechanism of important name reactions including rearrangements involving hydroxyl and Carbonyl functional groups

## **CORE COURSE 7: 5B07CHE/PCH - ANALYTICAL AND INORGANIC CHEMISTRY- II**

**CO1:** Understand the qualitative and quantitative aspects of analysis and separation techniques

**CO2:** Explain instrumentation and working principle of different analytical techniques – TGA, DTA and radio chemical method of analysis.

**CO3:** Familiarize with the preparation, properties and uses of some inorganic compounds like hydrides of boron, sulphur and silicon based inorganic polymers and understand their importance



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**CO4:** Explain the classification of refractories.

**CO5:** Know the position, electronic configuration and physical properties of noble gases and explain hybridization and geometry of different xenon compounds

**CO6:** Explain various steps involved in metallurgical operations and power metallurgy and understand Corrosion, theories of Corrosion and factors affecting Corrosion

## **CORE COURSE 8: 5B08CHE/PCH - INORGANIC CHEMISTRY**

**CO1:** Understand the behavior of transition and inner transition elements and explain the separation of lanthanides by ion exchange method and lanthanide contraction

**CO2:** Understand key features of co-ordination compounds and illustrate the theories of coordination complexes, stability of complexes and explain factors affecting crystal field splitting.

**CO3:** Explain biological functions of metal ions.

**CO4:** Familiarize new elements in periodic table and Understand recent developments in inorganic chemistry.

## **CORE COURSE 9: 5B09CHE/PCH - PHYSICAL CHEMISTRY I**

**CO1:** Recognize and relate the properties of ideal and real gases

**CO2:** Describe the properties of liquids.

**CO3:** Identify and distinguish the types of solutions

**CO4:** Explain colligative properties of dilute solution and determine the molecular weight of a solute

**CO5:** Identify Different crystallographic systems and various types of crystal defects

**CO6:** Describe X ray diffraction to explain internal structure of solids

## **CORE COURSE 10: 5B10CHE/PCH - PHYSICAL CHEMISTRY II**

**CO1:** Understand the concept of temperature, the thermodynamic state and equilibrium.

**CO2:** Explain the first law of thermodynamics through work and heat and its Mathematical Formulation.

**CO3:** Understand the ideal gas equation and kinetic theory of gases.

**CO4:** Understand the second law of thermodynamics and thermodynamic temperature scale.

**CO5:** Define entropy and thermodynamic potentials.

**CO6:** Understand the basic concepts of Statistical mechanics.

## **CORE COURSE 14: 6B14CHE/PCH- ORGANIC CHEMISTRY - III**

**CO1:** Acquaint with the classification, structures and properties of carbohydrates, explain the configuration of glucose and fructose, their inter conversion, illustrate Killiani-Fischer synthesis and Ruff degradation

**CO2:** Illustrate the preparative methods and the properties of different classes of organic



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acids, nitrogen containing compounds and heterocyclic compounds .

**CO3:** Classify amino acids and peptides and explain the synthesis of simple peptides by N-protection (t-butyloxycarbonyl and phthaloyl) & C-activating groups and Merrifield solid phase synthesis. Explain the methods of determination of primary structure of peptides

**CO4:** Distinguish the components of nucleic acids and lipids and their roles in biological system and the biological importance of various natural products .Familiarise with important drugs and their therapeutic applications

**CO5:** Recognise The types and characteristics of pericyclic reactions and analyse the pericyclic reactions by FMO methods. Understand the photochemistry of carbonyl compounds

**CO6:** Understand the principles of Green Chemistry and the importance of green synthesis and recognize the impact of green chemistry on human health and the environment

## **CORE COURSE 15: 6B15CHE/PCH - PHYSICAL CHEMISTRY - III**

**CO1:** Understand the mechanism of electrical conductance, theories of electrical conductance, and conductometric titrations

**CO2:** Understand the basic principle of ionic equilibrium and its application in laboratories

**CO3:** Design different types of electrochemical cell and able to calculate its potential.

**CO4:** Familiarise with electro analytical methods

**CO5:** Acquaint with kinetics of simple, complex, enzymatic and surface reactions

**CO6:** Understand basic principles of photochemistry and its application in spectrophotometry

## **CORE COURSE 16: 6B16CHE/PCH - PHYSICAL METHODS IN CHEMISTRY**

**CO1:** i) Explain the important principles of spectroscopy  
ii) Apply spectroscopic techniques in analyzing the structure of simple organic molecules

**CO2:** Acquainting the working principles of various instruments and their functions

**CO3:** Understand the basic principles of symmetry and group theory and its applications in chemistry

**CO4:** Study the basic principles of nanochemistry and understand the various nanofabrication methods

**CO5:** Explain the important principles for quantum chemical and molecular mechanic methods of computing the geometry and energy of molecules

## **CORE COURSE 17: DISCIPLINE SPECIFIC ELECTIVE COURSES**



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## **6B17CHE/PCH- A - ENVIRONMENTAL CHEMISTRY**

- CO1:** Know the importance of environmental studies and methods of conservation of natural resources.
- CO2:** Describe the structure and function of an ecosystem and explain the values and Conservation of bio-diversity.
- CO3:** Explain the sources, environmental effects and control measures of various types of pollutions.
- CO4:** Identify the toxic chemicals in environment and understand the sources, effects and treatment of heavy metal poisoning
- CO5:** Understand the methods of domestic water treatment , Sewage analysis and Sewage treatment

## **6B17CHE/PCH- B - APPLIED CHEMISTRY**

- CO1:** Explain the origin of coal, coal products , petroleum products and their applications.
- CO2:** Explain the manufacture of fertilizers , pesticides and their applications
- CO3:** Understand the manufacture of glasses, cement , ceramics and the formulations of paints and varnishes
- CO4:** Familiarize with the chemistry of fats and oils and explain the production of soaps and detergents.
- CO5:** Understand the chemistry of food additives and explain the manufacture and refining of pulp.
- CO6:** Understand importance of industrial safety and industrial pollution control.

## **6B17CHE/PCH- C - POLYMER CHEMISTRY**

- CO1:** Classify polymers and explain the configuration of polymers and properties like glass transition temperature and melting point of polymers
- CO2:** Illustrate the preparation, properties and applications of polymers
- CO3:** Interpret the mechanism of polymerization
- CO4:** Acquaint various polymer processing technologies and explain thermal methods of analysis of polymers
- CO5:** Know the recent advances in polymer chemistry

## **6B17CHE/PCH - D - NANOCHEMISTRY**

- CO1:** Understand the basic concepts and classification of nanomaterials.
- CO2:** Analyze different nano systems and their properties.
- CO3 :** Understand the various techniques adopted for the synthesis and characterization of



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nanomaterials.

**CO4** : Characterize the nanomaterials using various microscopic techniques.

**CO5**: Understand the application of nanomaterials in various fields including catalysis, photonics, and medicine

## **CORE COURSE 2 PRACTICAL I: (1B02CHE/PCH& 2B02CHE/PCH) - VOLUMETRIC ANALYSIS**

**CO1**: Apply the theoretical concepts while performing experiments.

**CO2**: Acquire practical skill to estimate acid, base, oxidizing agents etc by volumetric titration method

**CO3**: Estimate the metallic ions by complexometric titration method

**CO4**: Acknowledge experimental errors and their possible sources.

**CO5**: Able to prepare inorganic complexes

**CO6**: Design, carry out, record and analyze the results of chemical experiments

## **CORE COURSE 5 PRACTICAL II: (3B05CHE/PCH& 4B05CHE/PCH) - INORGANIC QUALITATIVE ANALYSIS**

**CO1**: Apply the theoretical concepts while performing experiments.

**CO2**: Acquire practical skill to analyse the anions and cations qualitatively present in a mixture of inorganic salts

**CO3**: Able to design, carry out, record and analyze the results of chemical experiments

**CO4**: Learns the effective usage of chemicals

## **CORE COURSE 11 PRACTICAL III: 5B11 CHE /PCH & 6B11 CHE/PCH - GRAVIMETRIC ANALYSIS**

**CO1**: Make use of standardised procedures for the Gravimetric analysis

**CO2**: learn the skills of Precipitation process, digestion, filtration, incineration etc.

**CO3**: Acquire practical Knowledge of co-precipitation

**CO4**: Handle sintered glass vessels

**CO5**: Acknowledge experimental errors and their possible sources.

**CO6**: Able to design, carry out, record and analyze the results of chemical experiments

## **CORE COURSE 12 PRACTICAL IV: 5B12 CHE/PCH& 6B12 CHE/PCH - ORGANIC CHEMISTRY**

**CO1**: Apply the theoretical concepts while performing experiments.

**CO2**: Acquire practical skill in qualitative analysis of organic compounds

**CO3**: Acquire practical skill in preparing organic compounds and in their purification by crystallisation

**CO4**: Separate organic compounds in a mixture –by steam distillation, TLC and Column



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Chromatography

**CO5:** Acquire the habit of working safely with the chemicals and handling of equipments

## **CORE COURSE 18 PRACTICAL V: 6B18CHE/PCH - PHYSICAL CHEMISTRY**

**CO1:** Acquire practical skill in physical chemistry experiments such as Cryoscopy, Transition Experiments, Phase Rule Experiments, Conductometric titrations, Potentiometric titrations, colorimetry and Chemical Kinetics

**CO2:** Learn statistical approach for evaluating data

**CO3:** Able to carry out and record these experiments in a skilful manner

**CO4:** Acquire the habit of working safely with the chemicals and handling of equipments

## **CORE COURSE 13 PROJECT/INDUSTRIAL VISIT: 5B13CHE/PCH 6B13CHE/PCH - PROJECT**

**CO1:** Able to enhance the skills of managing the resources, time and team work.

**CO2:** Students will be able to function as a member of an interdisciplinary problem solving team.

## **GENERIC ELECTIVE COURSE 1: 5D01CHE/PCH - CHEMISTRY IN SERVICE TO MAN**

**CO1:** i) Understand the classification, structure, function and applications of polymers  
ii) Understand the importance of biodegradable polymers

**CO2:** Acquaint with different types of fertilizers and pesticides and understand the effect of fertilizers and pesticides on the environment

**CO3:** Explain the classification of fuels and composition of petroleum and familiarise the fuel cells and batteries and Understand their applications in modern life

**CO4:** Explain different types of glasses, their applications and the composition of Portland cement

**CO5:** Identify the harmful chemicals present in cosmetics and understand their effects in human body

## **GENERIC ELECTIVE COURSE 2: 5D02CHE/PCH - DRUGS - USE & ABUSE**

**CO1:** Familiarise the classes of drugs and their examples

**CO2:** Distinguish prescription drugs and over the counter drugs

**CO3:** Understand the routes of administration of drugs and their importance

**CO4:** Familiarise various synthetic drugs and their uses

**CO5:** Understand the consequences of misuse of antibiotic

**CO6:** Recognise the drugs of abuse and understand the consequences of drug abuse

## **GENERIC ELECTIVE COURSE 3: 5D03CHE/PCH - ENVIRONMENTAL STUDIES**



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**CO1:** Differentiate the environmental segments and understand the importance of environmental segments

**CO2:** Identify the types of environmental pollution and the various sources of the pollution

**CO3:** Understand the consequences of environmental pollutions

**CO4:** Explain the measures of control of environmental pollution

**CO5:** Recognise various sustainable energy sources

## **GENERIC ELECTIVE COURSE 4: 5D04CHE/PCH - NANOMATERIALS**

**CO1:** Understand the basic concepts of nanoscale science and technology.

**CO2:** Inculcate the enquiry based learning and increase the level of interest in nanoscience.

**CO3:** Understand the societal implications and the scope of nanotechnology.

## **GENERIC ELECTIVE COURSE 5: 5D05CHE/PCH - CHEMISTRY IN EVERYDAY LIFE**

**CO1:** Identify the harmful ingredients and their effects of cleansing agent and cosmetics

**CO2:** Familiarise adulterants in food, food additives and food preservatives

**CO3:** Explain the harmful effects of modern food habits

**CO4:** Classify the drugs and familiarize the applications of various drugs

**CO5:** Understand the consequences of misuse of antibiotics

**CO6:** Prepare toilet soap using vegetable oil.

## **COMPLEMENTARY COURSES**

### **PHYSICS**

## **COMPLEMENTARY ELECTIVE COURSE I: 1C01PHY - MECHANICS**

**CO1:** Understand the basic concepts of Properties of matter

**CO2:** Explain the dynamics of rigid bodies.

**CO3:** Understand the basic concepts of wave motion and oscillations

## **COMPLEMENTARY ELECTIVE COURSE II: 2CO2PHY - ELECTRICITY, MAGNETISM AND THERMODYNAMICS**

**CO1:** Understand the basic concepts of Magnetism & electricity

**CO2:** Explain the magnetic effects of electric currents

**CO3:** Understand the basic principles of Thermodynamics

## **COMPLEMENTARY ELECTIVE COURSE III: 3C03PHY - OPTICS AND PHOTONICS**





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**CO1:** Understand the basic concepts of Interference

**CO2:** Understand the basic concepts of Diffraction

**CO3:** Understand the basic concepts of Polarization

**CO4:** Understand the basic concepts of Photonics and Fibre Optics

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04PHY - ELECTRONICS AND MODERN PHYSICS**

**CO1:** Understand the basic concepts of Basic electronics

**CO2:** Understand the basic concepts of Digital electronics

**CO3:** Understand the basic concepts of Nuclear Physics

**CO4:** Understand the basic concepts of Particle physics and Astrophysics

## **COMPLEMENTARY ELECTIVE COURSE V: 4C05PHY - PHYSICS PRACTICAL**

**CO1:** Familiarise with apparatus for experiments in mechanics, optics, electricity and magnetism and electronics and electronics experiments.

**CO2:** Develop skill in setting up of apparatus for accurate measurement of physical quantities.

**CO3:** Understand multiple experimental techniques for determining physical quantities.

**CO4:** Develop skill in systematic way of measurements by minimizing possible errors.

### **COMPLEMENTARY COURSES**

#### **MATHEMATICS**

## **COMPLEMENTARY ELECTIVE COURSE I: 1C01MAT-CH - MATHEMATICS FOR CHEMISTRY I**

**CO1:** Understand Successive differentiation and Leibnitz's theorem for the nth derivative of the product of two functions

**CO2:** Understand Fundamental theorem – Rolle's theorem, Lagrange's mean-value theorem and Cauchy's mean value theorem.

**CO3:** Understand Taylor's theorem, expansions of functions – Maclaurin's series, expansion by use of known series and Taylor's series.

**CO4:** Understand the method of finding limits of Indeterminate forms.

**CO5:** Understand Polar, Cylindrical and Spherical co-ordinates.

**CO6:** Understand Rank of a matrix, elementary transformation of a matrix, equivalent matrices, elementary matrices, Gauss-Jordan method of finding the inverse, normal form of a matrix and partition method of finding the inverse.

**CO7:** Understand solution of linear system of equations – method of determinants – Cramer's rule, matrix inversion method, consistency of linear system of equations, Rouché's theorem, procedure to test the consistency of a system of equations in n



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unknowns, system of linear homogeneous equations.

**CO8:** Understand Linear transformations, orthogonal transformation and linear dependence of vectors.

**CO9:** Understand methods of curve fitting, graphical method, laws reducible to the linear law, principles of least squares, method of least squares and apply the principle of least squares to fit the straight line  $y=a+bx$ , to fit the parabola  $y=a+bx+cx^2$ , to fit  $y=ax^b$ ,  $y=ae^{bx}$  and  $xy^n=b$

## **COMPLEMENTARY ELECTIVE COURSE II: 2C02MAT-CH - MATHEMATICS FOR CHEMISTRY II**

**CO1:** Understand Functions of two or more variables, limits and continuity.

**CO2:** Understand partial derivatives, homogeneous functions, Euler's theorem on homogeneous functions, total derivative, differentiation of implicit functions and change of variables.

**CO3:** **CO2:** Understand Reduction formulae for trigonometric functions and evaluation of definite integrals  $\int_0^{\frac{\pi}{2}} \sin^n x dx$ ,  $\int_0^{\frac{\pi}{2}} \cos^n x dx$  and  $\int_0^{\frac{\pi}{2}} \sin^v x \cos^q x dx$

**CO4:** Understand Substitutions and the area between curves, arc length, areas and length in polar coordinates.

**CO5:** Understand Double and Iterated Integrals over rectangles, double integrals over general regions, area by double integration, double integrals in polar form and triple integrals in rectangular co-ordinates.

**CO6:** Understand Eigen values, Eigen vectors, properties of Eigen values, Cayley-Hamilton theorem, reduction to diagonal form, similarity of matrices, powers of a matrix, reduction of quadratic form to canonical form and nature of a quadratic form

## **COMPLEMENTARY ELECTIVE COURSE III: 3C03MAT-CH - MATHEMATICS FOR CHEMISTRY III**

**CO1:** Understand Ordinary differential equations, Geometrical meaning of  $y'=f(x, y)$  and Direction Fields.

**CO2:** Understand Methods of solving Differential Equations: Separable ODEs, Exact ODEs, Integrating Factors, Linear ODEs and Bernoulli Equation.

**CO3:** Understand Orthogonal Trajectories, Existence and Uniqueness of Solutions.

**CO4:** Understand Second order ODEs, Homogeneous Linear ODEs of second order, Homogeneous Linear ODEs with constant coefficients, Differential Operators, Euler-Cauchy Equation, Existence and Uniqueness of Solutions – Wronskian, Nonhomogeneous ODEs and Solution by variation of Parameters

**CO5:** Understand Laplace Transform, Linearity, first shifting theorem, Transforms of Derivatives and Integrals, ODEs, Unit step Function, second shifting theorem,



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Convolution, Integral Equations, Differentiation and integration of Transforms and to solve special linear ODE's with variable coefficients and Systems of ODEs

**CO6:** Understand Fourier series, arbitrary period, Even and Odd functions, Half-range Expansions.

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04MAT-CH - MATHEMATICS FOR CHEMISTRY IV**

**CO1:** Understand Partial Differential Equations, Modeling, Vibrating String, Wave Equation.

**CO2:** Solve PDE by Separating Variables, by use of Fourier Series, D-Alembert's solution of the wave equation and Heat Equation.

**CO3:** Understand Numerical Integration, Trapezoidal Rule, Simpson's 1/3-Rule

**CO4:** Understand Numerical methods to find Solutions of Ordinary Differential Equations: Solution by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods.

**CO5:** Understand volumes of solid using cross sections and areas of surfaces of revolution

## **B.SC. COMPUTER SCIENCE**

### **COURSE OUTCOMES**

#### **CORE COURSE I: 1B01CSC INTRODUCTION TO C PROGRAMMING**

**CO1:** Aware about basics of programming.

**CO2:** Capable to analyze the problem and design algorithm and flowchart.

**CO3:** Familiar the basics of high-level language – C.

**CO4:** Able to develop efficient and error free programs in C.

#### **CORE COURSE II: 2B02CSC ADVANCED C PROGRAMMING**

**CO1:** Familiar with advanced concepts of C program.

**CO2:** Capable to work with user defined as well as library functions.

**CO3:** Skilled to solve more complex problems.

**CO4:** Able to develop C programs using structure, union, pointers and files.



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## **CORE COURSE III: 2B03CSC ADVANCED C PROGRAMMING - LAB**

### **GENERAL AWARENESS COURSE I: 3A11CSC PROGRAMMING IN C++**

**CO1:** Describe the Object-Oriented Paradigm

**CO2:** Understand dynamic memory management techniques

**CO3:** Analyze a problem and construct a C++ program that solves it

**CO4:** Discover errors in a C++ program and describe how to fix them

### **GENERAL AWARENESS COURSE II: 3A12CSC DATABASE MANAGEMENT**

**CO1:** Familiar with organized data collection.

**CO2:** Able to design data bases.

**CO3:** Skilled to normalize the data bases.

**CO4:** Capable to frame queries for various purposes

### **CORE COURSE IV: 3B04CSC DATA STRUCTURES**

**CO1:** Able to analyze the complexity of algorithm.

**CO2:** Familiar with linear and nonlinear data structures.

**CO3:** Acquire the ability to select appropriate data structure for a given problem.

**CO4:** Obtain skill for systematic approach to programming.

### **GENERAL AWARENESS COURSE III: 4A13CSC DIGITAL ELECTRONICS**

**CO1:** Introduce the basic and important concepts of Digital Principles and Applications.

**CO2:** Familiarize with basic building blocks of Digital systems, Digital Logic and Digital Circuits.

**CO3:** Design simple combinational digital systems.

**CO4:** Familiarize different number systems, codes and data representation.

### **GENERAL AWARENESS COURSE IV: 4A14CSC OPERATING SYSTEMS**

**CO1:** Familiarize with basics of design of operating systems.



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**CO2:** Introduce basic working process of operating systems.

**CO3:** To understand the importance process and scheduling.

**CO4:** To understand the issues in memory management.

## **CORE COURSE V: 4B05CSC SOFTWARE ENGINEERING**

**CO1:** To understand the Software Development Life Cycle Models.

**CO2:** To familiarize with Software Requirement Analysis and Specification.

**CO3:** To familiarize with Classical Software Design Techniques.

**CO4:** To familiarize with various Software Testing Techniques and Tools.

## **CORE COURSE VI: 4B06CSC LAB 2 – DATA STRUCTURES USING C++**

## **CORE COURSE VII: 4B07CSC LAB 3 – DATABASE MANAGEMENT SYSTEM**

## **CORE COURSE VIII: 5B08CSC WEB TECHNOLOGY**

**CO1:** Understand different components in web technology and WWW.

**CO2:** Learn to develop interactive Web pages.

**CO3:** Present a web document with server-side scripting using PHP.

**CO4:** Know the basics of AJAX.

## **CORE COURSE IX: 5B09CSC JAVA PROGRAMMING**

**CO1:** Know the overall structure and concept of logic building activity of Java programming language

**CO2.** Identify the real-world things as well as the relationship between them and understand transforming them into their corresponding computer representations.

**CO3.** Realize how to achieve code reusability using inheritance, interfaces and packages and expedite application development activities.

**CO4.** Familiarize simple and robust way of handling multitasking and runtime error as well as such kind of abnormal situations within a program.



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**CO5.** Design GUI based applications and applications that can be transmitted over Internet.

## **CORE COURSE X: 5B10CSC COMPUTATION USING PYTHON**

**CO1:** Learn Python for expressing computation

**CO2:** Familiarize with functions and modules in python

**CO3:** Understand object-oriented programming concepts

**CO4:** Learn the techniques for database connectivity and GUI programming in Python

## **CORE COURSE XI: 5B11CSC-A ALGORITHM DESIGNING**

**CO1:** Capable to select suitable algorithm design technique.

**CO2:** Able to design optimum algorithms for problems.

**CO3:** Skilled to design solutions for real problems.

## **CORE COURSE XI: 5B11CSC-B LINUX ADMINISTRATION**

**CO1:** To learn basic Linux commands and understand the file system structure

**CO2:** To understand the Boot loaders and the configuration files

**CO3:** To learn different system services, maintenance and configuring these

**CO4:** To experience Shell Scripting

## **CORE COURSE XI: 5B11CSC-C COMPUTER GRAPHICS**

**CO1:** Understand basic concepts of graphics input and display devices.

**CO2:** Learn line and circle drawing algorithms.

**CO3:** Familiarization with 2D and 3D transformations and projections.

**CO4:** Understand fundamentals of image processing.

## **CORE COURSE XII: 6B12CSC DATA COMMUNICATION AND COMPUTER NETWORKING**

**CO1:** Understand state-of-the-art in network protocols, architectures and application.



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**CO2:** To acquire knowledge about different computer networks

**CO3:** To understand the use of layer architecture for networking systems.

## **CORE COURSE XIII: 6B13CSC COMPILER DESIGN**

**CO1:** Learn the basic principles of compiler.

**CO2:** Get an idea about the related programs.

**CO3:** Understand different components of a compiler.

**CO4:** Understand the phases of a compiler.

## **CORE COURSE XIV: 6B14CSC COMPUTER ORGANIZATION**

**CO1:** Understand the basic terminology of computer system.

**CO2:** Understand the functional units of a computer system.

**CO3:** Understand the basic operations of a computer system.

**CO4:** Understand the memory organization in a computer system.

## **CORE COURSE XIV: 6B15CSC-A INFORMATION SECURITY**

**CO1:** To understand the need of information security and to master information security Concepts, mechanisms and services as well as issues related to information Security.

**CO2:** To be familiar with cryptography and its categories.

**CO3:** Distinguish public and private key crypto systems and familiarize the rsa crypto System.

**CO4:** To attain the knowledge of digital signature and its security services.

## **CORE COURSE XIV: 6B15CSC-B DATA MINING**

**CO1:** To Introduce the Concepts of Data Mining and its Applications.

**CO2:** To Understand Investigation of Data using practical Data Mining Tools.

**CO3:** To Introduce Association Rules Mining.

**CO4:** To Introduce Clustering and Classification.



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## **CORE COURSE XIV: 6B15CSC-C BIOINFORMATICS**

**CO1:** Understand Bioinformatics and biological databases.

**CO2:** Understand Concept of Biology.

**CO3:** Understand Sequence alignment and Similarity search tools.

**CO4:** Structural bioinformatics and Bioinformatic tools.

## **CORE COURSE XVI: 6B16CSC LAB 4 – JAVA PROGRAMMING**

## **CORE COURSE XVII: 6B17CSC LAB 5 – WEB TECHNOLOGY AND PYTHON PROGRAMMING**

## **CORE COURSE XVIII: 6B18CSC PROJECT**

### **GENERIC ELECTIVE COURSE 1: 5D01CSC - PROGRAMMING IN C**

**CO1:** To understand the basic knowledge of programming

**CO2:** To develop C programs

**CO3:** To develop skill in advanced program constructs

**CO4:** To develop skill in programming

### **GENERIC ELECTIVE COURSE 2: 5D02CSC - WEB TECHNOLOGY**

**CO1:** To understand the knowledge of HTML

**CO2:** To understand the knowledge of various HTML tags

**CO3:** To enable students to program for the World Wide Web using HTML

**CO4:** To understand the basic knowledge of Javascript

### **GENERIC ELECTIVE COURSE 3: 5D03CSC - DATABASE MANAGEMENT SYSTEM**

**CO1:** To understand the fundamentals of database management system

**CO2:** To develop Skill in designing database

**CO3:** To understand the concept of SQL commands

**CO4:** To develop Skill in writing queries





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## **GENERIC ELECTIVE COURSE 4: 5D04CSC - FUNDAMENTALS OF COMPUTERS AND PROGRAMMING**

**CO1:** To know the working principle of a computer

**CO2:** To understand the concept of number system

**CO3:** To understand the basics of computer network

**CO4:** To understand the basics of programming

## **GENERIC ELECTIVE COURSE 5: 5D05CSC - INTRODUCTION TO PYTHON PROGRAMMING**

**CO1:** Learn Python for expressing computation

**CO2:** Learn about program control statements in python

**CO3:** Familiarize with functions and modules in python

**CO4:** Learn the techniques for data visualization in python

### **COMPLEMENTARY COURSES**

#### **MATHEMATICS**

### **COMPLEMENTARY ELECTIVE COURSE 1: 1C01 MAT-CS - MATHEMATICS FOR COMPUTER SCIENCE I**

**CO1:** Understand Successive differentiation and Leibnitz's theorem for the nth derivative of the product of two functions

**CO2:** Understand Fundamental theorem – Rolle's theorem, Lagrange's mean-value theorem and Cauchy's mean value theorem.

**CO3:** Understand Taylor's theorem, expansions of functions – Maclaurin's series, expansion by use of known series and Taylor's series.

**CO4:** Understand the method of finding limits of Indeterminate forms.

**CO5:** Understand Polar, Cylindrical and Spherical co-ordinates.

**CO6:** Understand Rank of a matrix, elementary transformation of a matrix, equivalent matrices, elementary matrices, Gauss-Jordan method of



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finding the inverse, normal form of a matrix and partition method of finding the inverse.

**CO7:** Understand solution of linear system of equations – method of determinants – Cramer’s rule, matrix inversion method, consistency

of linear system of equations, Rouche’s theorem, procedure to test the consistency of a system of equations in n unknowns, system of linear homogeneous equations.

**CO8:** Understand Linear transformations, orthogonal transformation and linear dependence of vectors.

**CO9:** Understand methods of curve fitting, graphical method, laws reducible to the linear law, principles of least squares, method of least squares and apply the principle of least squares to fit the straight line  $y = a+bx$ , to fit the parabola  $y=a+bx+cx^2$ , to fit  $y = ax^b$ ,  $y = aebx$  and  $xy^n=b$

## COMPLEMENTARY ELECTIVE COURSE 2: 2C02 MAT-CS - MATHEMATICS FOR COMPUTER SCIENCE II

**CO1:** Understand Functions of two or more variables, limits and continuity.

**CO2:** Understand partial derivatives, homogeneous functions, Euler’s theorem on homogeneous functions, total derivative, differentiation of implicit functions and change of variables.

**CO3:** Understand Reduction formulae for trigonometric functions and evaluation of definite integrals  $\int_0^{\frac{\pi}{2}} \sin^n x dx$ ,  $\int_0^{\frac{\pi}{2}} \cos^n x dx$  and  $\int_0^{\frac{\pi}{2}} \sin^p x \cos^q x dx$ .

**CO4:** Understand Substitutions and the area between curves, arc length, areas and length in polar coordinates.

**CO5:** Understand Double and Iterated Integrals over rectangles, double integrals over general regions, area by double integration, double integrals in polar form and triple integrals in rectangular coordinates.

**CO6:** Understand Eigen values, Eigen vectors, properties of Eigen values, Cayley-Hamilton theorem, reduction to diagonal form, similarity of matrices, powers of a matrix, reduction of quadratic form to canonical form and nature of a quadratic form

## COMPLEMENTARY ELECTIVE COURSE 3: 3C03 MAT-CS - MATHEMATICS FOR



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## COMPUTER SCIENCE III

**CO1:** Understand Ordinary differential equations, Geometrical meaning of  $y'=f(x, y)$  and Direction Fields.

**CO2:** Understand Methods of solving Differential Equations: Separable ODEs, Exact ODEs, Integrating Factors, Linear ODEs and Bernoulli Equation.

**CO3:** Understand Orthogonal Trajectories, Existence and Uniqueness of Solutions.

**CO4:** Understand Second order ODEs, Homogeneous Linear ODEs of second order, Homogeneous Linear ODEs with constant coefficients, Differential Operators, Euler-Cauchy Equation, Existence and Uniqueness of Solutions – Wronskian, Non homogeneous ODEs and Solution by variation of Parameters

**CO5:** Understand Laplace Transform, Linearity, first shifting theorem, Transforms of Derivatives and Integrals, ODEs, Unit step Function, second shifting theorem, Convolution, Integral Equations, Differentiation and integration of Transforms and to solve special linear ODE's with variable coefficients and Systems of ODEs

**CO6:** Understand Fourier series, arbitrary period, Even and Odd functions, Half-range Expansions.

**CO7:** Understand Partial Differential Equations and to solve PDEs by separation of variables and by use of Fourier series.

## COMPLEMENTARY COURSE 4: 4C04 MAT-CS - MATHEMATICS FOR COMPUTER SCIENCE IV

**CO1:** Understand the concept of a graph, graphs as models, vertex degrees, sub graphs, paths and cycles, matrix representation of graphs, trees and connectivity – definition and simple properties.

**CO2:** Understand Linear Programming Problems, their canonical and standard forms.

**CO3:** Understand Methods to solve LPP : Graphical solution method and

Simplex method

**CO4:** Understand Transportation problems, transportation table, loops. Solve a Transportation Problem by finding an initial basic feasible solution and then by using the transportation algorithm known as MODI method.



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**CO5:** Understand Numerical Integration, Trapezoidal Rule, Simpson's 1/3- Rule

**CO6:** Understand Numerical methods to find Solutions of Ordinary Differential Equations: Solution by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods.

## COMPLEMENTARY COURSES

### STATISTICS

#### **COMPLEMENTARY ELECTIVE COURSE I: 1C01 STA - BASIC STATISTICS**

**CO1:** Understand the different types of data.

**CO2:** Compute various measures of central tendency, measures of variation.

**CO3:** Analyse the relationship between two variables.

**CO4:** Acquire knowledge in time series data and compute various index numbers.

#### **COMPLEMENTARY ELECTIVE COURSE II: 2C02STA - PROBABILITY THEORY AND RANDOM VARIABLES**

**CO1:** Evaluate the probability of events.

**CO2:** Understand the concept of random variables with examples in real life

**CO3:** Calculate the probability distribution of discrete and continuous random variables.

**CO4:** Understand the change of variable technique.

#### **COMPLEMENTARY ELECTIVE COURSE III: 3C03 STA - PROBABILITY DISTRIBUTIONS**

**CO1:** compute mathematical expectation of a random variable.

**CO2:** familiarize with different discrete probability distribution associated with real life situations.

**CO3:** understand the characteristics of different continuous distributions.

**CO4:** identify the appropriate probability model that can be used.

#### **COMPLEMENTARY ELECTIVE COURSE IV: 4C04 STA - STATISTICAL INFERENCE**



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**CO1:** Understand the uses of Chebychev's Inequality and Central Limit Theorem.

**CO2:** Apply various method of estimation

**CO3:** Understand the concept of testing statistical hypotheses and its importance in real life situation

**CO4:** Apply ANOVA

## B.SC. PHYSICS COURSE OUTCOMES

### **CORE COURSE 1: 1B01PHY - MECHANICS I**

**CO1:** Understand Newton's laws of motion, the concepts of linear and angular momentum and torque

**CO2:** Determine the centre mass of a given configuration

**CO3:** Understand the principle of work, energy and power

**CO4:** Determine angular momentum of a body about any given axis

### **CORE COURSE 2: 2B02PHY - MATHEMATICAL PHYSICS AND ERROR ANALYSIS**

**CO1:** Understand vector operations and vector algebra

**CO2:** Determine derivative and integral of various functions **CO3:** State fundamental theorems of calculus

**CO4:** Compare differential operators in various coordinate systems

**CO5:** Understand the basic concepts of modeling

**CO6:** Solve first order and second order ODEs

**CO7:** Estimate uncertainties in measured values

### **CORE COURSE 3: 3B03PHY - MECHANICS II**

**CO1:** Understand the concept of Galilean transformations and uniformly accelerating systems

**CO2:** Determine the trajectory of a body in central force problem using Newton's laws

**CO3:** Understand Kepler's laws of planetary motion

**CO4:** Formulate the mathematical equation of waves

**CO5:** Understand the concept and consequences of special theory of relativity

### **CORE COURSE 4: 4B04PHY - ELECTRONICS I**

**CO1:** Understand the basics of PN junction diode, Zener diode and their applications

**CO2:** Understand the structure, operations and characteristics of BJT and FET

**CO3:** Understand the biasing methods and design of BJT and FET circuits



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**CO4:** Understand the different number systems, conversions and binary arithmetic operations

**CO5:** Understand the basic combinational logic gates

**CO6:** Understand the Boolean algebra & logic simplification using Boolean algebra

## **CORE COURSE 5: 4B05PHY - GENERAL PHYSICS PRACTICAL I BASIC EXPERIMENTS IN PROPERTIES OF MATTER, OPTICS, ELECTRICITY & MAGNETISM**

**CO1:** Familiarize with apparatus for mechanical, electrical, magnetic and optical experiments.

**CO2:** Develop skill in setting up apparatus for accurate measurement of physical quantities.

**CO3:** Understand multiple experimental techniques for determining physical quantities.

**CO4:** Develop skill in systematic way of measurements by minimizing possible errors.

**CO5:** Develop skill to analyze by plotting graphs using software.

**CO6:** Develop skill for systematic troubleshooting.

**CO7:** Perform error analysis for experiments.

## **CORE COURSE 6: 5B06PHY - QUANTUM MECHANICS**

**CO1:** Understand the limitations of classical mechanics

**CO2:** Explain Blackbody radiation problem, Photoelectric effect and Compton Effect using quantum theory of radiation

**CO3:** Understand Rutherford, Bohr atom models and concept of energy and angular momentum quantisation

**CO4:** Understand de-Broglie hypothesis, concept of wave nature of matter and Heisenberg uncertainty principle

**CO5:** Determine probability of finding a particle and expectation values of variable using its wave function

**CO6:** Write and solve Schrodinger equation for simple quantum mechanical systems

**CO7:** State and explain Pauli's exclusion principle

## **CORE COURSE 7: 5B07PHY - ELECTROSTATICS AND MAGNETOSTATICS**

**CO1:** Understand the concept of Electric field, electric potential, magnetic field and magnetic potentials

**CO2:** Use the principle of superposition and law of Gauss to calculate electric field Intensity

**CO3:** Determine Electric potential of charge distributions and hence specify electric field intensity

**CO4:** Understand the basic properties of conductors and capacitors



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**CO5:** Calculate the magnetic fields due to currents using Biot-Savart and Ampere laws.

**CO6:** Compare Magnetostatics and Electrostatics.

**CO7:** Understand Diamagnets, Paramagnets and Ferromagnets.

## **CORE COURSE 8: 5B08PHY - THERMODYNAMICS AND STATISTICAL MECHANICS**

**CO1:** Understand the concept of temperature, the thermodynamic state and equilibrium.

**CO2:** Explain the first law of thermodynamics through work and heat and its Mathematical Formulation.

**CO3:** Understand the ideal gas equation and kinetic theory of gases.

**CO4:** Understand the second law of thermodynamics and thermodynamic temperature scale.

**CO5:** Define entropy and thermodynamic potentials.

**CO6:** Understand the basic concepts of Statistical mechanics.

## **CORE COURSE 9: 5B09PHY - ELECTRONICS II**

**CO1:** Understand the AC analysis of BJT circuits and CE amplifiers 4

**CO2:** Understand the feedback circuits, oscillators and power amplifiers

**CO3:** Understand OPAMP basics and different OPAMP circuits

**CO4:** Understand the standard forms Boolean Expressions, Functions of Combinational Logic and K map simplifications.

## **CORE COURSE 10: 6B10PHY - SOLID STATE PHYSICS & SPECTROSCOPY**

**CO1:** Understand basic crystal structure and compare various crystal systems

**CO2:** State and prove Bragg's law

**CO3:** Explain X-ray diffraction and various methods to obtain diffraction pattern

**CO4:** Understand basic properties of semiconductors and band structure of solids

**CO5:** Discuss Hall Effect and list its applications

**CO6:** Describe various regions of EM spectrum

**CO7:** Distinguish between microwave and infrared spectroscopy

**CO8:** Define Raman Effect and explain its quantum theory

## **CORE COURSE 11: 6B11PHY - OPTICS & PHOTONICS**

**CO1:** Understand the concept of interference and diffraction

**CO2:** Distinguish between Fresnel and Fraunhofer diffraction

**CO3:** Analyse mathematically diffraction pattern due to slits and apertures

**CO4:** Understand the concept of polarization and double refraction

**CO5:** Understand the basic principle and working of lasers

**CO6:** Explain different types of lasers

**CO7:** Understand the principle of holography and its applications



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**CO8:** Understand the principle of total internal reflection and propagation of light through optical fibres

**CO9:** Compare different types of optical fibres and their applications Optics and Photonics

## **CORE COURSE 12: 6B12PHY - NUCLEAR, PARTICLE & ASTROPHYSICS SEMESTER**

**CO1:** Understand the structure nucleus and nuclear constituents

**CO2:** Define nuclear forces and nuclear reactions

**CO3:** Familiarize elementary particles and their properties

**CO4:** Understand stellar classifications

**CO5:** Understand basic concepts of birth of the star

**CO6:** Identify different stars in HR diagram

**CO7:** Understand the theory of death of the star

**CO8:** Define white dwarf, neutron star and black hole

## **CORE COURSE 13: 6B13PHY - ELECTRODYNAMICS AND CIRCUIT THEORY**

**CO1:** Understand the basic concepts of Electrodynamics

**CO2 :** Explain the mathematical theory of Electromagnetic waves

**CO3 :** Understand different Network theorems

**CO4 :** Understand the basic concepts of Transient currents

## **CORE COURSE 14: DISCIPLINE SPECIFIC ELECTIVE**

### **6B14PHY(1) - PYTHON PROGRAMMING**

**CO1:** Develop skills in creating program sketches of scientific problems

**CO2:** Develop basic skills in logical thinking and programming

**CO3:** To make real-life scientific problems easier on a computer with user interaction and graphics

### **6B14PHY(2) - NANOSCIENCE**

**CO1:** Understand the basic concepts of Nanoscience

**CO2:** Understand the properties of materials in the nano range

**CO3:** Identify different techniques for the production of nanomaterials

**CO4:** Understand characterization techniques & applications of nanomaterial.

### **6B14PHY(3) - MATERIAL SCIENCE**

**CO1:** Understand the basic concepts of material science

**CO2:** Understand the properties of materials

**CO3:** Identify different engineering materials & their properties





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**CO4:** Understand the properties & characteristics of semiconducting, insulating & magnetic materials

## **6B14PHY(4) - COSMOLOGY**

**CO1:** Understand history of cosmology at different era

**CO2:** Explain general theory of relativity and curvature of space

**CO3:** Understand cosmological principle and Friedmann model

**CO4:** Explain expansion of universe based on Hubble's law and to state big bang theory

## **6B14PHY(5) - PLASMA PHYSICS**

**CO1:** Define plasma and plasma parameters

**CO2:** Understand applications of plasma

**CO3:** Determine the behavior of plasma in various E and B Fields

**CO4:** Determine the nature of plasma as a fluid

## **CORE COURSE 15: 6B15PHY - PRACTICAL II GENERAL PHYSICS II**

**CO1 :** Familiarise with apparatus for mechanical, electrical, magnetic and optical experiments.

**CO2:** Develop skill in setting up apparatus for accurate measurement of physical quantities.

**CO3:** Understand multiple experimental techniques for determining physical quantities.

**CO4:** Develop skill in systematic way of measurements by minimising possible errors.

**CO5:** Develop skill to analyse by plotting graphs using software.

**CO6:** Develop skill for systematic troubleshooting.

**CO7:** Perform error analysis for experiments.

## **CORE COURSE 16: 6B16PHY - PRACTICAL III ELECTRONICS**

**CO1:** Familiarise active and passive electronic components.

**CO2:** Familiarise multimeter, power supply, signal generator and cathode ray oscilloscope.

**CO3:** Develop skill in soldering and use of breadboard.

**CO4:** Develop skill in construction of rectifiers, voltage regulators, amplifiers and oscillators.

**CO5:** Observe, measure and analyse electrical signals.

**CO6:** Develop skill for troubleshooting circuits and components.

**CO7:** Develop skill to analyse by plotting graphs using software.

## **GENERIC ELECTIVE COURSE 1: 5D01PHY - INTRODUCTION TO CLIMATE AND CLIMATE CHANGE SCIENCE**

**CO1:** Understand the basic concepts of climate change science

**CO2:** Understand some of the potentially serious consequences of climate change



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**CO3:** Analyse linkages between climate change adaptation and development planning.

**CO4:** Describe relevant policy approaches and strategic frameworks for climate change mitigation

**CO5:** Identify international initiatives which support countries to plan for climate change

## **GENERIC ELECTIVE COURSE 2: 5D02PHY - RENEWABLE ENERGY SOURCES**

**CO1:** Understand the sources of renewable energy

**CO2:** Understand the solar energy measurements & its applications

**CO3:** Understand the wind energy production & applications

**CO4:** Identify the energy from biomass, geothermal & ocean

## **GENERIC ELECTIVE COURSE 3: 5D03PHY - BIOPHYSICS**

**CO1:** Understand the application of Physics in Biology and Medical fields

**CO2:** Understand the principles behind the movement of snakes, swimming of fishes and flying of birds

**CO3:** Understand about bioelectricity

**CO4:** Understand the principles behind EEG and ECG

**CO5:** Understand the sources of radiation and effects of radiation

**CO6:** Understand the basic principles of radiation protection and apply it in daily life.

## **GENERIC ELECTIVE COURSE 4: 5D04PHY - JOY OF STAR WATCHING**

**CO1:** Understand Our Universe and its origin

**CO2:** Understand simple constellations

**CO3:** Explain the stars in Kerala culture

**CO4:** Understand the techniques of star watching

## **GENERIC ELECTIVE COURSE 5: 5D05PHY - ELECTRICITY IN DAILY LIFE ELECTRONICS**

**CO1:** Understand the sources of Electricity

**CO2:** Explain the production of Electricity

**CO3:** Understand the basic concepts of electricity auditing

## **GENERIC ELECTIVE COURSE 6: 5D06PHY - INTRODUCTION TO BASIC ELECTRONICS**

**CO1:** Understand the concepts of Basic electronics.

**CO2:** Explain the Semiconductor diode

**CO3:** Understand the basic electronic measurements and the instruments.



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## COMPLEMENTARY COURSES

### MATHEMATICS

#### **COMPLEMENTARY ELECTIVE COURSE I: 1C01MAT-PH - MATHEMATICS FOR PHYSICS I**

- CO1:** Understand the concept of Differentiation and successive differentiation.
- CO2:** Understand Fundamental theorem - Rolle's theorem, Lagrange's mean-value theorem, Cauchy's mean-value theorem,
- CO3:** Understand the Taylor's theorem , expansions of functions - Maclaurin's series, expansion by use of known series
- CO4:** Understand the Matrices and System of Equations, Linear Transformations
- CO5:** Understand Rank of a matrix, elementary transformations, normal form of a matrix, inverse of a matrix, solution of linear system of equations.
- CO6:** Understand Linear transformations, orthogonal transformation, vectors - linear dependence
- CO7:** Understand Derivative of arc, curvature, Polar coordinates, Cylindrical and Spherical co-ordinates

#### **COMPLEMENTARY ELECTIVE COURSE II: 2C02MAT-PH - MATHEMATICS FOR PHYSICS II**

- CO1:** Understand partial derivatives, homogeneous functions, Euler's theorem, total derivative, differentiation of implicit functions, change of variables
- CO2:** Understand Integration and Integration by Successive Reduction, Integration of Trigonometric Functions
- CO3:** Comprehend Applications of Integration
- CO4:** Comprehend Eigen values, Eigen vectors, properties of Eigen values,
- CO5:** Understand Cayley- Hamilton theorem, Diagonal form, similarity of matrices, powers of a matrix, canonical form, nature of a quadratic form

#### **COMPLEMENTARY ELECTIVE COURSE III: 3C03MAT-PH - MATHEMATICS FOR PHYSICS III**

- CO1:** Understand the concept of Multiple Integrals and solves problems
- CO2:** Understand Vector Differentiation
- CO3:** Understand Laplace Transforms and its Applications
- CO4:** Understand Fourier Series and Half range expansions



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## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04MAT-PH - MATHEMATICS FOR PHYSICS IV**

**CO1:** Understand Wave Equation, Solution by Separating Variables, D-Alembert's solution of the wave equation.

**CO2:** Understand Heat Equation and Solution by Fourier Series

**CO3:** Understand Line integrals, path independence, conservative fields and potential functions, Green's theorem in the plane

**CO4:** Understand Surface area, surface integrals, Stoke's theorem, Divergence theorem

**CO5:** Understand Numerical Integration, Trapezoidal Rule, Simpson's 1/3-Rule

**CO6:** Understand Numerical Solutions of Ordinary Differential Equations by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods.

### **COMPLEMENTARY COURSES**

#### **CHEMISTRY**

## **COMPLEMENTARY ELECTIVE COURSE I: 1C01CHE/PCH - CHEMISTRY FOR PHYSICAL & BIOLOGICAL SCIENCES**

**CO1:** Understand the atomic structure, basics of quantum chemistry and its applications.

**CO2:** Explain theories of chemical bonding and molecular structure.

**CO3:** Classify environmental pollution and recognise the causes of pollution

**CO4:** Understand the basic concept of Chemical equilibrium and theories of acids and bases

**CO5:** Calculate pH values

**CO6:** Explain common ion effect and solubility product

## **COMPLEMENTARY ELECTIVE COURSE II: 2C02CHE/PCH - CHEMISTRY FOR PHYSICAL & BIOLOGICAL SCIENCES**

**CO1:** Understand the basic concept of classification, IUPAC nomenclature, bonding and structure of Organic compounds

**CO2:** Explain the concept of aromaticity and non-benzenoid aromatics

**CO3:** Understand the basic concepts of chemical equilibrium. Explain colloids, their properties and applications

**CO4:** Illustrate the laws of photochemistry and Explain the photochemical phenomena such as Photosensitization, quenching, Fluorescence, Phosphorescence, Chemiluminescence and bioluminescence.

**CO5:** Familiarise different types of analytical methods in chemistry and explain the principle of colorimetry



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**CO6:** Explain the principles underlying the qualitative and quantitative analysis

## **COMPLEMENTARY ELECTIVE COURSE III: 3C03CHE/PCH(PS) - CHEMISTRY FOR PHYSICAL SCIENCES**

**CO1:** Understand the basic principle underlying various spectroscopy

**CO2:** Understand the basic concepts of thermodynamics and laws of thermodynamics

**CO3:** Explain the formation, nomenclature and applications of coordination complexes, Illustrate the valence bond theory of coordination complexes and explain the factors affecting the stability of complexes

**CO4:** Understand the basic concepts of chemical kinetics and Calculate the value of  $E_a$  from the values of  $k$  at two temperatures. Illustrate the types of Catalysis and understand the Characteristics of catalytic reactions

**CO5:** Understand the basic concept of nuclear chemistry, and explain the detection of isotopes using Aston's mass spectrograph and separation of isotopes by diffusion methods

**CO6:** Explain the principle and applications of different types of Chromatography

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04CHE/PCH (PS) - CHEMISTRY FOR PHYSICAL SCIENCES**

**CO1:** Understand the basic concept in gaseous state Explain the deviation of real gases from ideal behavior and Maxwell distribution of velocities and its use in calculating molecular velocities. Distinguish average velocity, RMS velocity and most probable velocity

**CO2:** Understand the basic concepts of internal structure of Crystals (crystallography) and explain X-ray analysis of crystals

**CO3:** Understand the basic concepts in liquid state and solutions. Illustrate Henry's law and explain its applications. Identify colligative properties and apply colligative properties to determine molecular mass

**CO4:** Distinguish Specific conductance – molar conductance and equivalent conductance and explain laws of electrolysis, conductometric titrations and its applications

**CO5:** Explain electrochemical cell, electrode potential, types of electrodes, EMF Nernst equation and potentiometric titration

**CO6:** Acquaint with various instrumental methods in chemistry and Understand basic concepts of nanochemistry

## **COMPLEMENTARY ELECTIVE COURSE V: 4C05CHE/PCH - COMPLEMENTARY ELECTIVE - CHEMISTRY PRACTICAL**

**CO1:** Apply the theoretical concepts while performing experiments.

**CO2:** Acquire practical skill to estimate acid, base, oxidizing agents etc by volumetric



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titration method

**CO3:** Acknowledge experimental errors and their possible sources.

**CO4:** Design, carry out, record and analyze the results of chemical experiments

**CO5:** Acquire practical skill to analyse the anions and cations qualitatively present in a mixture of inorganic salts

**CO6:** Learns the effective usage of chemicals

## B.SC. ZOOLOGY COURSE OUTCOMES

### **CORE COURSE 1: 1B01ZLG - PROTISTA AND NON CHORDATA - I**

**CO1:** To understand the basic methods in zoology and animal classification.

**CO2:** Able to appreciate the process of evolution (unicellular cells to complex, multicellular organisms)

**CO3:** Familiar with the protist and non-chordate world (from Phylum Porifera to Mesozoa) that surrounds us.

**CO4:** Able to identify the invertebrates (from Phylum Porifera to Mesozoa) and classify them up to the class level with the basis of systematics

**CO5:** Understand the basis of life processes in the non-chordates (from Phylum Porifera to Mesozoa) and recognize the economically important invertebrate fauna.

### **CORE COURSE 2: 2B02ZLG - NON CHORDATA - II**

**CO1:** Familiar with the non-chordate world (Coelomates - from Phylum Annelida to Hemichordata) that surrounds us.

**CO2:** Able to identify the invertebrates (Coelomates - from Phylum Annelida to Hemichordata) and classify them up to the class level with the basis of systematics

**CO3:** Understand the basis of life processes in the non-chordates (from Coelomates - from Phylum Annelida to Hemichordata) and recognize the economically important invertebrate fauna.

### **CORE COURSE 3: 3B03ZLG - CHORDATA – I**

**CO1:** Understand the origin and evolutionary relationship in different subphyla of chordates.

**CO2:** To understand the diversity of chordates (from urochordates to reptiles).

**CO3:** Understand the unique characters of urochordates, cephalochordates and



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vertebrates

**CO4:** Recognize life functions of chordates (from urochordates to reptiles).

## **CORE COURSE 4: 4B04ZLG - CHORDATA – II AND COMPARATIVE ANATOMY**

**CO1:** Understand the general and unique characteristics and classification of Aves and Mammals

**CO2:** Understand the diversity and relation in form and structure of chordates.

## **CORE COURSE 5: 5B05ZLG - EVOLUTION, ETHOLOGY AND RESEARCH METHODOLOGY**

**CO1:** Realise that the whole living system has a common ancestry and so all are related

**CO2:** Realise the fundamental characteristics of science as a human enterprise

**CO3:** Apply scientific methods in day to day life

**CO4:** Able to design a research work on a topic

## **CORE COURSE 6: 5B06ZLG - ANIMAL PHYSIOLOGY**

**CO1:** Understand the function of various systems at cellular and system levels

**CO2:** Understand the mechanisms that work to keep the body alive and functioning

**CO3:** Apply the knowledge to lead a healthy life

## **CORE COURSE 7: 5B07ZLG - BIOCHEMISTRY AND BIOPHYSICS**

**CO1:** Understand the importance of Biomolecules

**CO2:** Familiar with various biochemical pathways

**CO3:** Develop knowledge about equipment like microscopes, spectrophotometers, centrifuges etc

## **CORE COURSE 8: 5B08ZLG - GENETICS**

**CO1:** Comprehensive and detailed understanding of the chemical basis of heredity.

**CO2:** Understanding about the role of genetics in evolution.

**CO3:** The ability to evaluate conclusions that are based on genetic data.

**CO4:** The ability to understand results of genetic experimentation in animals.

## **CORE COURSE 9: 6B09ZLG - CELL BIOLOGY, IMMUNOLOGY AND MICROBIOLOGY**

**CO1:** Structural and functional aspects of basic unit of life i.e. cell concepts

**CO2:** Gather basic concepts of Cell Biology along with various cellular functions

**CO3:** Understand the basic concepts of immunity

**CO3:** Understand the diversity of microbes and their use and harm



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## **CORE COURSE 10: 6B10ZLG - MOLECULAR BIOLOGY & BIOINFORMATICS**

**CO1:** Understand the importance of Biomolecules

**CO2:** Familiar with various tools and applications of Bioinformatics

## **CORE COURSE 11: 6B11ZLG - ENVIRONMENTAL SCIENCE**

**CO1:** Able to describe the relation between abiotic and biotic factors.

**CO2:** Students are able to describe various biological interactions.

**CO3:** Students are able to understand how change in population affect the ecosystem

## **CORE COURSE 12: 6B12ZLG - DEVELOPMENTAL BIOLOGY**

**CO 1:** Understand the major steps in embryological development .

**CO2:** Understand the intricate mechanisms involved in the development of animals.

## **GENERIC ELECTIVE COURSE 1: 5D01ZLG - WILDLIFE CONSERVATION AND MANAGEMENT**

**CO1:** Develop interest in conservation of nature

**CO2:** Acquire knowledge in in wildlife conservation strategies

## **GENERIC ELECTIVE COURSE 2: 5D02ZLG - APICULTURE**

**CO1:** Develop self-employment capabilities.

**CO2:** Acquires scientific knowledge of profitable farming.

## **GENERIC ELECTIVE COURSE 3: 5D03ZLG - SERICULTURE**

**CO1:** Develop self-employment capabilities.

**CO2:** Acquires scientific knowledge of sericulture

## **GENERIC ELECTIVE COURSE 4: 5D04ZLG - NUTRITION AND DIETETICS**

**CO1:** Acquire a general awareness regarding the realsense of health.

**CO2:** Understand the role of a balanced diet in maintaining health.

## **GENERIC ELECTIVE COURSE 5: 5D05ZLG - FIRST AID**

**CO1:** Acquire basic knowledge in first aid

**CO2:** Develop service mentality

### **COMPLEMENTARY COURSES**

#### **BIOLOGICAL TECHNIQUES**

## **COMPLEMENTARY ELECTIVE COURSE I: 1C01BGT - GENERAL LABORATORY TECHNIQUES**





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**CO1:** Understand the basic laboratory techniques

**CO2:** Develop an understanding of the methods used in routine lab work.

## **COMPLEMENTARY ELECTIVE COURSE II: 2C02BGT - LABORATORY EQUIPMENTS AND TECHNIQUES**

**CO1:** Acquire sound knowledge on the basic principles of common equipment used in biological laboratories

## **COMPLEMENTARY ELECTIVE COURSE III: 3C03BGT - PREPARATION OF BIOLOGICAL SPECIMENS**

**CO1:** Acquires basic knowledge on preparation of lab specimens for display in biology museums and also for other laboratory purposes

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04BGT - ADVANCED BIOLOGICAL TECHNIQUES**

**CO1:** Get exposed to some of the advance techniques in biology

**CO2:** Familiarize the student with the modern innovative techniques and terminologies currently used.

### **COMPLEMENTARY COURSES**

#### **CHEMISTRY**

## **COMPLEMENTARY ELECTIVE COURSE I: 1C01CHE/PCH - CHEMISTRY FOR PHYSICAL & BIOLOGICAL SCIENCES**

**CO1:** Understand the atomic structure, basics of quantum chemistry and its applications.

**CO2:** Explain theories of chemical bonding and molecular structure.

**CO3:** Classify environmental pollution and recognise the causes of pollution

**CO4:** Understand the basic concept of Chemical equilibrium and theories of acids and bases

**CO5:** Calculate pH values

**CO6:** Explain common ion effect and solubility product

## **COMPLEMENTARY ELECTIVE COURSE II: 2C02CHE/PCH - CHEMISTRY FOR PHYSICAL & BIOLOGICAL SCIENCES**

**CO1:** Understand the basic concept of classification, IUPAC nomenclature, bonding and structure of Organic compounds

**CO2:** Explain the concept of aromaticity and non-benzenoid aromatics

**CO3:** Understand the basic concepts of chemical equilibrium . Explain colloids, their properties and applications



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**CO4:** Illustrate the laws of photochemistry and Explain the photochemical phenomena such as Photosensitization, quenching, Fluorescence, Phosphorescence, Chemiluminescence and bioluminescence.

**CO5:** Familiarise different types of analytical methods in chemistry and explain the principle of colorimetry

**CO6:** Explain the principles underlying the qualitative and quantitative analysis

## **COMPLEMENTARY ELECTIVE COURSE III: 3C03CHE/PCH (BS) - CHEMISTRY FOR BIOLOGICAL SCIENCES**

**CO1:** i) Understand the basic concept of Coordination Chemistry, nomenclature, Werner's

coordination theory and Valence bond theory of coordination complexes

ii) Write the name of Coordination compounds

iii) Explain Werner's coordination theory and Valence bond theory of coordination

complexes

iv) Explain the application of coordination complexes

**CO2:** i) Understand the electron displacement effects in organic molecules

ii) Explain the mechanism of nucleophilic substitutions and eliminations in alkyl halides

iii) Explain the mechanism of aromatic electrophilic substitution reactions

**CO3:** i) Classify the isomerism in organic molecules

ii) Distinguish the geometrical isomers and explain their stability

iii) Explain the characteristics of chiral compound

iv) Explain the conformational isomers in alkanes and cycloalkanes

**CO4:** i) Explain the important types of polymerization, thermoplastics and thermosetting

plastics

ii) Understand the characteristics of biodegradable plastics

**CO5:** Understand the basic concept of thermodynamics and laws of thermodynamics

**CO6:** i) Understand the basic concept of chemical kinetics

ii) Calculate  $E_a$  from the values of  $k$  at two temperatures

iii) Explain homogeneous catalysis, heterogeneous catalysis and Characteristics of catalysis reactions

## **COMPLEMENTARY ELECTIVE COURSE IV: 4C04CHE/PCH (BS) - CHEMISTRY FOR BIOLOGICAL SCIENCES**

**CO1:** Illustrate the preparatory methods of glucose and fructose and explain their



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configurations Familiarize the structure and properties of sucrose and poly saccharides

**CO2:** Know the structure of important five membered and six membered heterocyclic compounds and explain their reactivity and important reactions. Explain the preparation and properties of Quinoline and iso quinoline

**CO3:** Understand the structure and functions of nucleic acids, Classify amino acids and explain the structure of protein and its importance

**CO4:** Understand the mechanism of enzyme action, enzyme catalysis

**CO5:** Know the structure of Vitamin A, B and C. and hormones progesterone Testosterone,

cortisone, adrenaline and Thyroxin

**CO6:** Understand the importance of metal ions in biological systems and Mechanism of O<sub>2</sub> and CO<sub>2</sub> transportation – Nitrogen Fixation Na-K pump

## **COMPLEMENTARY ELECTIVE COURSE V: 4C05CHE/PCH - COMPLEMENTARY ELECTIVE - CHEMISTRY PRACTICAL**

**CO1:** Apply the theoretical concepts while performing experiments.

**CO2:** Acquire practical skill to estimate acid, base, oxidizing agents etc by volumetric titration method

**CO3:** Acknowledge experimental errors and their possible sources.

**CO4:** Design, carry out, record and analyze the results of chemical experiments

**CO5:** Acquire practical skill to analyse the anions and cations qualitatively present in a mixture of inorganic salts

**CO6:** Learns the effective usage of chemicals

### COMMON COURSES

#### ENGLISH

### **COMMON COURSE 1: 1A01 ENG - Communicative English**

**CO1.** Understand and apply the rubrics of English grammar

**CO2.** Recognize and apply the basic patterns in English vocabulary

**CO3.** Read and elicit data, information, inferences and interpretations based on a given material in English

**CO4.** Develop the ability to speak in English in real life situations



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**CO5.** Elicit necessary information after listening to an audio material in English

**CO6.** Compose academic and non-academic writings including letters, paragraphs and essays

on a given topic and CV's for specific purposes

## **COMMON COURSE 2: 1A02 ENG - Readings on Kerala**

**CO1.** Understand the basic facts and patterns regarding the cultural evolution of Kerala through articles, poems, stories, life writings and historical narratives.

**CO2.** Acquaint with the life and works of the illustrious leaders of Kerala Renaissance and the major events.

**CO3.** Assimilate the notion of Kerala as an emerging society and critically examine the salient features of its evolution.

**CO4.** Understand the evolution and contemporary state of the concept of "gender" with reference to Kerala

**CO5.** Understand the form and content of Kerala's struggle against "casteism" and for "secularism"

**CO6.** Develop an awareness about the ecological problems and issues in Kerala

## **COMMON COURSE 3: 2A03 ENG - Readings on Life and Nature**

**CO1.** Understand the basic themes and issues related to ecology through articles, poems, stories, life writings and historical narratives.

**CO2.** Assume ecologically friendly attitudes in events related to everyday life.

**CO3.** Identify the specific ecological problems related to Kerala.

**CO4.** Identify the major ecological movements around the world and within the country.

**CO5.** Ability to express specific opinions when confronted with ecology/development binary.

**CO6.** Identify the major or minor ecological issues happening around the student's native place.

## **COMMON COURSE 4: 2A04 ENG - Readings on Gender**



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**CO1.** Understand the basic themes and issues related to gender through articles, poems, stories, life writings and historical narratives.

**CO2.** Understand the basic topics related to gender studies.

**CO3.** Understand gender as a social construct and also as a site of struggle.

**CO4.** Critically engage with certain seminal topics that have become a part of gender studies.

**CO5.** Understand the basic gender issues faced by Kerala.

**CO6.** Appreciate and use gender sensitive and politically right terms and usages in everyday life.

## **COMMON COURSE 5: 3A05 ENG - Readings on Democracy and Secularism**

**CO1.** Understand the relationship between higher education and nation building.

**CO2.** Understand the basic Constitutional values and themes through articles, poems, stories, life writings and historical narratives.

**CO3.** Evolve a deeper understanding and appreciation of the meaning of the words sovereignty, socialism, secularism and democracy in the Indian context.

**CO4.** Appreciate the relationship between higher education and the Constitutional directives regarding “scientific temper” and “the spirit of enquiry”.

**CO5.** Appreciate the prevalence of “human rights” as a prerequisite for democratic living.

## **COMMON COURSE 6: 4A06 ENG - Readings on Philosophy of Knowledge**

**CO1.** Understand the basic issues related to construction and acquisition of knowledge through articles, poems, stories, life writings and historical narratives.

**CO2.** Understand the relationship between higher education and nation building.

**CO3.** Evolve a deeper understanding of disciplines, multi-disciplinary approaches, interdisciplinary approaches and the various systems of knowledge.

**CO4.** Understand knowledge as a social construct and the dynamics of paradigm shifts.



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CO5. Understand the epistemological and ontological factors within higher education.

CO6. Understand logical fallacies and apply critical thinking.

## COMMON COURSES

### MALAYALAM

#### **ADDITIONAL COMMON COURSE I: 1A07 MAL - □□□□□□□□□□**

CO1. ചെറുകഥ, നോവൽ എന്നീ സാഹിത്യരൂപങ്ങളെ സാമാന്യമായി പരിചയപ്പെടുക, വായനാഭിരുചിയും ആസ്വാദനശേഷിയും വളർത്തിയെടുക്കുക.

CO2. ചെറുകഥയുടെയും നോവലിന്റെയും ഉദയവികാസങ്ങളെക്കുറിച്ചുള്ള അവബോധമുണ്ടാക്കുക.

CO3. ഘടന, പ്രമേയം, ആഖ്യാനം തുടങ്ങിയവ വിലയിരുത്തുകയും രചനകളുടെ രാഷ്ട്രീയം അപഗ്രഥിക്കുകയും ചെയ്യുക.

CO4. ജീവിതാവസ്ഥകളുടെ സങ്കീർണ്ണതകളും അനുഭൂതികളും ബോധ്യപ്പെടുത്തുകയും വിദ്യാർത്ഥികൾക്ക് മൗലികരചനകൾ നടത്തുന്നതിന് വഴിയൊരുക്കുകയും ചെയ്യുക.

#### **ADDITIONAL COMMON COURSE II: 2A08 MAL - □□□□□□□□□□**

CO1. ജീവിതാവസ്ഥകൾ, സങ്കീർണ്ണതകൾ, അനുഭൂതികൾ എന്നിവ ആവിഷ്കരിക്കുന്ന ഭാഷയുടെ സാമ്പ്രദായിക രൂപമായ കവിത എന്ന സാഹിത്യരൂപത്തെ സാമാന്യമായി പരിചയപ്പെടുകയും കാവ്യാസ്വാദനശേഷി രൂപപ്പെടുത്തിയെടുക്കുകയും ചെയ്യുക.

CO2. മലയാളകവിതയുടെ വളർച്ചയിലും വികാസത്തിലും നിർണ്ണായക സാധനം ചെലുത്തിയ കവികളെയും കാവ്യമാതൃകകളെയും കുറിച്ച് അവബോധമുണ്ടാക്കുക.

CO3. പ്രാചീനം, മധ്യകാലം, നവോത്ഥാനം, ആധുനികം , ആധുനികാനന്തരം എന്നീ കാലഘട്ടങ്ങളിൽ മലയാളകവിതയിലുണ്ടായ രൂപ-ഭാവ പരിണതികളെ പരിചയപ്പെടുക.

CO4. ഭാഷയുടെ സവിശേഷപ്രയോഗത്തിലൂടെ കവിത സാധ്യമാക്കുന്ന സാമൂഹ്യ സാംസ്കാരിക പരിതോവസ്ഥകളുടെ ആവിഷ്കരണവും അവയുടെ രാഷ്ട്രീയവും തിരിച്ചറിഞ്ഞ് നിരൂപണ ബുദ്ധി വിലയിരുത്താനുള്ള പരിശീലനം നൽകുക.

#### **ADDITIONAL COMMON COURSE III: 3A09 MAL - □□□□□□□□□□**



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- CO1. ആത്മകഥ/ സ്മരണ, ജീവചരിത്രം/കേട്ടെഴുത്ത്, സഞ്ചാരസാഹിത്യം, നിരൂപണം തുടങ്ങിയ ഗദ്യരൂപങ്ങളുടെ ഉദ്ഭവം,വളർച്ച,പരിണാമവഴികൾ എന്നിവയെ പറ്റി സാമാന്യാവബോധമുണ്ടാക്കുക
- CO2.ഗദ്യസാഹിത്യകൃതികൾവായിക്കുന്നതിനും നിരൂപണ മനോഭാവത്തോടെ ആസ്വദിക്കുന്നതിനും പ്രേരിപ്പിക്കുക.
- CO3. ഗൗരവപൂർണ്ണമായ ഒരു സിനിമാസ്വാദനസംസ്കാരം വളർത്തിയെടുക്കുക,
- CO4. വിവിധങ്ങളായ ഗദ്യരചനാ ശൈലികൾ പരിചയപ്പെടുക.
- CO5. ഗദ്യഭാഷയുടെ പ്രയോഗശേഷി വികസിപ്പിക്കുക.

## ADDITIONAL COMMON COURSE IV: 4A 10 MAL - □□□□□□□□□□□□□□□□

- CO1. കേരളത്തിന്റെ തനതായ ദൃശ്യകലാപാരമ്പര്യങ്ങളെക്കുറിച്ചും സമ്പന്നതയെക്കുറിച്ചും വിദ്യാർത്ഥികൾക്ക് അിറവ് പകരുക
- CO2. കഥകളി, തുള്ളൽ, നാടകം, സിനിമ പോലുള്ള ദൃശ്യകലകളെയും അവയ്ക്കായാതായ സാഹിത്യപാഠങ്ങളെയും പരിചയപ്പെടുത്തുക.
- CO3. കലാപരവും സാഹിത്യപരവുമായ പുതിയ അനുഭവങ്ങളെ ഉൾക്കൊള്ളൽ, കാവ്യാനുഭൂതികൾക്കൊപ്പം ജീവിതാവബോധത്തിന്റെ സ്വാംശീകരണം എന്നിവ ലക്ഷ്യം.
- CO4. സാമൂഹിക പരിഷ്കരണത്തിന്റെയും മന:സംസ്കരണത്തിന്റെയും ചാലകശക്തികളായി നാടകം പോലെയുള്ള കലാസൃഷ്ടികൾ വർത്തിക്കുന്നതിനെ വിശകലനം ചെയ്യുക.
- CO5. സിനിമ എന്ന ജനകീയകലയുടെ കേവലാസ്വാദനത്തിനപ്പുറമുള്ള സൈദ്ധാന്തിക തലങ്ങളിലേക്കും സാമൂഹിക-സാംസ്കാരിക വായനകളിലേക്കും വിദ്യാർത്ഥികളും സജ്ജരാക്കുക.

### COMMON COURSES



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## HINDI

### **ADDITIONAL COMMON COURSE: I: 1A07HIN - HINDI KAVITHA**

**CO1:** Understanding the role played by the poets of bhakthikal in literature and society.

**CO2:** Understanding the philosophy of life as well as poems of chayavad.

**CO3:** Understanding the poems of Modern poets in context with their experience of life.

**CO4:** Understanding the contemporary spirit of the poets.

### **ADDITIONAL COMMON COURSE : II: 2A08HIN - RACHANA THATHA PRAYOG**

**CO1:** Understanding Fundamental principles of Hindi Grammar.

**CO2:** Understanding the correct usage of Hindi grammar.

**CO3:** Developing significant increase in word knowledge.

**CO4:** Develop communicative skills in Hindi.

### **ADDITIONAL COMMON COURSE : III: 3A09HIN - KATHA SAHITHYA**

**CO1:** Analyze a variety of short stories in the cultural and historical context.

**CO2:** Analyze novels in the modern context.

**CO3:** Understand the story content and structure in depth.

**CO4:** Collaborate with peers of role playing story analysis and presentations

### **ADDITIONAL COMMON COURSE: IV: 4A10HIN - NATAK AUR EKANKI**

**CO1:** Understand the social and artistic movements that have shaped theatre.

**CO2:** Analyze and interpret texts and performances both in writing and orally.

**CO3:** Develop and apply process skills in rehearsal production and classroom settings.

**CO4:** Demonstrate problem solving skills in various theatrical contexts.