

D. B. F. Dayanand College of Arts and Science, Solapur

Name of Department: Chemistry

Name of Programme: B. Sc. Chemistry

Program Outcomes (PO's)

After completing B.Sc. Chemistry programme, students will be able to:

PO1: Understand the fundamental principles and laws of physical chemistry

PO2: Study and understand the properties of materials

PO3: Design and testing of electrochemical cells and electrochemical properties of materials

PO4: Empowering the students to do independent research of high calibre

PO5: Use the suitable reagent, reaction conditions for desired synthesis.

PO6: Understand the need and application of spectroscopic techniques.

PO7: Acquire the multidisciplinary approach in every context which empowers the students to do independent research of high calibre.

PO8: The student will learn to handle many instruments related to their studies which will help them to work in Pharmaceutical Industry.

PO9: Students can apply his/her knowledge in research field to make novel molecules.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn about the potential uses of various branches of physical Chemistry

PSO2: Gather attention about the physical aspects of atomic structure, dual nature, reaction pathways, various energy transformations, molecular assembly, etc.

PSO3: Gain complete knowledge about all fundamental laws of chemistry

PSO4: To understand the important concepts of chemistry

PSO5: To perform and understand chemical reactions.

PSO6: To understand the professional responsibility and ethical values.

Course Outcomes (CO's)

B.Sc. I Chemistry

Semester-I

Paper I (Physical Chemistry)

After completing this course students will be able to:

CO1: Evaluate differentiation and integration

CO2: Understand the basic principles of thermodynamics and chemical kinetics

CO3: Derive the reaction rate constant expressions for first and second order reactions

CO4: Derive the van der Waal's gas equation

CO5: Understand of the laws of ideal gases

CO6: Establish the relationship between critical constants and van der Waal's constants

Paper II (Inorganic Chemistry)

The students will be able to get knowledge such as:

CO1: To acquire knowledge of term in quantum mechanics, shapes of orbitals and periodic properties

CO2: To gain knowledge of ionic bonding and ionic solids.

CO3: The atomic structure and periodic properties and trends; types of chemical bonding.

CO4: Basic theory, mechanism and application of inorganic materials

CO5: Key knowledge of ionic bonding and different parameters of crystal structure.

CO6: The basic knowledge of the VBT and MOT acquire with various examples.

B.Sc. Part-I Chemistry
Semester-II
Paper-III (Organic Chemistry)

After completing this course students will be able to:

CO1: Know types of arrows, bond making and breaking, types and subtypes of reactions, reactive intermediates.

CO2: Know the types of hybridisation, resonance effect, hyperconjugation effect, inductive effect, steric effect.

CO3: Able to identify cycloalkanes, formation and reactions of cyclopropane.

CO4: Know about Alkenes, Dienes, Alkynes, nomenclature, formation, reactions and electrophilic and nucleophilic substitution reactions.

CO5: New knowledge of stereochemistry, optical isomerism, geometrical isomerism, chiral centre, enantiomer, diastereoisomer.

CO6: New concept-Aromaticity, terms used in aromaticity, various benzene structures, Huckel's rule, Mechanism of aromatic electrophilic substitution reactions.

Paper-IV (Analytical and Industrial Chemistry)

After completing this course students will be able to:

CO1: Determine the physical properties of liquids-viscosity, surface tension, parachor, dipole moment, refractive index, molecular refractivity, snell's law.

CO2: Awareness of pollution-types of pollution, various terms- TLV, DO, COD, BOD

CO3: Know about water pollution, types, treatment of water, potable water, properties, industrial water, Municipal sewage.

CO4: Determine the qualitative and quantitative elemental analysis, determination of molecular weight, Determination empirical formula and molecular formula.

CO5: Know about petroleum and petrochemicals, refining, knocking, cracking, hydroforming, Synthesis and industrial applications of some petrochemicals.

B. Sc. I Practical

After performing the practical's students were able to know-

CO1. Student should understand the concepts of viscosity, equivalent weight and heat of ionization and measure these properties practically.

- CO2. Student should understand the concepts of chemical kinetics and should practically determine specific reaction rate of I and II order reaction.
- CO3. Understanding of concepts of Molarity, Normality and practical determination of these properties.
- CO4. Understanding of concepts of paper chromatography and spot tests.
- CO5. Understanding of practical principals of estimation of amine, amide and acid and principles of organic qualitative analysis

B. Sc. Part-II Chemistry

Semester-III

Paper V (Organic Chemistry)

After completing this course students will be able to:

- CO1: Know the spectroscopic methods for the structure determination of organic compounds.
- CO2: Calculate the λ_{max} of conjugated compounds using Woodward-Fieser rule.
- CO3: Understand the stereochemistry of aldoxime and ketoximes and draw the different conformations of molecules using different projection formulae.
- CO4: Analyse the conformation of alkanes using energy profile diagram.
- CO5: Classify the various kinds of compounds into alcohols, phenols, aldehydes, ketones, ether, epoxide, carboxylic acids, diazo compounds etc.
- CO6: Establish the correlation between the structure, stability and reactivity of various kinds of compounds into alcohols, phenols, aldehydes, ketones, ether, epoxide, carboxylic acids, diazo compounds etc
- CO7: Remember the synthesis and mechanism involved in different reactions of various compounds such as alcohols, phenols, aldehydes, ketones, ether, epoxide, carboxylic acids, diazo compounds etc.

Paper VI (Inorganic Chemistry)

After completing this course students will be able to:

- CO1: To acquire knowledge of Coordination Chemistry
- CO2: To gain knowledge of IUPAC and VBT of Coordinate compounds.
- CO3: The types, structure and application of chelates
- CO4: Basic theory of Acids-Bases and its application and limitation

CO5: Key knowledge of d-block elements and its characteristics

CO6: The basic knowledge of the Inorganic chemistry

Semester-IV

Paper VII (Physical Chemistry)

After completing this course students will be able to:

CO1: Understand the basic principles and terminology of electrochemistry

CO2: Describe the concept of transport number and its determination methods

CO3: Evaluate the entropy changes for reversible, irreversible processes and during various phase transformations

CO4: Understand third law of entropy and its applications

CO5: Determine the crystal structures of NaCl and KCl by Bragg's X-ray diffraction method

CO6: Explain Nernst's distribution law and its applications

Paper VIII (Analytical and Industrial Inorganic Chemistry)

After completing this course students will be able to:

CO1: Know the methods of analysis of samples, role of indicators and types of volumetric estimations.

CO2: Understand the process of gravimetric analysis and their accuracy.

CO3: Determine the physicochemical techniques for synthesis of heavy chemicals.

CO4: Analyze and compare the methods of metallurgy.

CO5: Evaluate the amount of metals in natural sources.

CO6: Create awareness about applications of metals.

B. Sc. Part II

Laboratory Course (Practicals) Chemistry

After completing this course students will be able to:

CO1: Gain hands on experience to use viscometer, refractometer, polarimeter, Conductometer etc.

CO2: Use theory knowledge of Chemical kinetics in practice to detect rate of different reactions and factors affecting the rate of reactions.

CO3: Adopt the minute skills of quantitative determination such as gravimetric analysis and titrimetric analysis.

CO4: Learn the micro scale methods by performing semi micro qualitative analysis.

CO5: Synthesize organic and inorganic compounds independently and also learn crystallization technique.

CO6: Perform quantitative analysis of tablets and the unknown organic solutions skilfully.

CO7: Got the technique to identify unknown solid and liquid organic compounds.

B.Sc. Part-III Chemistry

Semester-V

Paper IX (Physical Chemistry)

After completing this course students will be able to:

CO1: Know historical development of quantum mechanics in chemistry and explain the differences between classical and quantum mechanics

CO2: Describe the De Broglie hypothesis and the Heisenberg's uncertainty principle

CO3: Describe the phase diagrams for one and two component systems

CO4: Understand different types of electrodes, their representations

CO5: Explain the applications of emf measurements

CO6: Understand laws of photochemistry, concept of quantum yield

CO7: construct Jablonski's diagram depicting various photophysical pathways

Paper X (Inorganic Chemistry)

After completing this course students will be able to:

CO1: Define the metal – ligand bonding in transition metal complexes.

CO2: Understand the role of catalyst in the different chemical reactions.

CO3: Describe the applications of nuclear chemistry.

CO4: Create awareness about role of metals in biological processes

CO5: Evaluate the importance of fertilizers.

CO6: Develop the awareness towards importance of metals and their compounds.

Paper XI (Organic Chemistry)

After completing this course students will be able to:

CO1: Know the spectroscopic methods for the structure determination of organic compounds.

CO2: Predict the structure of organic compounds using different spectroscopic methods like IR, NMR, Mass spectroscopy.

CO3: Understand the stereochemistry of cyclohexane, monosubstituted cyclohexane and draw

the different conformations of cyclohexane.

CO4: Understand Bayer's strain theory and stereoselective, stereospecific reactions.

CO5: Classify the various kinds of name reactions.

CO6: Predict the products, reagents and name of the reaction.

CO7: Understand the enolate intermediate and its synthetic importance.

Paper XII (Analytical and Industrial Physical Chemistry)

After completing this course students will be able to:

CO1: Discuss the basics electroanalytical techniques like colorimetry, potentiometry, flame photometry and conductometry

CO2: Discuss the potentiometric and the conductometric titrations

CO3: Understand the basic principles of electroplating and the terminology of electroplating

CO4: Describe electroplating process of nickel and chromium

CO5: Explain the instrumentation of colorimeter, flame photometer and conductometer

CO6: Discuss the advantages and disadvantages of electroanalytical techniques like colorimetry, potentiometry, flame photometry and conductometry

Semester-VI

Paper XIII (Physical Chemistry)

After completing this course students will be able to:

CO1: Understand electromagnetic radiation and electromagnetic spectrum.

CO2: Describe the rotational spectra of diatomic molecules using rigid rotor model, vibrational spectra of diatomic molecules using simple and unharmonical oscillation models

CO3: Explain the basic principles of Raman spectroscopy, classical and quantum mechanical explanation for Raman spectra

CO4: Draw and discuss the vapour pressure and boiling point diagrams of miscible liquids

CO5: Describe the solubility of partially miscible liquids

CO6: Understand the concept of free energy and their physical significance and derive thermodynamic derivations of law of mass action, van't Hoff isotherm and isochore

CO7: Explain kinetics of various complex reactions and discuss theories of reaction rates

Paper XIV (Inorganic Chemistry)

After completing this course students will be able to:

CO1: Understand the electronic configuration, source, separation and applications of f-block elements from the periodic table.

CO2: Correlate the structures of inorganic compounds of B, S, P and Xe.

CO3: Describe the types of metallic solids.

CO4: Study the synthesis and structures of Organometallic compounds.

CO5: Create the awareness about corrosion on metal surfaces.

Paper- XV: Organic Chemistry (DSE- 3 A)

After completing this course students will be able to:

CO1: Remembering classifications, synthesis, structure and chemical reactions of heterocyclic molecules.

CO2: Know the classifications and configuration of carbohydrates.

CO3: Understand the general idea, structure and synthesis of vitamins and hormones

CO4: Classify drugs based on their therapeutic action.

CO5: Know the synthesis and applications of dyes.

CO6: Understand general idea, synthesis and uses of agrochemicals.

Paper-XVI - Analytical and Industrial Organic Chemistry (DSE 4B (I))

After completing this course students will be able to:

CO1: Know types, cleansing action and preparation of soaps and detergents

CO2: Know the methods of preparation and uses of polymers.

CO3: Grasp the idea of different process involved in sugar and alcohol industry.

CO4: Know the importance of reagents in organic chemistry.

CO5: Understand the role green chemistry

CO6: Apply the chromatographic techniques.

B.Sc.-III Practical

Practical-I & IV: Physical Chemistry Practical

After completing this course students will be able to:

CO1: In-depth training on laboratory solution preparations on all concentration scales

CO2: Training on laboratory safety and lab ethics in scientific work

CO3: Know the principle and handling of pH-meter, Potentiometer, Conductometer,

spectrophotometer, Polarimeter, Polarography, etc.

CO4: Determine the energy of activation for first and second order reactions

CO5: Determine the rate constants of reactions and plot the graphs

CO6: Verify the Beer's law

Practical-II & IV: inorganic Chemistry Practical

After completing this course students will be able to:

CO1: Understand the methods of gravimetric estimation of metals from their salt solution.

CO2: Know the structural variation and their effect in coordination compounds.

CO3: Determine the percentage purity of synthesized inorganic compounds.

CO4: Evaluate the quality of commercial samples.

CO5: Compare the cation exchange and anion exchange chromatographic techniques for separation and evaluation of ions.

Practical-III & IV: Organic Analytical Practical

After completing this course students will be able to:

CO1: Understand to Separation of solid-solid binary mixture and Identification of its components.

CO2: Understand to Separation of solid-liquid binary mixture and Identification of its components.

CO3: Understand to Separation of liquid-liquid binary mixture and Identification of its components.

CO4: Carry out the various organic estimations.

CO5: Perform one stage organic preparations.

CO6: Prepare derivatives for various organic compounds.

Name of Department: Mathematics

Name of Programme: B. Sc. Mathematics

Program Outcomes (PO's)

After completion of B. Sc. Mathematics programme, students will be able to:

PO1: describe different algebraic structures, Rings, vector spaces, linear transformations, various metric spaces, sequences, series, partial differential equations, various types of graphs.

PO2: discuss theoretical aspects of algebraic structures, convergence of sequence and series, methods to solve ordinary and partial differential equations, estimate singularities and solutions of improper integral equations.

PO3: describe matrices, complex numbers, different conics, groups, rings, various number systems, computational aspects of number system, types of PDEs, ODEs, graphs, methods to find approximate solutions of functions.

PO4: apply theorems of group theory to finite groups, apply techniques to solve problems on gcd and lcm, determine countability of sets and different types of functions, calculate extreme values of functions, radius curvature.

PO5: develop abstract thinking, logical approach and analytical perspective for different areas of Mathematics.

PO6: categorize different types of spaces in metric spaces, compare numerical methods to solve the problems.

PO7: devise logical framework and abstract approach required for proving the results in Pure Mathematics

PO8: evaluate solutions of ordinary and partial differential equations, solutions to integral equations and curvatures for different surfaces, determine proper and improper integral

PO9: evaluate computational aspects regarding matrices and complex numbers.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: apply basic abstract approach, logical thinking, analytical and computational techniques learned from various papers in the course to the problems/results.

PSO2: estimate solutions to problems from applied Mathematics and analyze the solutions.

PSO3: gain basic knowledge about different branches of Mathematics

B. Sc. I Semester I

Paper –I Algebra

After completion of this course students will be able to

C.O 1 Define types of Matrices, system of homogeneous and Non-homogeneous linear equations, complex numbers and groups .

C.O 2 Explain Cayley Hamilton theorem and De Moivre's theorem .

C.O 3 Evaluate Eigen values and Eigenvectors ,complex roots of unity

CO 4 Deduce circular hyperbolic and transcendental functions

CO5: Evaluate solutions of homogenous and non-homogenous system of linear equations

CO6: Estimate rank of matrix by elementary row transformations by converting it into echelon form

Paper –II Calculus

After completion of this course students will be able to

CO1: Define limit, continuity of function of two variables, gradient, curl etc.

CO2: Explain method of solving indeterminate forms.

CO3: calculate reduction formulae limit continuity of function of two variables, nth derivative

CO4: Differentiate technique of solving integration of sine and cosine function

CO5: Summarize the ways of solving partial derivatives of higher order

CO6: Express the power series of given functions

B.Sc. I Semester II

Paper –III Geometry

After completion of this course students will be able to

CO1: Define translation rotation invariant direction cosines direction ratios of a plane

CO2: Explain general equation of plane, Intercept form.

CO3: Compute center, radius, diameter of sphere, distance of point from a plane and equation of tangent and normal.

CO4: Differentiate the differentiate types of conics

CO5: Summarize the ways of finding equation of planes.

CO6: Identify the conics from second degree equations.

Paper –IV Differential Equation

After completion of this course students will be able to

CO1: Define differential equation first order linear differential equation with constant coefficients

CO2: Explain methods of solving differential equation of first order and linear differential equation with constant coefficient

CO3: Solving linear differential equation with constant coefficients to find C. I and P.I

CO4: Deduce short methods of finding Particular integral

CO5: Analyze various methods of solving ordinary differential equation

CO6: Evaluate solution of linear differential equation and Bernoulli s equation

Semester I& II

NTL-I (DSC IA+IB)

After completion of this course students will be able to

CO1: Apply Cayley Hamilton theorem to find inverse of matrix.

CO2: Evaluate nth roots of complex numbers using De-Moivre's theorem.

CO3: Solve examples of System of homogeneous and non- homogeneous linear equation.

CO4: Apply Leibnitz's theorem and solve examples.

CO5: Solve examples based on change of axis, polar co-ordinate, planes and spheres.

CO6: Solve differential equations of first order and first degree and equations of the type $f(D)=X$ using short methods

B.Sc. II Semester III

Paper –V Differential Calculus

After completion of this course students will be able to

- CO1: Define curvature radius of curvature Jacobean Maxima minima of functions
- CO2: Coverts equation of curves into parametric form, Cartesian form polar form
- CO3: Compute equation of tangent, normal of a curve at a given point, finding maxima and minima of a function
- CO4: Evaluate undetermined multipliers of two and three variables using Lagrange's method
- CO5: Explain how to find maxima and mime of function using double derivative
- CO6: Apply necessary and sufficient condition for extreme values

Paper –VI Laplace Transform

After completion of this course students will be able to

- CO1: Define Laplace transform inverse Laplace transform null function beta function
- CO2: Recite formulae of Laplace transform and inverse Laplace transform
- CO3: Apply Laplace transform of nth derivation initial value theorem finial value theorem to solve examples
- CO4: Differentiate the methods of solving inverse Laplace transform using Heaviside's formula
- CO5: Evaluate different examples Laplace transform of various functions using multiplication by t ,division by t , first shifting theorem and second shifting theorem
- CO 6 Apply method of Laplace transform to solve ODE and PDE

B.Sc. II Semester IV

Paper –VII Differential Equation

After completion of this course students will be able to

- CO1: Define differential equation first order and degree higher thenfirst, linear equation of second order homogenous linear equation simultaneous equation and total differential equation
- CO2: Remember necessary and sufficient condition for the inerrability of total differential equation.
- CO3: Explain methods of solving Clairaut's equation, equation reducible to Clairaut's
- CO4: Solving linear differential equation of second order to C.F

CO5: Differentiate equation solvable for x and solvable for y

CO6: Summarize method of solving homogenous linear equation

Paper –VIII Abstract Algebra

After completion of this course students will be able to

CO1: Define Group , subgroup ,homomorphism , isomorphism of groups

CO2 Explain equivalence relation partition of set, congruence and division algorithm

CO3: Apply Euclidean algorithm to finding GCD and LCM

CO4: Deduce Euclidean algorithm Cayley theorem Lagrange's theorem

CO5: Evaluate order of group order of elements Euler phi function

CO6: Summarize different concepts in group theory

Semester III & IV

NTL-II (DSC IIA+IIB)

After completion of this course students will be able to

CO1: Evaluate examples based on Tangents and Normals.

CO2: Evaluate Radius of curvature ,Jacobians and maxima – minima of functions.

CO3: Evaluate Laplace transform , Inverse Laplace transform of given functions using various formulae.

CO4: Evaluate GCD, LCM , Equivalence classes.

CO5: Evaluate differential equation of first order and degree higher than first and linear differential equation of second order.

CO6: Evaluate examples based on Groups and Group Homomorphism.

B.Sc. III Semester V

Paper –IX Algebra-II

After completion of this course students will be able to

CO1: Define Rings ,integral domain , fields Quotient rings , vector space, linear transformation and inner product space

CO2: Differentiate linear dependence and independence of vectors in a given set

CO3: Compute matrix representation of a given linear transformation

CO4: Constructs basis given vector space

CO5: Explain theorems of isomorphism , Homomorphism of rings, Quotient rings

CO6: Estimate whether the functions form inner product space or not , basis of a vector space

Paper –X Complex Analysis

After completion of this course students will be able to

CO1: Defines analytic function , holomorphic function , simply connected domain multiple connected domain , harmonic conjugate

CO2: Explain necessary and sufficient condition of analytic function , Milne Thomson's method

CO3: Compute zeros of a function , residue of function

CO5: Evaluate definite integrals

CO4: Differentiate different types of singularities and solve examples

CO6: Apply Cauchy residue theorem , Cauchy integral formula to solve different examples .

Paper –XI Real Analysis

After completion of this course students will be able to

CO1: Defines set , relation , functions sequence of real numbers series of real numbers

CO2: Explains monotone convergence theorem Cauchy sequence , different types of test for convergence of series

CO3: calculate limit of sequence , limit sup , limit inf , sum of series

CO4: Deduce operations on convergence sequence , equivalence relations of countability of set

CO5: Apply comparison test ratio test root test to check convergence of series

CO6: Solves the examples of sequence and series of a real number

Paper –XII Partial Differential Equations

After completion of this course students will be able to

CO1: Define P.D.E , Linear PDE , and non -linear PDE and types of integral of pde

CO2: Classify various types of first order PDE and linear PDE with constant coefficient into Homogenous and non-homogenous

CO3: Construct PDE by eliminating arbitrary constants and arbitrary functions

CO4: Deduce special methods of solution of non linear PDE using charpits method applicable to certain standard form I , II, III, IV

CO5: Evaluate complementary function and particular integral of linear homogenous and non-homogenous PDE by using general method

CO6: Develop short methods for finding PI of linear homogenous and non-homogenous PDE when $f(x,y)$ is $\phi(ax+by)$ and $x^m y^n$ form

B.Sc. III Semester VI

Paper –XIII Metric Spaces

After completion of this course students will be able to

CO1: Defines metricspace, complete metric space, compact metric space , open set , closed set

CO2: Explain limit of function continuity of a function in metric spaces

CO3: Apply Heine borel theorem to check compactness

CO4: Differentiates open set closed set complete metric space and compact metric space

CO5: Justify whether the given set is metric space or not

CO6: Revise the concepts of metric spaces

Paper –XIV Numerical Analysis

After completion of this course students will be able to

CO1: Define finite differences, interpolation

CO2: Explain Newton's forward interpolation formula, Backward interpolation formula and Lagrange's interpolation formula

CO3: Applying numerical methods to solve differentiation and integration and maxima minima of tabulated function

CO4: Deduce Quadrature formulae

CO5: Evaluate definite integrals using quadrature formulae

CO6: Evaluate CF and PI of differential equations

Paper –XV Graph Theory

After completion of this course students will be able to

- CO1: Define graphs sub graphstrees, number systems
- CO2: Explain types of graphs such as complete graph, regular graph, null graph etc
- CO3: Apply prims algorithm, kruskals algorithm to find shortest path
- CO4: Construct graph using matrix representation
- CO5: Convert a given number into another system such as binary to decimal and decimal to binary
- CO6: Construct spanning tree , minimal spanning tree from a given graph

Paper –XVI Integral Calculus

After completion of this course students will be able to

- CO1: Define Beta function, gamma function, multiple integral
- CO2: Explain necessary and sufficient condition for convergence of improper integrals
- CO3: Calculate Area volume bounded by the curve using multiple integrals
- CO4: Evaluate beta and gamma of function
- CO 5 Apply properties of beta gamma function to solve integration
- CO6: Modify double integrals

Semester V &VI

NTL-III (A)

After completion of this course students will be able to

- CO1: Evaluate examples of Rings , subrings, Integral Domains and Fields.
- CO2: Solve example based on linear dependence, linear Independence and Homomorphism of rings.
- CO3: Evaluate examples on Innner product space.
- CO4: Evaluate examples on Metric spaces , open sets, closed sets and bounded sets.
- CO5: Evaluate examples on limits, Cauchy sequences in Metric space.
- CO6: Evaluate examples based on completeness, connectedness, open cover, Dense sets in Metric Soaces.

NTL-III (B)

After completion of this course students will be able to

C.O. 1 Evaluate examples based on analytic function.

CO2: Evaluate examples of complex integration.

CO3: Evaluate examples of Calculus of Residue ,Integration round the unit circle and integrals of the type $\int_0^{2\pi} (\cos \theta, \sin \theta) d\theta$.

CO4: Evaluate examples of Forward, Backward , central differences, shift operator and many more.

CO5: Evaluate examples of Interpolation.

CO6: Solve examples of Numerical Differentiation and Integration.

NTL-III (C)

After completion of this course students will be able to

CO1: Evaluate numerical examples on set, relation and functions.

CO2: Evaluate examples based on nth term of sequence, Convergence , Divergence Liminf, Limsup of Sequences.

CO3: Apply various tests for convergence of series.

CO4: Evaluate examples based on operations of Graphs.

CO5: Evaluate Adjacency and Incidence Matrix of Graph.

CO6: Convert given numbers of one number system into another.

NTL-III (D)

After completion of this course students will be able to

CO1: Compute PDE by elimination of arbitrary constants and arbitrary function.

CO2: Apply Charpit's Method to solve Non-linear PDE.

CO3: Evaluate C.F. and P.I. of Homogeneous and Non-Homogeneous linear PDE.

CO4: Evaluate Improper integrals.

CO5: Evaluate examples of Beta and gamma functions.

CO6: Evaluate examples of Multiple Integrals.

Name of the Department – Botany

Name of Programme- B. Sc. I

Programme Outcomes (PO's)-

After completing B. Sc. I Botany programme, students will be able to :

PO 1- Understand the skills in microbiology field.

PO 2- Study & Understand the ecological & medicinal importance of Algae, fungi & Different plant species.

PO 3- Understand the various branches of Botany.

PO 4- Understand & improve their basic knowledge about microbes, Algae, Fungi, ecology & Taxonomy.

PO 5- Understand the skill for identification of Algae, Fungi, Viruses, Bacteria & Plant Species.

PO 6- Understand the different branches of Environment.

Po 7- Empowering the students to do independent research of high caliber.

Programme Specific Outcome (PSO's):

After completing this course, students will be able to:

PSO 1- Learn about the various branches of Botany.

PSO 2- Gather the attention about the general characters, occurrence, Classification & reproduction of various plant species like Algae, Fungi, & Archegoniates.

PSO 3- To gain complete knowledge about all fundamental branches of Botany.

PSO 4- Improve their basic knowledge about microbes, Algae, Fungi, ecology and Taxonomy.

Course Outcome (CO's)

Semester I

Paper No. I- Microbiology & Phycology

After completing this course, students will be able to:

CO 1- Understand the basic concept of Microbiology.

CO 2- Understand in detail about the Viruses, Diversity of Bacteria & about the Mycoplasma.

CO 3- Understand the importance of Algae.

CO 4- Understand in detail about division Cyanophyta along with example of *Nostoc*

CO 5- Understand in detail about division Xanthophyta along with example of *Vaucheria*.

CO 6- Understand in detail about division Chlorophyta along with example of *Spirogyra*.

CO 7- Understand in detail about division Rhodophyta along with example of *Polysiphonia*.

Course Outcome (CO's)

Semester I

Paper No. II- Fungi and Archegoniate

After completing this course, students will be able to:

CO 1- Understand about the general introduction of true fungi.

CO 2- Understand about division zygomycotina.

CO 3- Understand about the division Ascomycotina.

CO 4- Get a detailed idea about Archegonitae.

CO 5- Understand about the Bryophytes and life cycle of *Riccia* with its economic importance.

CO 6- Understand about the Pteridophytes and life cycle of *Selaginella* with its economic importance.

CO 7- Understand about the Gymnosperms and life cycle of *Cycas* with its economic

Importance.

Course Outcome (CO's)

Semester II

Paper No. III- Plant Ecology

After completing this course, students will be able to:

- CO 1- Understand about the Climate & Edaphic factors of environment.
- CO 2- Understand about the ecological adaptations in plants.
- CO 3- Understand about the Plant communities.
- CO 4- Understand about the concept of ecology.
- CO 5- Understand about the ecological succession.

Course Outcome (CO's)

Semester II

Paper No. IV- Taxonomy of Angiosperms

After completing this course, students will be able to:

- CO 1- Understand about the importance of taxonomy.
- CO 2- Understand about the classification systems in taxonomy.
- CO 3- Understand different methods of classification and rules of nomenclature.
- CO 4-. Understand technique and botanical gardens in India.
- CO 5- Understand detailed identifying characters of family.

Course Outcome (CO's)

Semester I & II

B. Sc. I Practical (Based on Paper No. I to IV)

After completing this course, students will be able to:

- CO 1- Learn about the handling and uses of dissecting and compound microscope.
- CO 2- Understand about the structure of various viruses by electron micrographs.
- CO 3- To study the technique about Gram staining method for bacteria.
- CO 4- Study the various identification characters of various Algae, Fungi, Archegoniate.
- CO 5- Study the identification Nomenclature and classification characters of various families of Plants.
- CO 6 - study technique about testing pH and water holding capacity of various soil samples.
- CO 7 – Gain knowledge about various meteorological instruments.
- CO 8 – Understand about density & frequency of plants by Quadrat methods.
- CO 9 – Understand the ecological adaptations of Hydrophytes & Xerophytes.

Name of the Department – Botany

Name of Programme- B. Sc. II

Programme Outcomes (PO's)-

After completing B. Sc. II Botany programme, students will be able to :

- PO 1- Understand the Plant Internal Structures, organization, their roles & importance
- PO 2- Study & Understand various physiological process
- PO 3- Understand the various branches of Botany.

- PO 4- Understand & improve techniques in plant identification
PO 5- Understand the metabolism process in plant
PO 6- Understand the different branches of Environment.
Po 7- Empowering the students to do independent research of high caliber.

Programme Specific Outcome (PSO's):

After completing this course, students will be able to:

- PSO 1-Gain complete knowledge about all fundamental branches of Botany.
PSO 2- Gain knowledge about plant physiology & plant anatomy
PSO 3- Gain complete knowledge about plant embryology process of plant development, pollination & dispersal mechanisms.
PSO 4- Improve their basic knowledge about metabolic process in the plant.

Course Outcome (CO's)

Semester III

Paper No. V- Plant Anatomy

After completing this course, students will be able to:

- CO 1- Understand internal organization of plant
CO 2- Understand growth & Development Inside the Plant & tissues involved for that
CO 3- Understand types of tissue
CO 4- Understand Primary structure of plant body
CO 5- Understand secondary structure of plant body
CO 6- Understand epidermal tissue system in plant & variations
CO 7- Understand mechanical & secretory tissue system in plant

Course Outcome (CO's)

Semester III

Paper No. VI- Plant Metabolism

After completing this course, students will be able to:

- CO 1- Understand process of metabolism in plants
CO 2- Understand about types of enzymes, mechanism of action & their properties
CO 3- Understand about the process of nitrogen fixation in plant
CO 4- Understand different types of growth regulators their biosynthesis & physiological role
CO 5- Understand about types of nutrition required for plant & role of each nutrient
CO 6- Understand carbohydrate metabolism, types of carbohydrate, their properties & example
CO 7- Understand growth conditions required for plant growth & development

Course Outcome (CO's)

Semester III

Paper No. VII – Embryology of Angiosperms

After completing this course, students will be able to:

- CO 1- Understand about Physiological process in plant
CO 2- Understand method of photoperiodism, types of phytochrome
CO 3- Understand translocation in plants
CO 4- Understand method of phloem loading & unloading
CO 5- Understand main physiological process in plant i.e photosynthesis, light % & dark reactions

CO6- Understand the process of respiration enzymes involved in that. Glycolysis, TCA cycle
CO7- Understand The process of photorespiration

Course Outcome (CO's)

Semester III

Paper No. VIII- Embryology of Angiosperms

After completing this course, students will be able to:

- CO 1- Understand about the importance of embryology
- CO 2- Understand different steps up to the development of embryo
- CO 3- Understand structural organization in flowers
- CO 4-. Understand process of pollination & fertilization
- CO 5- Understand developmental steps in embryo & endosperm development
- CO6- Understand Development of dicot & monocot embryo
- CO7- Understand methods of seed & fruit dispersal with their required conditions

Course Outcome (CO's)

Semester III & IV

B. Sc. II Practical (Based on Paper No. V to VIII)

After completing this course, students will be able to:

- CO 1- Learn internal organization of cells, simple, complex tissue
- CO 2- Understand primary & secondary structure of plant body
- CO 3- Understand maceration technique
- CO 4- Study the various epidermal., mechanical & secretory tissue system
- CO 5- Understand roles & deficiency symptoms of micronutrients
- CO 6 - Understand roles & deficiency symptoms of macronutrients.
- CO 7 –Understand the process of separation of pigments by paper chromatography
- CO 8 – Understand Kranz anatomy
- CO 9 – Understand various biochemical test
- CO10-Understand to find sugar concentration in plant by hand refractometer
- CO11-Understand flower reorganization
- CO12-Understand effect of growth regulators on seed growth
- CO13-Understand self & cross pollinated plants
- CO14- Understand the method of TLC
- CO15-Understand the enzyme activity
- CO16- Understand self & cross pollinated plants
- Understand dispersal mechanism in seed & fruits

Name of the Department – Botany

Name of Programme- B. Sc. III

Programme Outcomes (PO's)-

After completing B. Sc. III Botany programme, students will be able to :

- PO 1- Understand techniques of genetic engineering
- PO 2- Study & Understand the methods of identification of plants
- PO 3- Understand the various branches of Botany.
- PO 4- Understand & improve their basic knowledge & skills related to plant tissue culture

- PO 5- Understand the skill for molecular biology
PO 6- Understand the different branches of Environment, genetics, molecular biology
Po 7- Empowering the students to do independent research of high caliber.

Programme Specific Outcome (PSO's):

After completing this course, students will be able to:

- PSO 1-Gain complete knowledge about all fundamental branches of Botany.
PSO 2- Gain knowledge about molecular techniques, Genetic engineering, embryology, pathology
PSO 3- Gain knowledge about tissue culture techniques, media preparation, inoculation
PSO 4- Improve their basic knowledge about plant breeding techniques
PSO 5 – Get knowledge about disease identification

Course Outcome (CO's)

Semester V

Paper No. IX- Plant Systematics

After completing this course, students will be able to:

- CO 1- Understand different terminology related to plant systematic
CO 2- Understand method of identification
CO 3- Understand method of nomenclature
CO 4- Understand method of herbarium preparation
CO 5- Understand methods of classification
CO 6- Understand vegetative & reproductive characters of various families

Course Outcome (CO's)

Semester V

Paper No. X- Genetics

After completing this course, students will be able to:

- CO 1- Understand Mendels work , laws & Concepts in genetics
CO 2- Understand about Mendels work , laws
CO 3- Understand about Medalian inheritance
CO 4- Understand process of linkage & crossing over
CO 5- Understand methods of sex determination & sex linked inheritance
CO 6- Understand Qualitative inheritance with example
CO 7- Understand Quantitative inheritance with example

Course Outcome (CO's)

Semester V

Paper No. XI – Molecular biology

After completing this course, students will be able to:

- CO 1- Understand genetic material & role
CO 2- Understand structure of genetic material
CO 3- Understand replication in DNA & enzymes involved
CO 4-Understand Transcription process
CO 5- Understand Translation process

CO6- Understand the process of protein synthesis

Course Outcome (CO's)

Semester VI

Paper No. XII- Plant Breeding

After completing this course, students will be able to:

CO 1- Understand techniques of plant breeding

CO 2- Understand methods of crop improvement

CO 3- Understand methods of mutation & plant breeding

CO 4-. Understand process of IPR

CO 5- Understand work in various crop breeding institutes

Course Outcome (CO's)

Semester VI

Paper No. VI- Plant Pathology

After completing this course, students will be able to:

CO 1- Understand terms in plant pathology

CO 2- Understand different fungal diseases with their symptoms & control measures

CO 3- Understand different bacterial diseases with their symptoms & control measures

CO 4-. Understand different mycoplasma diseases with their symptoms & control measures

CO 5- Understand techniques in aerobiology & seed pathology

Course Outcome (CO's)

Semester VI

Paper No. XIV- Plant Biotechnology

After completing this course, students will be able to:

CO 1- Understand terms in R-DNA technology

CO 2- Understand different methods of gene transformation

CO 3- Understand blotting techniques, PCR, DNA fingerprinting

CO 4-. Understand gene cloning technique

CO 5- Understand techniques in plant tissue culture

CO6- Understand role of biotechnology in agriculture, industry & forestry with biotechnological institutes

Course Outcome (CO's)

Semester VI

Paper No. XVI- Biostatistics

After completing this course, students will be able to:

CO 1- Understand methods in biostatistics

CO 2- Understand methods of collection of primary & secondary data

CO 3- Understand methods of calculation of central tendency

CO 4-. Understand methods of calculation of probability

CO 5- Understand methods of calculation of t test, chi square test

Course Outcome (CO's)

Semester V & VI

B. Sc. III Practical (Based on Paper No. V to VIII)

After completing this course, students will be able to:

- CO 1- Techniques of plant identification
- CO 2- Understand morphological characters of plant
- CO 3- Understand different families
- CO 4- Study the various types of diseases
- CO 5- Understand method of isolation of pathogen
- CO 6 - Understand problems in genetics
- CO 7 –Understand sex linked inheritance
- CO 8 – Understand biotechnological instruments
- CO 9 – Understand micropropagation
- CO10-Understand technique of anther, ovary, embryo culture
- CO11-Understand method of protoplast isolation
- CO12- Understand process of media preparation
- CO13-Understand qualitative & quantitative estimation of genetic material
- CO14- Understand methods of replication
- CO15-Understand methods of blotting
- CO16- Understand process of cell organelles isolation
- CO17- Understand methods of sampling
- CO18- Understand method of presentation of data
- CO19- Understand various biostat methods

Name of Department: Electronics
Name of Programme: B.Sc. Electronics
Program Outcomes (PO's)

After completing B.Sc. Electronics programme, students will be able to:

- PO1: The students will enrich their knowledge in electronics
- PO2: Study and understand the principals of electronics
- PO3: Understand design and testing of electronic circuits
- PO4: They will be given deep exposure and knowledge about various concepts, circuits and methods to study circuits which we are using in almost every electronic device
- PO5: They will get knowledge and motivation to compete in national level tests like JAM, NGPE, etc
- PO6: They will be prepared to accept challenges in broad areas of the theoretical and experimental world of electronics.
- PO7: Understand the need and development of electronic circuits
- PO8: They will be able to recognize and implement the importance of continuous learning for self learning and develop throughout the academic career
- PO9: Empowering the students to do independent research of high calibre

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: Students will be familiar with the core concepts and will be aware about the recent trends in the electronics community.
- PSO2: They will be conceptually and technically skilled enough to carry out their further studies with an idea and sense of academic and social ethics.
- PSO3: They will be capable enough of taking up higher studies in electronics and to get jobs in industries.

Course Outcomes (CO's)

Semester-I

Paper - I: Basic Circuit Theory and Network Analysis

After completing this course students will be able to:

- CO1: Learn about the basic concepts of the circuit configuration for the design.
- CO2: Apply computer mathematical and simulation programs to solve various real life multi- disciplinary topics through circuit solution.
- CO3: Gain knowledge about circuit which are useful in laboratory and industry.
- CO4: Learn and understanding of the fundamental laws and elements of electrical circuits.
- CO5: Learn about various techniques to develop A/D and D/A convertors.
- CO6: Analyze the circuit using Kirchhoff's law and Network simplification theorems

Semester-I

Paper - II: Digital Fundamentals

After completing this course students will be able to:

- CO1. Identify various number systems, binary codes and formulate digital functions using Boolean algebra
- CO 2. Reduce the Boolean expression using Boolean laws.
- CO 3. Explain odd parity generator and even parity generator.
- CO 4. Compare the operation of various analog to digital and digital to analog conversion circuits.
- CO 5. Boolean expression simplification using K map.
- CO 6. Develop logic circuits using Universal gates.
- CO7. Design of i) half adder ii) Full adder

Semester-II

Paper - III: Semiconductor Devices

After completing this course students will be able to:

- CO1: To introduce the operation of semiconductor device
- CO2: Calculate the major physical parameters in doped semiconductors and Pn-junctions.
- CO3: To introduce the fundamental concepts and working principle of JT, JFET, FET, MOS
- CO4: Design a simple BJT bias circuit for a given specification.
- CO5: Understand MOS transistor theory and short channel effects.
- CO6: Understand and analyze MOS field-effect transistor (MOSFET) and bipolar junction transistor (BJT).
- CO6: Students understand the terms Zener diode, breakdown voltage, etc.

Semester –II

Paper - IV: Digital Electronics

After completing this course students will be able to:

- CO1: To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
- CO2: Design synchronous counters and develop sequential circuit applications using flip flop and register
- CO3: Convert different type of codes and number systems which are used in digital communication and computer systems.
- CO4: The ability to understand, analyze and design various combinational and sequential circuits.

Practical Course

After completing this course students will be able to:

CO1: Use of different electronic measuring and testing instruments such as function generators, power supplies, CRO, etc.

CO2: Identify different semiconductor devices and understand their working principle and characteristics

CO3: Design and test different electronic circuits

CO4: To evaluate assembly language programs using Microcontroller

CO5: To demonstrate the device control using microcontrollers chips

CO6: To prepare students for implementation of the acquired knowledge for domestic and industrial applications

Semester –III

Paper –V-Electronic Circuits

After completing this course students will be able to:

CO1: To know the switching characteristics of component

CO2: Interpret various applications of diode.

CO3: To give understanding of various types of amplifier circuits.

CO4: Student understands principles of oscillation and designs various oscillator circuits.

Semester –III

Paper –VI- Pulse and Switching Circuits

CO1: Formulate clamping circuit theorem and design practical clamping circuits by understanding the different diode clamper circuits

CO2: Analyze the monostable, astable multivibrator circuits with applications and evaluate time, frequency parameters.

CO3: Understand the different types of sampling gates with operating principles using diodes, transistors and also evaluate various parameters of sampling gates.

Semester –III

Paper –VII: Operational Amplifier and Applications

CO1: The DC and AC characteristics of operational amplifiers and its effect on output and their compensation techniques.

CO2: Understand the basic concepts of operational amplifier and its various applications.

CO3: Understand the basics of PLL and its practical applications.

CO4: Develop skills to design simple circuits using OP-AMP.

CO5: Elucidate and design the linear and non-linear applications of an opamp and special application Ics.

Semester-IV

Paper-VIII: Digital Techniques and Microprocessor

CO1: Understand Apply a basic concept of digital fundamentals to Microprocessor based personal computer system.

CO2: Use registers and instructions of 8085.

CO3: Develop assembly language programs using 8085.

CO4: Learn architectures of modern ADC and DAC

CO5: Analyze the data transfer information through serial & parallel ports.

Practical Course

After completing this course students will be able to:

CO1: Use of different electronic measuring and testing instruments such as Op-amp, IC, microcontroller.

CO2: Identify different multivibrator devices and understand their working principle and characteristics

CO3: Design and test different electronic circuits

CO4: To evaluate assembly language programs using Microcontroller

CO5: To demonstrate the device control using microcontrollers chips

CO6: To prepare students for implementation of the acquired knowledge for domestic and industrial applications

Name of Department: Electronics

Name of Programme: B.Sc. Electronics

Program Outcomes (PO's)

After completing B.Sc. Electronics programme, students will be able to:

PO1: The students will enrich their knowledge in electronics

PO2: Study and understand the principles of electronics

PO3: Understand design and testing of electronic circuits

PO4: They will be given deep exposure and knowledge about various concepts, circuits and methods to study circuits which we are using in almost every electronic device

PO5: They will get knowledge and motivation to compete in national level tests like JAM, NGPE, etc

PO6: They will be prepared to accept challenges in broad areas of the theoretical and experimental world of electronics.

PO7: Understand the need and development of electronic circuits

PO8: They will be able to recognize and implement the importance of continuous learning for self learning and develop throughout the academic career

PO9: Empowering the students to do independent research of high calibre

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Students will be familiar with the core concepts and will be aware about the recent trends in the electronics community.

PSO2: They will be conceptually and technically skilled enough to carry out their further studies with an idea and sense of academic and social ethics.

PSO3: They will be capable enough of taking up higher studies in electronics and to get jobs in industries.

Course Outcomes (CO's)

Semester-V

Paper IX: Linear Integrated Circuits and Applications

After completing this course students will be able to:

CO1: Learn about the basic concepts for the circuit configuration for the design of linear integrated circuits and develops skill to solve engineering problems

CO2: Develop skills to design simple circuits using OP-AMP and their applications.

CO3: Gain knowledge about design and development of regulated power supplies which are useful in laboratory and industry.

CO4: Gain knowledge about PLL and its applications in communication.

CO5: Learn about various techniques to develop A/D and D/A convertors.

CO6: Develop skills to design active filter circuits and solve problems related to it.

Semester-V

Paper X: Fundamentals of Microcontroller

After completing this course students will be able to:

CO1. Select a microcontroller suitable to the application.

CO 2. Architect a microcontroller system and estimate the required hardware and software resources.

CO 3. Perform the detailed hardware design of a microcontroller system.

CO 4. Program the microcontroller using suitable techniques including use of allocation schemes and device drivers.

CO 5. Find effective solutions and debug to a wide range of real-world microcontroller applications.

Semester –VI

Paper XIII: Power Electronics

After completing this course students will be able to:

CO1: Identify various devices, circuits, and outline their role in power electronic applications.

CO2: Discuss drive and protection circuits of power devices.

CO3: Illustrate the role of power converters in industrial, commercial, and residential applications.

CO4: Classify various power converters, general converter topologies and illustrate their use in power conversion and power transmission.

CO5: Determine the basic parameters of various power converters and compare them.

CO6: Design base/ gate drive circuits and protection circuits of power devices.

Semester -VI

Paper XIV: Embedded System Design

After completing this course students will be able to:

CO1: Describe the basics of Microcontroller.

CO2: Discuss the concept and types of embedded systems.

CO3: Apply knowledge to Interface with AVR Microcontroller.

CO4: Analyse case studies.

CO5: Test knowledge to Interface with AVR Microcontroller.

CO6: Create Embedded C programs.

Semester -VI

Paper XV: Electronics Instrumentation

After completing this course students will be able to:

CO1: Recognize the evolution and history of units and standards in Measurements.

CO2: Identify the various parameters that are measurable in electronic instrumentation.

CO3: Employ appropriate instruments to measure given sets of parameters.

CO4: Practice the construction of testing and measuring set up for electronic systems.

CO5: To have a deep understanding about instrumentation concepts this can be applied to Control systems.

CO6: Relate the usage of various instrumentation standards.

Semester -VI

Paper XVI (DSE-2): Modern Communication Systems

After completing this course students will be able to:

CO1: Demonstrate an understanding of optical fiber communication link, structure, propagation and transmission properties of an optical fiber.

CO2: Estimate the losses and analyze the propagation characteristics of an optical signal in different types of fibers

CO3: Define orbital mechanics and launch methodologies

CO4: Describe satellite subsystems

CO5: Design link power budget for satellite

CO6: Explain the basic physical and technical settings functioning of mobile communications systems,

CO7: Describe the basic principles of mobile communication system.

Name of Department: Physics

Name of Programme: B. Sc. (Physics)

Program Outcomes (PO's)

Following are programme outcomes after pursuing B. Sc. Physics programme.

1. Knowledge about different mathematical methods and statistics
2. Nature of solids and its properties and uses
3. Mechanics of classical particles
4. Nucleus and subatomic particles
5. Nature and properties of electromagnetic waves
6. Study of quantum mechanical systems
7. Vivid materials and their properties
8. Characteristics and applications of Semiconductor devices
9. Practical applications of different concepts and applications to study physical properties

Program Specific Outcomes (PSO's)

Following are Programme Specific Outcomes after pursuing B.Sc. Physics programme.

- 1) Students learn fundamental laws in physics and different concepts, and how to apply them to various systems.
- 2) Get in depth knowledge of various physical phenomena and causes behind it.
- 3) Develop capacity to obtain solution to some physical system/problems.
- 4) Learn practical applications based on various concepts/ideas
- 5) Apply the knowledge gained through project work and practical course

Course Outcomes (CO's)

B. Sc. Part I

B. Sc. Part I: Semester-I

Physics Paper I: MECHANICS AND PROPERTIES OF MATTER

Following are the Course Outcomes of this course:

- a) Understanding the concept of Moment of Inertia and applying them in calculations of the moment of inertia of various systems.
- b) Understand the physics and mathematics of oscillations and to solve the equations of motion for simple harmonic and damped oscillators

- c) Understand the concepts of energy, work, power, the concepts of conservation of energy and be able to perform calculations using them.
- d) Understand the concepts of elasticity and be able to perform calculations using them.
- e) Understand the concepts of surface tension and viscosity and be able to perform calculations using them.
- f) Understand the concepts of viscosity & fluid dynamics and its application in real life problems.
- g) Demonstrate quantitative problem-solving skills in all the topics

Physics Paper II: Optics

- a) Understand technical applications of simple optical instruments.
- b) Understand and explain the different optical method of testing and measuring of various physical parameters
- c) Understand Fermat's principle, explain about different aberrations in lenses and discuss the method to minimize them.
- d) Understand the types of eyepieces and construction and working of spectrometer and optical bench for determining various optical values.
- e) Understand the phenomenon of interference of light and its formation in thin film, Newton's ring, wedge shaped film etc. due to division of amplitude.
- f) Explain Schuster method, Distinguish between diffraction and interference patterns, prism and grating spectra
- g) Comprehended the basic principle of laser and its parts, the construction and working of He-Ne and Ruby laser.
- h) Solve problems using suitable assumptions and formulae as well as able to assess the results

B. Sc. Part I: Semester-II

Physics Paper III: Heat and Thermodynamics

- a) Determination of Coefficient of Viscosity, Thermal Conductivity and Diffusion.
- b) Understand Liquefaction of gases by various methods and Properties of Liquid He-II.
- c) Apply the laws of thermodynamics to formulate the relations necessary to analyse a thermodynamic process.
- d) Analyse the heat engines and calculate thermal efficiency.
- e) Analyse the refrigerators and calculate coefficient of performance.
- f) Understand property 'entropy' and derive some thermo-dynamical relations using entropy concept

Physics Paper IV: Electricity, Magnetism and Basic Electronics

- a) Understand the concept of Varying Current and applying them in charging and discharging of capacitor and time constant.
- b) Understand the concept of AC circuits and different AC bridges.
- c) Understand the concepts Magnetostatics and applying them to determine magnetic induction and, also understand Ballistic Galvanometer theory and its constants.
- d) Understand the rectifiers specially Bridge rectifier with filters also different wave shaping circuits.
- e) Understand BJT include its output characteristics under CE and CB mode with application of transistor amplifier.

B. Sc. I Practical

- a) Understand determination of acceleration due to gravity and moment of inertia.
- b) Understand calculation of surface tension and viscosity of liquid.
- c) Learn to determine frequency of a. c.
- d) Learn to determine angle of prism and its dispersive power
- e) Learn to determine of wavelength of light by using grating
- f) Study phenomenon of interference and working of Zener diode, characteristics of transistor.

B. Sc. Part II

B. Sc. Part II: Semester-III

Physics Paper V - General Physics and Sound

Following are course outcomes:

- a) Study properties of vectors and vector algebra
- b) Understand proceSSIONal Motion of bodies its applications
- c) Students understand how are properties of liquids like viscosity can used to study viscosity of liquids
- d) Student become acquainted with Production and properties of sound and how these properties can be used for acoustic of buildings?

Physics Paper VI – Electronics

After successfully completing this course following are course outcomes:

- a) Understand construction, working and characteristics of various semiconductor device like UJT and its use as relaxation oscillator
- b) Study use of transistor as faithful amplifier and oscillator
- c) Construction and working of CRO is understood in detail
- d) Students learn how to build and test a regulated power supply of desired voltage

B. Sc. Part II: Semester-IV

Physics Paper VII – Optics

- a) Here, students understand detailed theory of an optical system
- b) Study various phenomena of light, such as, Interference, Diffraction and Polarization
- c) Students understand concept of resolution and study resolving power of instruments
- d) Students understand Total Internal Reflection and fibre optical communication

Physics Paper VIII - Modern physics

- a) Students understand theory of relativity and important phenomena of mass-energy relation
- b) Know concept of matter waves
- c) Students study Vector atom model and various concepts like, spin hypothesis and Pauli exclusion principle

Physics B. Sc. II Practical

- a) Study to determine different module of elasticity by different methods
- b) Understand determination of viscosity, surface tension, thermal conductivity, and velocity of sound.
- c) Understand biasing of transistor, sensitivity of CRO.
- d) Study de Morgan's theorems, different oscillators and understand amplification and adder circuits
- e) Solar cell characteristics and diffraction of light, calculation of impedance.

B. Sc. Part III

The syllabus is designed with specific focus on key Learning Areas. • To equip student with necessary fundamental concepts and knowledge base. • To develop specific practical skills. • To impart training on circuit design, analysis, building and testing. • To prepare students for demonstrating the acquired knowledge. • To encourage student to develop skills for accepting challenges of upcoming technological advancements.

B. Sc. Part III: Semester -V

Physics Paper IX: Mathematical Physics and Statistical Physics

- a) Understand different mathematical and statistical methods in physics and how to apply them to different physical systems.
- b) Understand black body radiation and related laws
- c) Study various ensembles

Physics Paper X: Solid State Physics

- a) Understand concepts of lattice and various Bravais lattices
- b) Know concepts of Brillouin zones
- c) Understand properties of solids

- d) Study different magnetic materials and their properties
- e) Study concept of superconductivity

Physics Paper XI: Classical Mechanics

- a) Students learn conservation theorems and apply it to different physical systems
- b) Study Lagrangian formulation its applications
- c) Understand moving and rotating co-ordinate systems to understand various atmospheric phenomena
- d) Learn techniques of calculus of variation
- e) Get insight of coupled oscillatory systems

Physics Paper XII: Nuclear Physics

- a) Get knowledge of nucleus of an atom
- b) Study various particle accelerators and their use in particle detection
- c) Analyse nuclear reactions
- d) Understand radioactive decay processes
- e) Study elementary particles, their properties, and various interactions

B. Sc. Part III: Semester -VI

Physics Paper XIII: Electrodynamics

- a) Enumerate basic theory of electrodynamics
- b) Applying laws of motion to charged particles in various fields
- c) Illustrate Time varying fields and its applications
- d) Understand physical interpretation of Maxwell's equations
- e) describe propagation of electromagnetic fields
- f) Interpret reflection and refraction of em waves
- g) Persuade Dipole radiation

Physics Paper XIV: Materials Science

- a) Understand different materials and their properties
- b) Classify Polymer materials
- c) Get knowledge of ceramic materials and their properties
- d) Study composite materials, biomaterials
- e) Explore properties of nanoscale materials

Physics Paper XV: Atomic Physics, Molecular Physics and Quantum Mechanics

- a) Discuss Atomic spectra and selection rules
- b) Interpret Electric and magnetic fields on atomic spectra
- c) Study Molecular spectra and Raman effect
- d) Applications of Schrodinger's wave equations to various systems
- e) Know properties of quantum mechanical operators and operation algebra

Physics Paper XVI: Electronics

- a) Study construction and applications of Operational Amplifier
- b) Discuss different operating modes of TIMER IC
- c) Explain Applications of SCR, Diac -Triac and FETs
- d) Learn Display devices and illustrate their operations

Physics B Sc III Practical

- a) Study determination of surface tension, rigidity modulus, viscosity
- b) Study Cardinal points of a system, spherical aberration of a lens, dispersive power and resolving power of prism
- c) Understand working of Multivibrator, RS and JK flip-flops, timer etc.
- d) Study Hall effect, determination of high resistance, self-inductance, thin film deposition techniques.
- e) Learn MS Word, excel, PDF and plotting in origin software

Name of Department: Geology
Name of Programme: B. Sc. Geology

Program Outcomes (PO's)

After completing B.Sc. Geology programme, students will be able to:

PO1. Understand of concepts in Geology and geological processes.

PO3. Understand the economic importance and exploration of natural resources, applications of geological expertise in various fields, geological mapping, and understanding the earth's geological evolution.

PO4. Study the applications of various concepts, theories, and principles learned to demonstrate, design, and perform experiments in the laboratory.

PO5. Study to develop the ability to apply the knowledge acquired in the laboratories and classroom in the field visits.

PO6. Understand the applications of digital literacy and spatial thinking by imparting knowledge of remote sensing and GIS and using digital resources.

PO7. Analyse the knowledge for a career in professional practice in industries related to geogenic hazards associated with environmental issues.

PO8. Analyse the scientific reasoning ability for surface and subsurface water conservation issues.

PO9. Empowering the students to address real geological problems in the field.

PO10. Understand various applications and linkage of geology in interdisciplinary areas/subjects such as geography, chemistry, physics, etc.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn about the potential uses of various branches of Geology.

PSO2: Gather attention about the economic importance and exploration of natural resources, applications of geological expertise in various fields, geological mapping, earth's geological evolution, geogenic hazards associated with environmental issues and applications of Remote sensing and GIS etc.

PSO3: Gain complete knowledge about all fundamental concepts, theories and application of Geology.

Course Outcomes (CO's)

B. Sc I Semester – I

DSC 1A Physical Geology

After completing this course students will be able to:

CO1: Understand the scope and application of Geology and gives them the confidence to go to the next level of learning in the subject.

CO2: Know about Earth system, understand the societal and environmental relevance of earth system.

DSC 2A Structural Geology

After completing this course students will be able to:

CO 1: Basic knowledge about origin and age of the earth, various diastrophic processes like earthquakes, volcanism etc,

CO 2: Understanding the phenomena of folding, faulting, structural mapping and handling of basic geological field instruments.

Course Outcomes (CO's)

B.Sc. I Semester – II

DSC 1B Crystallography &

After completing this course students will be able to:

CO 1: Understand the concepts of crystal characters, parameters, symmetry and systems.

CO 2: Identify and classify the crystal system and elements of symmetry of crystals.

DSC 2B Mineralogy

After completing this course students will be able to:

CO 1: Understand the definition of minerals and physical properties of minerals.

CO 2: Knowledge of handling petrologic polarizing microscope and about basic physical and optical properties of certain common rock forming minerals.

B.Sc. I Geology Practical

After completing this course students will be able to:

CO 1 Crystallography: Improve ability of recognizing the symmetry elements of normal class of all crystal systems and will be able to draw certain simple and combination crystal forms, found in these classes of all crystal systems.

CO 2 Mineralogy: Develop the ability of recognizing and describing certain common minerals on the basis of their diagnostic physical properties, use of petrological polarizing microscope and study of optical properties of common rock forming minerals.

CO 4 Physical Geology: Compute the ability to identify basic geomorphologic, physical & topographic features on maps and ground, besides deriving information from Survey Of India Maps

CO 5 Structural Geology: Familiar to use Geology clinometers/ Brunton compass, recognize different faults and fold types, solve structural problems based on dip and strike, besides preparing cross sections from basic geologic maps.

CO 6 Field Training: Grow into familiar with elementary aspects of field geology, observations to be made there, collection of field samples and report preparation thereon.

Course Outcomes (CO's)
B.Sc. II Semester – III
DSC V: Igneous Petrology

After completing this course students will be able to:

CO 1: Understand origin, distribution, classification, textures and occurrences of igneous rocks.

CO 2: Understand various concepts related to formation and characteristics of various types of rocks and apply knowledge in various rock industries, mining and construction industries.

DSC VI: Sedimentary and Metamorphic Petrology

After completing this course students will be able to:

CO 1: Understand origin, distribution, classification, textures and occurrences of sedimentary and metamorphic rocks.

CO 2: Identify the different rocks with its physical characteristics, mode of formation, sedimentary basin history to review its potentiality of the basin for economic resources exploration and to understand the geological frame work with time and space.

Course Outcomes (CO's)
B.Sc. II Semester – IV
DSC VII Stratigraphy

After completing this course students will be able to:

CO 1: Understand the definition, scope and units of stratigraphy.

CO 2: Familiar to appreciate the stratigraphic principles, distribution of rocks in geological time scale in the Indian Subcontinent and their correlation in global geology.

DSC VIII Palaeontology

After completing this course students will be able to:

CO1: Understand the definition of Palaeontology and its mode of formations

CO 2 Understanding of classification, evolution and distribution of various invertebrate, vertebrate and plant fossils.

B.Sc. II Geology Practical

After completing this course students will be able to:

CO 1 Igneous Petrology: Develop the ability to identify certain igneous rocks in hand specimen as well as in thin sections, using the physical and optical properties of minerals present in them.

CO 2 Sedimentary and Metamorphic Petrology: Develop the ability to identify certain Sedimentary and Metamorphic rocks in hand specimen as well as in thin sections, using the physical and optical properties of minerals present in them.

CO 3 Palaeontology: Identify the morphological characters, taxonomic classification and age of selected invertebrate groups, viz., brachiopods, bivalves, cephalopods, trilobites and echinoids.

CO 4 Stratigraphy: Learn to prepare lithostratigraphic maps of India showing distribution of important geological formations.

CO 5 Field Training: Progress familiar with geological field observations in sedimentary or petrologically important terrains and report preparation thereon.

Course Outcomes (CO's)
B.Sc. II Semester – III Geochemistry
Paper I: Introduction to Geochemistry

After completing this course students will be able to:

CO 1: Understand Gibb's and Goldschmidt's phase rules

CO 2: Familiar with crystalline state, principles of crystal structure and its formation, Covalent bonds, coordination number.

CO 3: Understand silicate structures, Isomorphism and Polymorphism.

Paper II: Introduction to Solar system and Geospheres

After completing this course students will be able to:

CO 1: Understand the cosmic abundance of element, composition of sun, earth, planets and meteorites.

CO2: Understand zonal structure of earth, primary differentiation of the elements and geochemical classification.

CO 3: Understand the structure, composition, constituents and evolution of the atmosphere.

CO 4: Understand the nature of hydrosphere and composition of sea water and terrestrial water.

Paper III: Principles of Geochemistry

After completing this course students will be able to:

CO 1: Understand the chemical equilibrium, geologic usage, pH, hydrolysis of acids and bases.

CO 2: Familiar with organic material in sediments and its reaction, Origin of coal and petroleum,

CO 3: Classify colloids with its properties like electric charges, ion exchange and stability.

Classification of clay minerals with its structure and properties.

Paper IV: Chemistry of Earth

After completing this course students will be able to:

CO 1: Understand physicochemical system of earth, geochemical cycle, Radiogenic Isotope Geochemistry. Geochronology, Radiogenic Isotopic tracers, evolution of Mantle, Crust and Sediments.

CO 2: Understand the concept of Redox potential, Ionic potential, Hydrogen ion concentration, Eh and pH diagrams with its limits in nature.

CO 3: Classify clay minerals on basis of their formation, types, composition.

CO 4: Study Environmental Geochemistry and its brief introduction types and sources of Air, Water and Soil Pollutions

B.Sc. II Geochemistry Practical

After completing this course students will be able to:

CO 1: Develop the ability of recognizing and describing economic and industrial minerals on the basis of their diagnostic physical properties.

CO 2: Solve the Pyroxene- Hess calculations and Plagioclase- Felspar calculations from given chemical data.

CO 3: Solve CIPW Norm calculations of given petrochemical data.

CO 4: Analysis of natural waters and soils. Estimation of Ca, Mg-carbonates, bicarbonates, chlorides, and sulphates.

CO 5: Estimate of alumina and manganese in ore minerals, Calcium and Magnesium in carbonate rocks.

CO 6: Detection of traces of metals by chromatography

CO 7: Qualitative analysis of representative ores and minerals by calorimetric method.

Course Outcomes (CO's)
B.Sc. III Semester-V
DSE 1A Paper –IX Economic Geology

After completing this course students will be able to:

CO1. Knowledge of geological processes of formation of various ore deposits.

CO2. Applications of ore deposits and their distribution.

CO3. Understand environmental impact of mining, and the importance conservation of mineral resources.

Course Outcomes (CO's)
Semester-V
DSE-2A Paper X- Hydrogeology

After completing this course students will be able to:

CO1. Understand parameters, geological controls, and dynamics of surface and subsurface hydrology.

CO2. Understanding of exploration of groundwater.

CO3. Understanding of applications of various structures to recharge groundwater for sustainable resource.

CO4. Knowledge of environmental impact, conservation, and development of surface and subsurface water resources.

Course Outcomes (CO's)
Semester-V
DSE- 4A Paper – XI: Applied Geology – Engineering Geology

After completing this course students will be able to:

CO1. The students understand the impact of natural dynamic geological processes on civil engineering structure.

CO2. The students will get acquainted with engineering properties of rocks and their uses in construction.

CO3. The students will know the significance of factors of geological consideration for the construction of large construction projects.

CO4. The students will get preliminary understanding of planning, design and execution stages of the structures in their professional life.

Course Outcomes (CO's)

Semester-V

DSE- 4A Paper – XII: Applied Geology – Prospecting and Mining Geology

After completing this course students will be able to:

CO1. Knowledge of various methods of minerals exploration by linking interdisciplinary subject knowledge.

CO2. Understand various mining methods both open cast and underground mining.

CO3. Preliminary understanding of sampling methods for exploration and ability to collect and analyze data.

CO4. Fundamental understanding of environmental impact of mining on society and various methods to mitigations.

Course Outcomes (CO's)

Semester-VI

SEC 1B PAPER – XIII PHOTOGEOLOGY AND REMOTE SENSING

After completing this course students will be able to:

CO1. Understand and define basic principles of photogeology and remote sensing.

CO2. Acquisition, recognition, analyze, and interpret various types of remote sensing data.

CO3. Get skill of preliminary digital image processing and classification of digital data.

CO4. Get skill of preparing geological maps on GIS platform.

CO5. Understand the various applications of remote sensing and GIS.

Course Outcomes (CO's)

Semester-VI

SEC 2B PAPER – XIV GEOMORPHOLOGY AND GEOTECTONICS

After completing this course students will be able to:

CO1. Knowledge of natural forces that shapes the earth and formation of various surface features.

CO2. Understand the dynamism of earth's surface and effects of movements of mankind.

CO3. Skill of tools and techniques to prepare geomorphologic maps.

Course Outcomes (CO's)

Semester-VI

SEC 3B PAPER – XV ENVIRONMENTAL GEOLOGY

After completing this course students will be able to:

CO1. Knowledge of interaction and energy exchange between earth's spheres.

- CO2. Understand the earth's energy budget and impact of anthropological activities on environment.
- CO3. Understand process of generation natural hazards and their impact on society.
- CO4. Develop understanding of mitigate natural hazards by applying geological knowledge.

Course Outcomes (CO's)
Semester-VI
SEC 4B PAPER – XVI GEOCHEMISTRY

After completing this course students will be able to:

- CO1. Establish linkage between knowledge of geology and chemistry.
- CO2. Understand geochemical activities since formation of the earth and migration of the elements.
- CO3. Knowledge of isotopes and their applications in geology.
- CO4. Geochemistry of solar system.
- CO 5: Understand chemical bonds, colloids, periodic table, cosmic abundance of elements, geochemical classification, distribution of major, minor and trace elements in various rock types and the basics of geochemical thermodynamics.

B.Sc. III Geology Practical

After completing this course students will be able to:

- CO1 Engineering Geology: Become familiar with soil profiles, engineering properties and identification of building stones, models of landslide, tunnel and dam.
- CO 2 Economic Geology: Study ore and economic minerals in hand specimen, preparation of maps showing distribution of important metallic and non-metallic deposits and important coal and oil fields of India.
- CO 3 Hydrogeology: Ability to study hydrogeological models, estimation of porosity and permeability from the given data, preparation and interpretation of water table maps.
- CO 4 Environmental: Familiar with important geological hazards: earthquakes, volcanoes, landslides, avalanches, floods and, draughts; hazard mitigation
- CO 4 Field Geology: Understand geological field observations in important engineering geology or geological hazard sites and report preparation thereon.

Name of Department: Statistics
Name of Programme: B.Sc. Statistics
Program Outcomes (PO's)

After completing B.Sc. Statistics programme, students will be able to:

- PO1: Demonstrate the ability to use skills in Statistics and different practicing areas for formulating and tackling Statistics related problems.
- PO2: Identifying and applying appropriate principles and methodologies to solve a wide range of problems associated with Statistics.
- PO3: Fundamental/systematic or coherent understanding of the academic field of Statistics and its different learning areas and applications.
- PO4: Procedural knowledge that creates different types of professionals related to subject area of Statistics, including professionals engaged in government/public service and private sectors.
- PO5: Use skills in areas related to one's specialization area within the disciplinary/subject area of Statistics and emerging developments in the field of Statistics.
- PO6: Plan and execute Statistical experiments or investigations, analyze and interpret data/information collected using appropriate methods and report accurately the findings of the experiment/investigations.
- PO7: Recognize the importance of statistical modelling and computing to analyze the real problems using various statistical tools.
- PO8: Problem-solving skills that are required to solve different types of Statistics-related problems with well-defined solutions.
- PO9: Investigative skills, including skills of independent thinking of Statistics-related issues and problems.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: Acquire core knowledge of the basic concepts of statistics which include the major areas of probability theory, probability distributions, distribution theory, statistical inference, survey sampling, designs of experiments, applied statistics, industrial statistics, nonparametric inference and operations research.
- PSO2: Practical exercises done will enable students to analyze and interpret data and also to draw valid conclusions. This will enable students to face real time applications.
- PSO3: Apply the concepts of statistics, Operations Research, Probability theory, Time Series, Designs of Experiment, etc. in real life problems.
- PSO4: Understand the applications of statistics concept in other disciplines such as mathematics, physics, economics, etc.
- PSO5: Provides a platform for pursuing higher studies leading to Post Graduate or Doctorate degrees.

Course Outcomes (CO's)

Part-I Semester-I
Paper-I: Descriptive Statistics-I

The students will be able to get knowledge such as:

CO1: Statistics and its scope and importance in various areas such as Medical, Engineering, Agricultural and Social Sciences etc.

CO2: Information about various Statistical organisations in India and their functions for societal developments.

CO3: Understand the concept of a statistical population and a sample from a population.

CO4: Classification and tabulation of data. Different types of data.

CO5: Diagrammatical and graphical representation of data.

CO6: Measures of central tendency, Dispersion, Skewness and Kurtosis and Moments.

CO7: Moments and their use in studying various characteristics of data.

Paper-II: Probability and Probability Distributions-I

After completing this course students will be able to:

CO1: Distinguish between random and non-random experiments.

CO2: Concept of probability, different approaches to the theory of probability. Concept of events, mutually exclusive independent and exhaustive events. Sample space and its properties.

CO3: Use the basic probability rules including addition and multiplicative laws, conditional probability and Bayes theorem.

CO4: Knowledge related to concept of independence of attributes.

CO5: Use the basic probability rules including addition and multiplicative laws, conditional probability and Bayes theorem.

CO6: Knowledge related to probability mass function and probability density function. Mathematical expectation of a random variable. Conditional expectation and variance.

Semester-II

Paper-III: Descriptive Statistics-II

After completing this course students will be able to:

CO1: Concept of correlation, correlation coefficients - Karl Pearson's correlation coefficient, Spearman's rank correlation coefficient.

CO2: Concept of Regression, Principle of least squares, Linear and curvilinear regression.

CO3: Gain knowledge on Categorical data. Consistency of categorical data.

CO4: Knowledge of independence and association between two attributes.

CO5: Know about the different types of control charts for variables and attributes and their construction.

CO6: Apply the statistical tools in business, economical and commercial areas with the help of index numbers.

CO7: Have a clear understanding about the different indices, criteria of a good index, cost of living index number and calculate indices from given data.

Paper-IV: Probability and Probability Distributions-II

After completing this course students will be able to:

- CO1: Made a bridge between the elementary statistical tools and probability theory.
- CO2: Knowledge of important discrete distributions such as Bernoulli, Binomial, Hypergeometric, uniform distributions.
- CO3: Identify the type of statistical situation to which different distributions can be applied.
- CO4: Apply the theoretical discrete probability distributions in the relevant application areas.
- CO5: Use different distributions to solve simple practical problems.

Practical Paper-I

After completing this course students will be able to:

- CO1: Represent statistical data by graphically.
- CO2: Compute various measures of central tendency, dispersion, moments, skewness, and kurtosis.
- CO3: Compute correlation coefficient, regression coefficients.
- CO4: Analyze data pertaining to discrete and continuous variables and to interpret the results.
- CO5: Understand consistency, association and independence of attributes.
- CO6: Compute price index number, quantity index number.
- CO7: Compute probabilities of bivariate distributions.
- CO8: Know applications of some standard discrete probability distributions.

Part-II Semester-III

Paper-V: Probability Distribution –I

The students will be able to get knowledge such as:

- CO1: Understand concept of discrete and continuous probability distributions with real life situations.
- CO2: Distinguish between discrete and continuous distributions.
- CO3: Find the various measures of random variable and probabilities using its probability distribution.
- CO4: Knowledge of the relations among the different distributions.
- CO5: Understand the concept of transformation of univariate and bivariate continuous random variable.

Paper – VI: Statistical Methods

After completing this course students will be able to:

- CO1: Understand the concept of Multiple Linear Regression.
- CO2: Understand the concept of Multiple Correlations and Partial Correlation.
- CO3: Knowledge of the concept of sampling theory.
- CO4: Understand the concepts of time series, the different models, measurement of trend and seasonal variations.
- CO5: Know about the different types of control charts for variables and attributes and their construction.
- CO6: Capable to construction and working of Shewhart's control charts for variables and attributes.

Semester-IV

Paper – VII: Probability Distribution –II

After completing this course students will be able to:

CO1: Know some standard continuous probability distributions with real life situations.

CO2: Distinguish between various continuous distributions.

CO3: Find the various measures of continuous random variable and probabilities using its probability distribution.

CO4: Understand the relations among the different distributions.

CO5: Understand the Chi-Square, t and F distributions with their applications and inter relations.

Paper – VIII: Applied Statistics

After completing this course students will be able to:

CO1: Understand the concepts of time series, the different models, measurement of trend and seasonal variations.

CO2: Fitting of trend by Moving Average method and measurement of Seasonal Indices by simple average and Ratio-to-Moving Average methods.

CO3: Understand critically the problems that are faced in testing of a hypothesis with reference to the errors in decision making.

CO4: Gain knowledge of Chebyshev's inequality and the Central Limit Theorem.

CO5: Apply the different testing tools like t-test, F-test, chi-square test, etc. to analyse the relevant real life problems.

CO6: Understand the basic concepts of vital statistics. Mortality rates, fertility rates and their measurements. Have a basic idea about migration and population projection.

Practical Paper-II, III

After completing this course students will be able to:

CO1: Compute probabilities of standard probability distributions.

CO2: Compute the expected frequency and test the goodness of fit.

CO3: Drawing random samples from standard probability distributions.

CO4: Compute the multiple and partial correlation coefficients.

CO5: Selection of samples by SRS.

CO6: Computation and interpretation of vital statistics.

CO7: Construction of control chart.

CO8: Obtain results using soft wares like MS-Excel.

Part-III Semester-V

Paper-IX: Statistical Inference-I

After completing this course students will be able to:

CO1: Gain knowledge in the concepts of Theory of estimation and distinguish various types of estimation.

CO2: Gain knowledge on Point estimation. Properties of estimators and mean square error. Minimum variance unbiased estimators, Rao- Cramer Lower Bound of variance and their results.

CO3: Importance and application of inferential aspect of point estimation.

CO4: Understand the sufficient conditions for consistency and construction of sufficient statistic and optimal estimators.

CO5: Understand the concept and application of Fisher information and CR inequality.

Paper –X: Probability Distributions

After completing this course students will be able to:

CO1: Understand the concepts of various univariate and multivariate probability distributions.

CO2: Importance and application of univariate distributions such as Laplace, Cauchy, Lognormal, Weibull, Logistic, Pareto, Power Series Distribution.

CO3: Understand the concept of Bivariate Normal Distribution.

CO4: Concept and application of Truncated Distributions.

CO5: Apply and fit the different distributions to analyse the relevant real life problems.

Paper-XI: Sampling Techniques

After completing this course students will be able to:

CO1: Basic knowledge of complete enumeration and sample, sampling frame, sampling distribution, sampling and non-sampling errors, principal steps in sample surveys, limitations of sampling etc.

CO2: Understand basic concepts of survey sampling, basic principles in sampling, Simple random sampling, systematic sampling, stratified sampling, two-stage and multistage sampling.

CO3: An idea of conducting the sample surveys and selecting appropriate sampling techniques.

CO4: Knowledge about comparing various sampling techniques.

CO5: Apply the different sampling methods for designing and selecting a sample from a population.

CO6: Implement of Cluster sampling, Ratio and Regression estimation in real life problems.

Paper-XII: Operations Research

After completing this course students will be able to:

CO1: Understand the concept of Linear programming problem and its application to real life problems.

CO2: Understand the basic concepts of Operation research. Formulation of a linear programming problem. Obtain graphical solutions to a linear programming problem.

CO3: Know the different optimal techniques to solve physical problems.

CO4: Represent transportation and assignment problems as LPP, solve transportation and assignment problems using different methods.

CO5: Importance of Transportation, Assignment and Sequencing problems.

CO6: Use of decision theory in solving complex problems.

CO7: Importance of simulation techniques in every aspects of Statistical theory.

SEC Paper: MS-EXCEL

After completing this course students will be able to:

CO1: Understand importance of MS-Excel in day-to-day life.

CO2: Use MS-Excel for facilitation for their own development and development of the society.

CO3: Construct knowledge using MS-Excel and become a lifelong learner.

CO4: Become responsible citizens of the modern technology-based world.

Semester-VI

Paper-XIII: Statistical Inference –II

After completing this course students will be able to:

CO1: Gain knowledge in the concepts of Theory of estimation and application of interval estimation. Know the properties of estimators and construction of interval estimators.

CO2: Distinguish between parametric and non-parametric tests. Area of applications.

CO3: Testing of hypothesis using Non-Parametric tests like sign test, Wilcoxon rank test, Mann-Whitney test, etc. and ability to use them judiciously for the testing of given data.

CO4: Understand Neyman-Pearson Lemma and its applications in testing of hypothesis regarding different distributions. Power functions of UMP test. Likelihood Ratio test.

Sequential test- Wald SPRT.

CO5: Gain knowledge on testing of hypothesis. Different types of hypothesis. Statistical tests, types of error, size and power of a test, most powerful (MP), uniformly most powerful (UMP) and unbiased test.

CO6: Understand problem of statistical inference, problem of testing of hypothesis and construct SPRT in case of Binomial, Poisson, and Normal Distribution.

CO7: Knowledge of Various one sample tests NPT such as test of randomness, Sign test, Kolmogorov Smirnov (KS) test.

Paper –XIV: Probability Theory

After completing this course students will be able to:

CO1: Knowledge about order statistics and associated distributions.

CO2: Concept of weak law of large numbers and central limit theorem of convergence of random variables.

CO3: Understand the notion of a discrete-time Markov chain and be familiar with both the finite state-space case and some simple infinite state-space cases, such as random walks and birth-and-death chains.

CO4: Gain knowledge in the concepts of queuing theory and basic terms.

CO5: Understand various elements of a queuing system and each of its description.

CO6: Analyze M/M/1 model.

Paper –XV: Designs of Experiments

After completing this course students will be able to:

CO1: Understand the basic terminology involved in designing of experiment.

CO2: Understand the concepts of CRD, RBD, LSD and its applications.

CO3: Analyse the different mathematical models with the help of statistical designs and appropriate data and made valuable conclusions by proper evaluation.

CO4: Gain knowledge about one way and two way Analysis of Variance under fixed, random and mixed effects model.

CO5: Use appropriate experimental designs to analyze the experimental data.

CO6: Understand the concepts of Factorial experiments with two and three levels, Complete and partial confounding and Analysis of covariance.

CO7: Construct fractional factorial experiments and apply confounding in real life problems.

Paper –XVI: Quality Management and Reliability Theory

After completing this course students will be able to:

CO1: Understand the concepts of quality control, control charts for variables and attributes.

Know about the different types of control charts for variables and attributes and their construction. Producer's and consumer's risk, Acceptance sampling plans.

CO2: Meaning and dimensions of quality and its importance in real life and in manufacturing industry.

CO3: Apply various tools and techniques involved in process and product control. Effectively interpret the results from the control charts.

CO4: Understand basic of production process monitoring and apply concept of control charts on it.

CO5: Apply the acceptance and continuous sampling plans in production process. Know and apply the concept of weighted control charts, six sigma.

CO6: Understand the concept and real life application of reliability theory.

Practical Paper- IV, V, VI, VII

After completing this course students will be able to:

CO1: Obtain estimators using estimation methods such as Maximum likelihood, Minimum chi square and method of moments.

CO2: Construct Most Powerful test, Uniformly Most Powerful test.

CO3: Construct SPRT in case of Binomial, Poisson, Exponential and Normal Distribution.

CO4: Apply various designs for agricultural data/agricultural field and explain which design will give the maximum yield of a crop.

CO5: Perform measures of control chart such as OC, ARL, ATI etc. and various sampling inspection techniques.

CO6: R programming with some basic notions for developing their own simple programs and exposed various computational algorithms using R language.

CO7: Solve real life problems of Linear Programming Problem, Assignment Problem, Transportation Problem and Sequencing problems by various methods.

CO8: Carry out one way and two way Analysis of Variance and use factorial experiment for agriculture data.

CO9: Give statistical interpretation of the experimental results obtained.

CO10: Draw various types of control charts such as \bar{X} and R, \bar{X} and s, p chart, EWMA, CUSUM etc. and draw conclusions therefrom.

Name of Department: Computer Science

Name of Programme: B.Sc. (ECS)

Program Outcomes (PO's)

PO1: Identify, formulate, research literature, and analyze complex scientific problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and applied sciences.

PO2: Apply computer science theory and software development fundamentals to produce computing-based solution.

PO3: The education objectives of the major to produce graduates who possess: A sound technical foundation in computer science and the ability to creatively apply computer and related technologies to practical problems.

PO4: An understanding of professional, ethical, legal, security, and social issues and responsibilities for the computing profession.

PO5: Create, select, and apply appropriate techniques, resources, and modern computing and IT tools including prediction and modelling to complex scientific activities with an understanding of the limitations.

PO6: Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.

PO7: Students will be prepared for a career in an information technology oriented business or industry, or for graduate study in computer science.

PO8: An ability to analyze impacts of computing on individuals, organizations, and society.

PO9: An ability to apply knowledge of computing and mathematics appropriate to the discipline.

PO10: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Program Specific Outcomes (PSO's)

PSO1: Program focuses on giving knowledge of computer from basics to different programming languages like C, C++, JAVA, VB.NET etc.

PSO2: It will provide the knowledge of Database, Different types of Database Software, its application & implementation in real life software's.

PSO3: It will enable the student for developing websites using different scripting languages.

PSO4: It will enable the student for developing application /software's using different programming languages.

PSO5: Program focuses on giving knowledge of Computer Skill Like java script, Linux and shell programming, R Lang, XML programming, SQL server, MySQL etc. so that students have hands on practice on such subjects.

PSO6: The students will get awareness about the new subjects like Android, Python, JSP, Servlet etc. which are used in MNC.

PSO7: Due to some courses like Digital Image Processing student will take initiative in research Field PSO8: Program also focuses on giving knowledge of Basic Networking, Mobile computing so that student will select the Computer Networking field as a Career.

PSO9: students will able to take up self-employment in Indian & global software market.

PSO10: Program also focuses on to Meet the requirements of the Industrial standards.

Course Outcomes (CO's)

Semester-V

Paper IX: Communication and Networking

Upon successful completion of this course, students will be able to :

CO1: Familiarize with contemporary issues in network technologies.

CO2: Know the layered model approach explained in OSI and TCP/IP network models

CO3: Identify different types of network devices and their functions within a network.

CO4: Know the Basic routing mechanisms, IP addressing scheme and internetworking concepts.

CO5: Familiarize with IP and TCP Internet protocols.

CO6: Understand major concepts involved in design of WAN, LAN and wireless networks.

CO7: Know the basics of network configuration and maintenance.

CO8: Know the fundamentals of network security issues.

Paper X: Theory of Computer Science

Upon successful completion of this course, students will be able to :

CO1. Understand the basic concepts and application in Theory of Computation.

CO2. Apply this basic knowledge of Theory of Computation in the computer field to solve computational problems and in the field of compiler also.

Paper XI: Visual Programming

Upon successful completion of this course, students will be able to :

- CO1: Design, create, build, and debug Visual programming applications.
- CO2: Explore Visual Programming Integrated Development Environment (IDE).
- CO3: Implement syntax rules in Visual programming.
- CO4: Explain variables and data types used in program development.
- CO5: Write and apply decision structures for determining different operations.
- CO6: Write and apply loop structures to perform repetitive tasks.
- CO7: Write and apply procedures, sub-procedures, and functions to create manageable code.

Paper XII (DSE-2): Advanced Java

Upon successful completion of this course, students will be able to :

- CO1: He will be able to develop distributed business applications, develop web pages using advanced server-side programming through servlets and Java server pages.
- CO2: Demonstrate approaches for performance and effective coding.
- CO3: To learn database programming using Java.
- CO4: To study web development concept using Servlet and JSP.

Paper XIII (DSE-2): Advanced Python Programming

Upon successful completion of this course, students will be able to :

- CO1: Design, create, build, and debug Java
- CO2: Explore Integrated Development Environment (IDE).

Semester –VI

Paper XIV: System Security

Upon successful completion of this course, students will be able to-

- CO1: Develop an understanding of information assurance as practiced in computer operating systems, distributed systems, networks and representative applications.
- CO2: Gain familiarity with prevalent network and distributed system attacks, defenses against them, and forensics to investigate the aftermath.

CO3: Develop a basic understanding of cryptography, how it has evolved, and some key encryption techniques used today.

CO4: Develop an understanding of security policies (such as authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges.

Paper XV: Compiler Construction

Upon successful completion of this course, students will be able to-

CO1: Acquire knowledge of different phases and passes of the compiler and also able to use the compiler tools like LEX, YACC, etc. Students will also be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

CO2: Understand the parser and its types i.e. Top-Down and Bottom-up parsers and construction of LL, SLR, CLR, and LALR parsing table.

CO3: Implement the compiler using syntax-directed translation method and get knowledge about the synthesized and inherited attributes.

CO4: Acquire knowledge about run time data structure like symbol table organization and different techniques used in that.

CO5: Understand the target machine's run time environment, its instruction set for code generation and techniques used for code optimization.

Paper XVI: Internet Programming using ASP.Net

Upon successful completion of this course, students will be able to-

CO1: Create, Design, Debug and Deploy Web applications.

CO2: Explore Integrated Development Environment (IDE).

CO3: Understand working of Asp.Net web application

CO4: Demonstrate Asp.Net server controls.

CO5: Study database operations using ADO.Net.

CO6: Understand importance and working of state management.

Paper XVII: Angular JS

Upon successful completion of this course, students will be able to-

CO1: Create Design, Debug and Deploy Web applications.

CO2: Explore Integrated Development Environment (IDE).

Paper XVIII: Mobile Application Development

Upon successful completion of this course, students will be able to-

CO1: Create Design, Debug and Deploy Android applications.

CO2: Explore Integrated Development Environment (IDE).

Practical-IV

CO1: Identify patterns, tokens, and regular expressions for lexical analysis.

CO2: Design Lexical analyzer for given language using C and LEX/YACC tools

CO3: Design and analyze top-down and bottom-up parser

CO4: Generate the intermediate code

CO5: Generate machine code from intermediate code forms

CO6: Identify patterns, tokens, and regular expressions for lexical analysis

CO7: Design Lexical analyzer for given language using C and LEX/YACC tools

Practical-V

CO1: Identify, formulate and analyze problems as well as identify the computing requirements appropriate to their solutions.

CO2: Understand and analyze a web page and identify its elements and attributes.

CO3: Develop web pages using markup languages like HTML, DHTML and style sheets for making it more presentable to the user.

CO4: Develop dynamic web pages using client side programming and server side programming.

CO5: Develop XML documents and XML Schema to formulate the web services.

CO6: Understand the C#.NET environment and how to develop small programs

CO7: Develop menu based program for text manipulation

CO8: Understand ADO .NET and develop database applications

CO9: Develop the applications using DataGrid for displaying records

Practical-VI

CO1: Use utility classes in the real time applications

CO2: Develop applications using Files, Swing and Applets

- CO3: Develop applications using Sevlets and JSP working with Database.
- CO5: Develop client-side Javascript frameworks and the Angular framework.
- CO6: Use various Angular features including directives, components, and services.
- CO7: Implement a functional front-end web application using Angular.

Practical-VII

- CO1: Students should be able to design and construct a hardware and software system, component, or process to meet desired needs.
- CO2: Students are provided to work on multidisciplinary Problems.
- CO3: Students should be able to work as professionals, with portfolio ranging from data management, network configuration, designing hardware, database and software design to management and administration of entire systems.

Semester –III

Data Structure using C++ -I

After completing this course, students will be able to:

CO1: Students should be able to understand the most basic aspects of data structures including Complexity of algorithm and Design strategies of Algorithm

CO2: Students should be able to understand the most basic aspects of data structures including stacks, queue, linked list and trees.

CO 3: Should be able to understand implementations of stack, queue and linked list operation

Data Structure using C++ -II

After completing this course, students will be able to:

CO1: Should be able to understand different sorting and searching algorithms.

CO2: Ability to have knowledge of tree and graphs concepts.

Software Engineering

After completing this course, students will be able to:

CO1. Learn the phases of software development

CO2. Develop process models and process system models

CO3. Gather, understand, analyze and specify requirements

CO4. Develop architectural diagram, and implement by following coding principles

CO5. Apply testing strategies and handle software product maintenance issues

Software Testing

After completing this course, students will be able to:

CO1: Describe fundamental concepts in software testing such as manual testing, automation testing and software quality assurance.

CO2: Design and develop project test plan, design test cases, test data, and conduct test operations

CO3: Apply recent automation tool for various software testing for testing software

CO4: Apply different approaches of quality management, assurance, and quality standard to software system

CO5: Apply and analyze effectiveness Software Quality Tools

Probability Theory –I

After completing this course, students will be able to:

CO 1: Knowledge of bivariate data , correlation, types of correlation and methods to study it.

CO 2: Knowing of estimation of value of unknown variable using value of known variable

CO 3: Ability of studying correlation and regression for trivariate

Probability Theory-II

After completing this course, students will be able to:

CO 1: Ability of studying continuous random variable, it's pdf, mean, variance and cdf

CO 2: Knowledge of continuous probability distribution like Uniform, Exponential, Normal, T and F with their properties.

CO 3: Knowing importance of testing of hypothesis using statistical methods

Introduction to Python programming

After completing this course, students will be able to:

To read and write simple Python programs. 1,2 2 To develop Python programs with conditionals and loops. 2,4 3 To define Python functions and to use Python data structure- lists, tuples, dictionaries 3 4 To do input/output with files in Python 2 5 To do searching ,sorting and merging in Python

Semester –IV

Database Management System

After completing this course, students will be able to:

CO1: Appreciate the need for DB approach and understand the components and roles of DBMS

CO2: Develop ER diagram for representing conceptual data model

CO3: Convert ER diagram into a set of relations representing logical data model

CO4: To understand the importance and functions of different E-R model, Relational model and Relational Algebra operations.

CO5: To understand the importance and functions of different Transaction Concepts, Database Security Concepts, Database Recovery and Atomicity.

MYSQL

After completing this course, students will be able to:

CO1: Learn structured query language (SQL) to an intermediate/advanced level.

CO2: Be able to write data retrieval queries and evaluate the result set.

CO3: Be able to write SQL statements that edit existing data.

CO4: Be able to write SQL statements that create database objects.

CO5: Understand the structure and design of relational databases.

CO6: Understand the importance and major issues of database security and the maintenance of data integrity

Operating System

After completing this course, students will be able to:

CO1: Allocate Main Memory based on various memory management techniques.

CO2: Compare Memory allocation using Best fit, Worst fit, and first fit policies.

CO3: Apply page replacement policies for dynamic memory management.

CO4: Schedule CPU time using scheduling algorithm for processors.

CO5: Compare various device scheduling algorithms.

Linux OS and Shell Scripting

After completing this course, students will be able to:

CO1: Understand the basic commands of Linux operating system and can write shell scripts.

CO2: Create file systems and directories and operate those using programs.

CO3: Understand the processes background and fore ground by process and signals system calls.

CO4: Create shared memory segments, pipes, message queues and can exercise inter process communication.

CO5: Create sockets and semaphores to interact between processes of different system.

Statistics for Data Science

After completing this course, students will be able to:

- CO1: Students will demonstrate proficiency with statistical analysis of data.
- CO2: Students will develop the ability to build and assess data-based models.
- CO3: Students will execute statistical analyses with professional statistical software.
- CO4: Students will demonstrate skill in data management.

Optimization techniques

After completing this course, students will be able to:

- CO1: Explain the applications of optimization techniques and solve practical problems on linear programming, sensitivity analysis and transportation model.
- CO2: Formulate and solve integer linear programming problems and sequential linear programming.

Web Development using PHP

After completing this course, students will be able to:

- CO1: Create variables, functions and loops
- CO2: Apply OOP features.
- CO3: Create and manipulate files.
- CO4: Write mysql queries for given problem statement
- CO5: Connect to mysql through command line and through PHP MYADMIN
- CO6: Apply Cookies, Sessions and Validation.

Environmental studies

After completing this course, students will be able to:

- CO1: Gain knowledge about environment and ecosystem.
- CO2: Students will learn about natural resource, its importance and environmental impacts of human activities on natural resource.
- CO3: Gain knowledge about the conservation of biodiversity and its importance.
- CO4: Aware students about problems of environmental pollution, its impact on human and ecosystem and control measures.
- CO5: Students will learn about increase in population growth and its impact on environment

Practical I & II

Data Structure I and II

- CO1: Calculate and analyze performance of algorithms
- CO2: Choose the appropriate data structure and algorithm design method for a specified application.
- CO3: Identify which algorithm or data structure to use in different scenarios.
- CO4: Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures
- CO5: Implementation of greedy approach for solution of the optimization problems.
- CO6: Implementation of dynamic programming for solution of the optimization problems. CO7: Implementation of backtracking for solution of the different large state space problems.
- CO8: Implement basic data structures such as arrays and linked list.
- CO9: Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- CO10: Implement various searching and sorting algorithms.
- CO11: Programs to demonstrate the implementation of various operations on stack and queue.
- CO12: Know about the basic concepts of Link-list.

DBMS and MYSQL

- CO1: Implement Basic DDL, DML and DCL commands
- CO2: Understand Data selection and operators used in queries and restrict data retrieval and control the display order
- CO3: Write sub queries and understand their purpose
- CO4: Use Aggregate and group functions to summarize data
- CO5: Join multiple tables using different types of joins
- CO6: Understand the PL/SQL architecture and write PL/SQL code for procedures, triggers, cursors, exception handling etc..

Python

- CO1: Illustrate Python programming concepts like conditional execution, data structures, and regular expressions.

CO2: Write Python code for concepts like classes and objects, iterations, strings, file handling etc.

CO3: Implement a Python application using web services and database concepts.

CO4: Design solutions to given problems using Python programming language

Practical I & II

Software Engineering and Software Testing

CO1: Able to prepare SRS document, design document, test cases and software configuration management and risk management related document.

CO2: Develop function oriented and object oriented software design using tools like rational rose.

CO3: Able to perform unit testing and integration testing.

CO4: Apply various white box and black box testing techniques e) Able to track the progress of a project using Openproj tool.

Operating System and Linux OS and Shell Scripting

CO1: Understand and apply knowledge of basic UNIX/LINUX commands to solve various software problems and to automate real time applications.

CO2: Understand and implement the concept of process synchronization tool like semaphore to solve mutual exclusion problem in order to coordinate concurrent process

CO3: Apply knowledge of process management techniques to design and solve various process synchronization problems like Producer Consumer problem, Reader Writer problem and dining philosopher's problem.

CO4: Compare and contrast among various CPU scheduling algorithms and apply knowledge to identify the best scheduling algorithm as per software requirement.

CO5: Understand and apply the concepts of deadlock in operating systems to design and implement various deadlock avoidance algorithms like Banker's algorithm used in banking system.

CO6: Understand and apply knowledge of basic UNIX/LINUX commands to solve various software problems and to automate real time applications.

Web Development using PHP

CO1: Understand, analyze and apply the role of PHP.

CO2: Build web applications using PHP.

Practical I & II

Probability Theory –I and II

CO1: Understand and use the various fitting distribution like Binomial distribution, Poisson distribution, Hypergeometric distribution and Normal distribution

CO2: Understand and use Measures of central tendency on ungrouped data and grouped data.

Statistics for Data Science and Optimization techniques

CO1: Understand and use the various Data processing techniques on columns, rows, statistical information, Max value, min value etc.

CO2: Understand and use the various Data visualization techniques Bar graph/Histogram/Pie Chart/Line Graph

CO3: Understand and use the various Data Analysis techniques central tendency, dispersion, Binomial distribution ,normal distribution

Semester –I

Fundamental of Computer

Upon successful completion of this course, students will be able to-

CO1: To understand basic concepts and terminology of information technology.

CO2: To a basic understanding of personal computers and their operations.

CO3: To understand various input and output devices.

CO4: To understand memory management.

Basics of Operating System

Upon successful completion of this course, students will be able to-

CO1: To provide a sound understanding of the Computer operating system, its structures, and its functioning.

CO2: To understand the services provided by and the design of an operating system.

CO3: To understand different approaches to memory management.

CO4: To understand the services provided by and the design of an operating system.

CO5: To understand what a process is and how processes are synchronized and scheduled.

Course Title: Programming using ‘C’

(Paper Code: I)

Upon successful completion of this course, students will be able to-

CO1: To understand the fundamentals of C programming.

CO2: To read, Understand, Write and execute the programs using C.

CO3: To apply logical thinking to a given program and write the code.

CO4: To identify the correct and efficient ways of solving problems.

Python - I

Upon successful completion of this course, students will be able to-

CO1: Understand the basic concepts and applications of Python.

CO2: Design, create, build, and debug python applications.

CO3: Explore Integrated Development Environment (IDE).

CO4: Write and apply decision structures for different operations.

CO5: Write loop structures to perform iterative tasks.

Numerical Methods

Upon successful completion of this course, students will be able to-

CO1: Ability to appreciate real world applications which use these concepts.

CO2: Skill to formulate a problem through Mathematical Modeling and programming.

Graph Theory

Upon successful completion of this course, students will be able to-

CO1: Understand the notion of mathematical thinking, and mathematical proofs and to apply them in problem solving.

CO2: Ability to understand and apply concepts of graph theory in solving real world problems and ability to reason logically.

Basic Electronics

Upon successful completion of this course, students will be able to-

CO1: Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, inductors, capacitors, diodes and transistors.

CO2: Gain an intuitive understanding of the role of power flow and energy storage in electronic circuits.

CO3: Learn how to develop different power supplies in the computer system.

Advanced Electronics

Upon successful completion of this course, students will be able to-

CO1: Learn how to develop the Integrated circuits (IC) in electronics systems.

CO2: Learn how to Manufacturing Resistors, Capacitors, Diode and Transistor in IC.

CO3: An understanding of different Display devices, Sensors and PCB technologies used in Computer System.

Semester –II

Introduction to Web Technology

Upon successful completion of this course, students will be able to-

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete applications over the web.

CO3: Demonstrate the important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CO4: Utilize the concepts of JavaScript.

Operating System

Upon successful completion of this course, students will be able to-

CO1: Describe and analyze memory management and its allocation policies.

CO2: Identify the use and evaluate the storage management policies concerning different storage management technologies.

CO3: To understand different approaches to memory management.

Object Oriented Programming using C++

Upon successful completion of this course, students will be able to-

CO1: Describe the procedural and object oriented paradigm with concepts of streams classes, functions, data and objects.

CO2: Understand dynamic memory management techniques using pointers, constructors, destructors, etc.

CO3: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism.

CO4: Classify inheritance with the understanding of early and late binding, usage of exception handling, and generic programming.

CO5: Demonstrate the use of various OOPs concepts with the help of programs

Python - II

Upon successful completion of this course, students will be able to-

CO1: Write and implement a functional approach to application development.

CO2: Write and implement a modular approach to application development.

CO3: Design an application using object-oriented paradigm.

CO4: Create error free applications by applying the exception handling concept.

CO5: Design an application that contains the use of different files for data processing.

Linear Algebra

Upon successful completion of this course, students will be able to-

CO1: Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.

CO2: Understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving.

CO3: Be able to use effectively algebraic techniques to analyze basic discrete structures and algorithms.

CO4: Understand asymptotic notation, and its significance, and be able to use it to analyze asymptotic performance for some basic algorithmic examples.

CO5: Understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

Discrete Mathematics

Upon successful completion of this course, students will be able to-

CO1: To understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.

CO2: To understand the basics of combinatorics, and be able to apply the methods from these subjects in problem solving.

CO3: To use effectively algebraic techniques to analyze basic discrete structures and algorithms.

CO4: To understand asymptotic notation, and its significance, and be able to use it to analyze asymptotic performance for some basic algorithmic examples.

CO5: To understand some basic properties of graphs and related discrete structures, and be able to relate these to practical examples.

Digital Electronics and Microprocessor

Upon successful completion of this course, students will be able to-

CO1: Design and construct logic as well as arithmetical circuits

CO2: Calculate various important parameters of Digital logic families

CO3: Design & analyze combinational logic circuits

CO4: Design & analyze sequential logic circuits

CO5: To Execute 8085 Microprocessor Assembly language programming.

Introduction to Microcontroller and Embedded System

Upon successful completion of this course, students will be able to-

CO1: Design, test and critically evaluate embedded solutions to real-world situations using digital components (sequential and combinational).

CO2: Recognize the key features of embedded systems in terms of computer hardware and be able to discuss their functions. You will be aware of the key factors affecting computing hardware evolution.

CO3: Design, test and critically evaluate embedded solutions to real-world situations using (embedded) computer systems interfaced with digital hardware

Practical I

Fundamental of Computer and Basics of Operating System

CO1: Familiarizing with Open Office (Word processing, Spreadsheets and Presentation).

CO2: To acquire knowledge on editor, spread sheet and presentation software.

CO3: The students will be able to perform documentation and accounting operations.

CO4: Students can learn how to perform presentation skills.

Introduction to Web Technology and Operating System

CO1: Implement Static/Dynamic concepts of web designing.

CO2: Develop ability to retrieve data from a database and present it in a web page.

CO3: Design web pages that apply various dynamic effects on the web site.

Practical II

Programming using 'C' and Python – I

After completion of the course the student should able to:

CO1: Understand the usage of variables, constants, operators in programs

CO2: Develop programs for manipulating decision making and looping constructs

CO3: Perform operations on functions, arrays and structures

CO4: Apply pointers for developing simple programs

CO5: Handle file for real time application

Object Oriented Programming using C++ and Python – II

CO1: Use classes and objects, functions, friend functions and arrays of objects

CO2: Understand the constructors, destructors and overloading

CO3: Implement the concept of inheritance

CO4: Illustrate the use of virtual base class and manipulators

CO5: Write program related to file

Practical III

Numerical Methods and Graph Theory

CO1: Define graph, Forward difference and Backward difference.

CO2: Classify the types of Graph.

CO3: Deduce the relation between Forward, backward difference and shift operator.

CO4: Apply the interpolation formulae to interpolate various functions based on a given data.

CO5: Evaluate the integration using Numerical methods, Spanning tree.

CO6: Apply Euler's method and Euler's modified to solve ODE of first order.

Linear Algebra and Discrete Mathematics

CO1: Solve systems of linear equations using multiple methods, including Gaussian elimination and matrix inversion.

CO2: the basic arithmetic operations on vectors and matrices,

CO3: How to count different type of discrete structure.

CO4: Apply the Inclusion-Exclusion of principal of two sets

CO5: Determine eigenvalues and eigenvectors and solve eigenvalue problems

CO6: Apply principles of matrix algebra to linear transformations.

Practical IV

Basic Electronics and Advanced Electronics

CO1: Demonstrate and explain electronics components.

CO2: Compute different parameters for characterizing different circuits like rectifiers, regulators etc. using diodes and BJTs.

CO3: Understand rectifier and filter circuits

Digital Electronics and Microprocessor and Introduction to Microcontroller and Embedded System

CO1: Illustrate the basics of Boolean algebra and logic gates and their realization using discrete electronic components.

CO2: Prepare various combinational and sequential circuits.

CO3: Realize basic gates from universal gates.

CO4: identify the difference between the different microprocessor and microcontroller and can describe the advantages and disadvantages of both.

CO5: Demonstrate the internal architecture of different microprocessor 8085 and compute assembly language programs of 8085 microprocessor

CO 6: analyze, specify, design, write and test assembly language programs.

Name of Department: English
Name of Programme: BA (opt. English)
Program Outcomes (PO's)

After completing B.A (opt. English) programme, students will be able to:

- PO1. Students are acquainted with different languages and social sciences.
- PO2. Students are eligible to appear for various state and national level competitive examinations.
- PO3. They are eligible to enter post graduate program of their interest / specialization.
- PO4. Scope for overall development of their personality.
- PO5. They are acquainted with various communication skills.
- PO6. Development of social aspects of their personality.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: Students are able to convey their message verbally.
- PSO2: Ability to write clearly and effectively.
- PSO3: students are able to comprehend and review various texts in English of them .
- PSO4: they are acquainted with texts of British, Indian, Afro- American, Russian literature.
- PSO5: understanding of the development of the English language as used in works of literature.
- PSO6: understanding of the development of the historical and cultural range of literature written in English.
- PSO7: students will be able to identify, describe, and explain such features as grammar, language pattern, and structures of English.

Course Outcomes (CO's)

Part I Semester-I

Introduction to Literature (Paper I)

The students will be able to get knowledge such as:

- CO1: To introduce the concept and functions of literature.
- CO2: To introduce major and minor forms of literature.
- CO3: To make students read and understand poems of different types.
- CO4: To introduce short story as a form of literature.
- CO5: To introduce literary terms.

Introduction to Literature (Paper I)

After completing this course students will be able to:

CO1: Students are able to identify literary aspects of text.

CO2: Students are familiar with various forms of literature.

CO3: Students can read and understand different types of poems with certain poetical qualities.

CO4: Students are acquainted with elements of short story as a form.

CO5: Students can analyze literary texts with terms.

Part I Semester II

Introduction to literature (Paper II)

After completing this course students will be able to:

CO1: To introduce the concept and functions of literature

CO2: To introduce major and minor forms of literature

CO3: To make students read and understand poems of different types.

CO4: To introduce one act play as a form of literature.

CO5: To introduce literary terms.

Introduction to literature (Paper II)

After completing this course students will be able to:

CO1: Students are able to identify literary aspects of text.

CO2: Students are familiar with various forms of literature

CO3: Students can read and understand different types of poems with certain poetical qualities

CO4: Students are acquainted with elements of one act play as a form

CO5: Students can analyze literary texts with term.

Course Outcomes (CO's)

Part II Semester-III

British Literature (Paper III)

The students will be able to get knowledge such as:

CO1: To introduce to the students British literature and writers.

CO2: To initiate process of literary and critical interpretation of the texts.

CO3: To acquaint students novel, essay, poetry and drama forms.

British Literature (Paper III)

The students will be able to get knowledge such as:

CO1: Students are able to identify characteristics of 18th century novel.

CO2: Students can appreciate novel as a form.

CO3: Students are aware of different types of essays and can enjoy essay as a form of literature.

Part II Semester-IV

Indian English Literature (Paper IV)

The students will be able to get knowledge such as:

CO1: To introduce the students the Indian English Literature

CO2: To acquaint students with different literary forms (poetry, essays, drama and novel)

CO3: To initiate reading skills of Indian Literature in English.

CO4: To acquaint students with the critical and analytical skills of literary works in Indian English.

Indian English Literature (Paper IV)

After completing this course students will be able to:

CO1: Students will analyse critically the novel.

CO2: Students will be able to analyze and comprehend the essays.

CO3: Students will gain knowledge of features of Indian English novel.

Course Outcomes (CO's)

Part III Semester- V

British Literature (Paper V)

The students will be able to get knowledge such as:

CO1: To introduce to the students British literature and writers.

CO2: To initiate process of literary and critical interpretation of the texts.

CO3: To acquaint students with historical background and literary characteristics of the texts.

CO4: To enable students to read novel as a form of literature

British Literature (Paper V)

After completing this course students will be able to:

CO1: Students are able to identify characteristics of literature.

CO2: Students can appreciate novel as a form

CO3: Students are aware of different types of essays and can enjoy essay as a form of literature

Course Outcomes (CO's)

Part III Semester- VI

Indian English Literature (Paper VI)

The students will be able to get knowledge such as:

CO1: To introduce the students the Indian English Literature

CO2: To initiate reading skills of Indian Literature in English.

CO3: To acquaint students with the critical and analytical skills of literary Works in Indian English.

CO4: To acquaint students with different literary forms (poetry , essays, Drama and novel)

Indian English Literature (Paper VI)

After completing this course students will be able to:

CO1: Students will be able to analyse critically the drama

CO2: Students will able to appreciate the poem critically

CO3: Students will gain knowledge of features of Indian English drama.

Course Outcomes (CO's)

Part III Semester- V

Introduction to Literary Criticism (Paper VII)

The students will be able to get knowledge such as:

CO1: To introduce to the learners the basics of literary criticism

CO2: To sensitize the learners to critical approaches.

CO3: To enable the learners to read and appreciate literary texts critically

CO4: To expose them to major trends in literary criticism.

Introduction to Literary Criticism (Paper VII)

After completing this course students will be able to:

CO1: Students are able to understand the basics of literary criticism

CO2: Students can appreciate the poetry critically.

CO3: Students will familiarize with the tenets of practical criticism.

CO4: Students will learn to write critical appreciation of poetry.

Course Outcomes (CO's)

Part III Semester- V

British Literature (Paper VIII)

The students will be able to get knowledge such as:

CO1: To introduces students the major literary movements in British literature.

CO2: To help students to appreciate the poem critically.

CO3: To cultivate aesthetic and ethical values in life through literary texts.

CO4: To cultivate aesthetic and ethical values in life through literary texts

British Literature (Paper VIII)

After completing this course students will be able to:

CO1: Students will gain knowledge of major literary movements in British literature.

CO2: Students will be able to appreciate the poem critically.

CO3: Students will be able to cultivate aesthetic and ethical values in life through literary texts.

Course Outcomes (CO's)

Part III Semester- V

Indian English Literature (Paper IX)

The students will be able to get knowledge such as:

CO1: To acquaint the students with the important happenings in Indian English Literature.

CO2: To make students aware about the various issues and features of Indian English Poetry.

CO3: To acquaint the students about the experiments that Indian dramatists are doing in the play writing and theatre.

CO4: To make students aware about the social issues that the Indian novelists are raising through their novels.

Indian English Literature (Paper IX)

After completing this course students will be able to:

CO1: Students develop a literary sense regarding Indian English Literature.

CO2: Students obtain techniques about understanding, comparing and evaluating Indian Poetry in English.

CO3: Student get knowledge of the experiments and various new trends in the Indian theatre.

CO4: Students develop critical and literary approaches to the literature written in English.

Course Outcomes (CO's)

Part III Semester- V

Literatures in English (Paper X)

The students will be able to get knowledge such as:

CO1: To develop understanding of Afro-American Fiction and Russian theatre.

CO2: To make students aware of Afro-American fiction

CO3: To make students read and understand poems of different types

CO4: To familiarize the students with the rich and complex literary tradition of the world

Literatures in English (Paper X)

After completing this course students will be able to:

CO1: Students are able to understand Afro-American literature and Russian theatre

CO2: Student can analyses critically Afro-American fiction

CO3: Students can read and understand different types of poems with certain poetical qualities

CO4: Students are able to respond critically analyze the drama

Course Outcomes (CO's)

Part III Semester- V

Introduction to Structure & Function of Modern English (Paper XI)

The students will be able to get knowledge such as:

CO1: To introduce the classification of words and three approaches to the study of words

CO2: To introduce the concept of phrase with structure and function of kinds of phrases

CO3: To introduce the concept of clause with its different types.

CO4: To introduce communicate concepts.

Introduction to Structure & Function of Modern English (Paper XI)

After completing this course students will be able to:

CO1: Students can identify word classes

CO2: Students are able to analyze and identify types of phrase and their function

CO3: Students can understand and differentiate different types of clauses

CO4: Students are able to use them in their communication.

Course Outcomes (CO's)

Part III Semester- VI

Literary Criticism (Paper XII)

The students will be able to get knowledge such as:

CO1: To introduces the students with basic concepts in criticism

CO2: To introduce the students major trends in literary criticism.

CO3: To train the students to critically appreciate the poetry

CO4: To acquaint the students with principle of literary criticism

Literary Criticism (Paper XII)

After completing this course students will be able to:

CO1: Students are able to understand the basics of literary criticism

CO2: Students can appreciate the poetry critically.

CO3: Students are familiar with principle of literary criticism

CO4: Students can critically appreciate to the forms of literature.

Course Outcomes (CO's)

Part III Semester- VI

British Literature (Paper XIII)

The students will be able to get knowledge such as:

CO1: To introduce students the major movements in modern novel and modern poetry in British literature.

CO2: To help students to appreciate the poem critically.

CO3: To cultivate aesthetic and ethical values in life through literary texts.

CO4: To cultivate aesthetic and ethical values in life through literary texts.

British Literature (Paper XIII)

After completing this course students will be able to:

CO1: Students will gain knowledge of modern novel and modern poetry in British literature

CO2: Students will be able to appreciate the poem critically

CO3: Students will be able to cultivate Aesthetic and ethical values in life through literary texts.

CO4: Students will be able to cultivate Aesthetic and ethical values in life through the learning and understanding of literary texts.

Course Outcomes (CO's)

Part III Semester- VI

Indian English Literature (Paper XIV)

The students will be able to get knowledge such as:

CO1: To help the students to study and analyze critically the drama.

CO2: To help students to appreciate the poem critically.

CO3: To acquaint students with the salient features of Indian English Drama.

Indian English Literature (Paper XIV)

After completing this course students will be able to:

CO1: Students will be able to analyse critically the drama.

CO2: Students will able to appreciate the poem critically.

CO3: Students will gain knowledge of features of Indian English drama.

Course Outcomes (CO's)

Part III Semester- VI

Literatures in English (Paper XV)

The students will be able to get knowledge such as:

CO1: To familiarize the students the features of postcolonial fiction and drama

CO2: To introduce post colonial novel to the students

CO3: To develop the students clear understanding of postcolonial drama

CO4: To develop the understanding of short stories among students

Literatures in English (Paper XV)

After completing this course students will be able to:

CO1: Student can understand the features of postcolonial fiction and drama

CO2: Students are able to critically analyze the novel

CO3: Students can analyze the drama critically

CO4: Students can enjoy the reading stories and can interpret it critically

Course Outcomes (CO's)

Part III Semester- VI

Introduction to Structure & Function of Modern English (Paper XVI)

The students will be able to get knowledge such as:

CO1: To introduce the process of sentence formation.

CO2: To introduce the concept of discourse and its elements.

CO3: To introduce the concept cohesion and types cohesive devices with their applications.

CO4: To introduce communicate concepts.

Introduction to Structure & Function of Modern English (Paper XVI)

After completing this course students will be able to:

CO1: Students are able to form different kinds of sentences.

CO2: Students are able to analyze and identify type of discourse and its characteristics.

CO3: Students can identify cohesive devices and their role in the formation of text.

CO4: Students are able to use them in their communication.

Name of Department: English

Name of Programme: BA (Compulsory English)

2020-21

Program Outcomes (PO's)

After completing B.A (Compulsory English) programme, students will be able to:

- PO1. Students are acquainted with different languages and social sciences
- PO2. Students are eligible to appear for various state and national level competitive examinations.
- PO3. They are eligible to enter post graduate program of their interest / specialization
- PO4. Scope for overall development of their personality
- PO5. They are acquainted with various communication skills
- PO6. Development of social aspects of their personality

Program Specific Outcomes (PSO)

- PSO1. Students are able to describe their scientific experiments in English
- PSO2. They are able to draft scientific discourse in English
- PSO3. Students are acquainted with various sentence structures of English
- PSO4. Students are able to use effective language in their presentations
- PSO5. They are introduced with soft skills of English
- PSO6. They are able to convert information into knowledge

Course Outcomes (CO's)

BA PART I

Compulsory English

The students will be able to get knowledge such as:

- CO1. They develop the ability to enter different professions as per their interest and capacity
- CO2. Ability to demonstrate thinking skills by analyzing, synthesizing, and evaluating, information from multiple sources
- CO3. Students will produce well researched written work that engages with both primary and secondary sources from literature

CO4 Students will develop an informed familiarity with multiple cultural atmospheres.

After completing this course students will be able to:

CO1. To be able to enter different professions as their capacity.

CO2. Students will develop their thinking skills by using different sources.

CO3. Students will get familiar with research and such other concepts.

CO4. Students will know to demonstrated ideas in works of literature.

Course Outcomes (CO's)

BA PART II

Compulsory English

The students will be able to get knowledge such as:

CO1. Students are able to convey their message verbally

CO2. Ability to write clearly and effectively

CO3. Students are able to comprehend and review various texts in English of them

CO4. students will be able to identify, describe, and explain such features as grammar, language pattern, and structures of English.

After completing this course students will be able to:

CO1. Students will develop their verbal ability.

CO2. Students get progress in clear and effective writing.

CO3. They will be able to review the texts on their own.

CO4. Students will be able to identify and describe features of grammar.

Course Outcomes (CO's)

BA PART III

Compulsory English

The students will be able to get knowledge such as:

CO1 students will develop their ability to describe and explain such things as literary and creative genre canons.
CO2 students will develop their ability to describe and explain such things as literary practical and professional writing formats.
CO3 students will develop their ability to describe and explain types of rhetorical discourse.
CO4 students will develop their ability to describe and explain types of linguistic phenomena.

After completing this course students will be able to:

CO1 Students will get to know creative genre in literature.
CO2 Students are acquainted with literary practical and professional writing formats.
CO3 Students will be able to explain types of rhetorical discourse.
CO4 They will be able to explain and understand types of linguistic phenomena.

Name of Department: English

Name of Programme: BSC (Compulsory English)

2020-21

Program Outcomes (PO's)

After completing BSC (Compulsory English) programme, students will be able to:

PO1. Students are acquainted with different languages and social sciences
PO2. Students are eligible to appear for various state and national level competitive examinations.
PO3. They are eligible to enter post graduate program of their interest / specialization
PO4. Scope for overall development of their personality
PO5. They are acquainted with various communication skills
PO6. Development of social aspects of their personality

Program Specific Outcomes (PSO)

PSO1. Students are able to describe their scientific experiments in English
PSO2. They are able to draft scientific discourse in English

PSO3. Students are acquainted with various sentence structures of English

PSO4. Students are able to use effective language in their presentations

PSO5. They are introduced with soft skills of English

PSO6. They are able to convert information into knowledge

Course Outcomes (CO's)

BSC PART I

Compulsory English

The students will be able to get knowledge such as:

CO1.They develop the ability to enter different professions as per their interest and capacity

CO2. Ability to demonstrate thinking skills by analyzing, synthesizing, and evaluating, information from multiple sources

CO3students will produce well researched written work that engages with both primary and secondary sources from literature

CO4Students will develop an informed familiarity with multiple cultural atmospheres.

After completing this course students will be able to:

CO1. To be able to enter different professions as their capacity.

CO2. Students will develop their thinking skills by using different sources.

CO3. Students will get familiar with research and such other concepts.

CO4. Students will know to demonstrated ideas in works of literature.

Course Outcomes (CO's)

BSC PART III

Compulsory English

The students will be able to get knowledge such as:

CO1 students will develop their ability to describe and explain such things as literary and creative genre canons.

CO2students will develop their ability to describe and explain such things as literary practical and professional writing formats.

CO3 students will develop their ability to describe and explain types of rhetorical discourse.
CO4 students will develop their ability to describe and explain types of linguistic phenomena.

After completing this course students will be able to:

CO1 Students will get to know creative genre in literature.
CO2 Students are acquainted with literary practical and professional writing formats.
CO3 Students will be able to explain types of rhetorical discourse.
CO4 They will be able to explain and understand types of linguistic phenomena.

DEPARTMENT OF MARATHI

CO/PO 2021-2022

B.A. PROGRAMME

Programme Outcome (PO's)

After completing B.A. programme students will be able to –

- PO 1 – Students are aware of the teaching of Marathi Saints and Indian Bhakti Movement
- PO 2 – Students are acquainted with difference languages social sciences and cultural history of Maharashtra.
- PO 3 – Students comes to know they creative use of Marathi Language
- PO 4 – Students are acquainted with various communication skills
- PO 5 – Development of Social Aspects of the student's personality
- PO 6 – Students can grab their own good livelihood

Programme Specific Outcomes (PSO's)

After completing the courses student will be able to

- PSO 1 – Students are able to understand the different periods of Marathi language and salient features.
- PSO 2 – Students comes to know the tradition of Maharastrian Society and their complete culture.
- PSO 3 - Students are aware of Social Stratification and In-hidden rituals
- PSO 4 – Students also understand the impact of various factors on the Marathi language.
- PSO 5 – Student can interpret the happenings of the society.
- PSO 6 – Students can also understand the social, cultural and socio-political elements of the Society.

SAHITYADARPAN (B.A.1 COM. MARATHI)

After completing compulsory Marathi Course

- CO 1 – Students can understand the cultural heritage of Maharashtra.
- CO 2 – They can also understand the Saint tradition
- CO 3 – Students become aware the changing Janera of Marathi literature.
- CO 4 – Students understood the practical and literary function of the language.

P1- SAHITYARANG

After completing this course students are able to

- CO1-Students come to know tradition of Maharashtra Society and Literery Culture
- CO2-Students also come to know the forms of story and its elements.
- CO3-Students are acquainted with the lyrical language of stories .
- CO4-Students understood the literary forms and aim of literature
- CO 5 – Students can understand the Social History through the textual stories.

P2- SAHITYARANG

After completing this course students are able to

- CO1-Students become aware about the literary forms like Marathi Poem
- CO2-Through the texts the students can study the rural changing scenario and spectrum of the poems.
- CO3-Students become aware about Mararathi kavya.
- CO4-The changing human values in literary Jenera like Striwad ,Dalit Sahitya

P-3 KADAMBARI VADMYPRAKAR AND UPYOJIT MARATHI

After completing this course students are able to

- CO 1 – Students become aware the Janera of Marathi Novel
- CO 2 – Students comes to know the plots of Novels
- CO 3 – Students can understand the characters and story of Kadambari.
- CO 4 – Students are able to elaborate the pro-long stories.

P-4 KAVITA WANGMAYPRAKAR VA KAVYASWAD

After completing this course students are able to

- CO1-Students understand the Marathi Kavya , critical terms and concepts.
- CO2-Students are acquainted with the Lavani, Sneet and Bhavkavya .
- CO3-Students come to know the modern poetry
- CO4-Students are acquainted with various literary streams .

P-5 LALIT GADYA V UPYOJIT MARATHI

After completing this course students are able to

- CO 1 – Students are able to understand the practical Marathi
- CO 2 – Student can understand the Janera of Lalit Gadya for their livelihood.
- CO 3 – Students become aware light writing and light speaking

P- 6 NATAK WNGMAYPRAKAR

After completing this course students are able to

- CO1-Students understand the history and golden era of Marathi Rangbhoomi
- CO2-Student undstand Marathi natak and sanskrut natya etihhas
- CO-3Student undstand the natya januara –comedy
- CO-4Student awre of the tradition of Marathi comedy

P-7 SAHITYASHASTRA

After completing this course students are able to

- CO 1 – Students understand the term and concepts of criticism
- CO 2 – Students become aware about Indian Shityashastra.
- CO 3 – Students understand the difference between practical language and literary language
- CO 4 – Students also understand the concept of Shabdshakti.

P-8 MARATHI BHASHA VIDHYAN VA VYAKARAN

After completing this course students are able to

- CO-1 Students undstands modern linguistics and the concepts
- CO-2Students undstands the communication skill and its various types
- CO-3 Students comes to know the pronunciation and the alphabets of Marathi
- CO-4 Students undstand the constraction ans stratuere of Marathi laugeuge

P-9 MADHYAYUGIN MARATHI VYAMAHACHA ITIHAS

After completing this course students are able to

- CO-1 Students understand old Marathi literary history of Marathi
- CO-2 Students understand the Bhakti movement Maharashtra As well as India
- CO-3 student aware of the philosophy of Marathi saint
- CO-4 student well aware of the various sects and their culture

P-10 UPYOJIT MARATHI

After completing this course students are able to

- CO-1 Students understand the practical Marathi language
- CO-2 student also understand practical and creative writing skills
- CO-3 students can able to earn their own bread
- CO-4 student can differentiate their practical and creative syllabus

P – 11 ADHUNIK MARATHI VANDMAYATIL VIVDH PRAVAH (DALIT ANI GRAMIN)

After completing this course students are able to

- CO – 1 Through this course students come to know the changing scenario of rural society.
- CO - 2 Students can understand the problems of Dalits.
- CO – 3 Students can understand new creation of Dalit literature culture in the history of Indian literature
- CO – 4 Students can learn the philosophy of Dr. Babasaheb Ambedkar.

P- 12 SAHITYASHASTRA UTTARARDH

After completing this course students are able to

- CO 1 – Students can understand the ‘Ras’ sankalpana
- CO 2 – Students also understand the Indian ‘Kavyanand Mimamsa Theory’
- CO 3 – Students can elaborate the literary Janya
- CO 4 – Students can understand values of literature

P – 13 MARATHI BHASHA VIDHYAN VA VYAKARAN

After completing this course students are able to

- CO-1 Students understand the descriptive method of linguistics.
- CO-2 Students acquaint with basic grammar of Marathi
- CO-3 Students understand the language and dialects
- CO-4 Students become aware about the esthetic of language – idioms and phrases

P- 14 MADHYAYUGIN MARATHI VYAMAHACHA ITIHAS

After completing this course students are able to

- CO-1 Students understand Pandit Sahitya and its salient features
- CO-2 Students come to know Marathi Lavani and its golden era
- CO-3 Students understand the Bhatya Vyagamay
- CO-4 Students understand the tradition of Shahir Vyagamay

P 15 – UPYOJIT MARATHI UTTARARDH

After completing this course students are able to

CO – 1 Students can adopt new writing skills in the area of advertising

CO – 2 Students understand very well the modern soft-skills – anchoring, voice making, and script writing.

CO – 3 Students can become Art Critics

CO – 4 Students can adopt the skill writing own experiences

P 16 – AADHUNIK MARATHI SAHITYATIL VIVDH PRAVAH (STRIVADI VA MUSLIM)

After completing this course students are able to

CO -1 Students can understand the new era of feminism

CO – 2 Students can also appreciate the feminist criticism

CO – 3 Students become aware about the religious approach to the literature.

CO – 4 Students can use religious method practically.

Name of Department: Political Science

Name of Programme: B.A. Political science

Program Outcomes (PO's)

After completing B.A. Political Science programme, students will be able to:

PO1: Bachelor of Arts graduates are also able to go into non-Arts related professions via graduate coursework study including law, teaching, journalism and media.

PO2: Bachelor of Arts students study ideas, movements and theories in culture, society, history, language, reasoning and more. Extensive reading and research helps arts students to form a broad understanding about the world around them and the ways in which humans connect and interact.

PO3: Bachelor of Arts degree graduates are able to synthesize complex information and communicate it concisely both orally and in written form.

PO4: Bachelor of Arts students develop strong analytical skills – the ability to break ideas and issues down into their component parts and drill down to the root of problems while considering possible solutions.

PO5: Bachelor of Arts students know how to find information, and have the discernment to distinguish between good, authoritative information and poor quality, unreliable information. As part of their studies, arts students are required to find and research a large number of primary and secondary resources, and distil and analyze the most relevant points to create a clear argument.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: The Students of Political Science are able to analyze the Political and current issues and understand background of any political issues.
- PSO2: The students of Political Science are able to understand importance Indian Constitution.
- PSO3: To create awareness in students of Political Science about Indian political system and acquaint student with functioning of Local Self Government machinery.
- PSO4: To inculcate the values of social obligations & nationalism in student and Supportive to built good citizen & society.

Course Outcomes (CO's) **Semester-I** **(Indian Government and Politics)**

After completing this course students will be able to:

CO1: Students can understand the Philosophy of Indian Constitution.

CO2: Students can understood the Fundamental Rights, Duties and Directive Principles of State Policy..

CO3: Students can Understood the system of Union Legislature and Union Executives system

CO4: Students can understood the Judiciary system.

Semester-II

(Indian Government and Politics)

After completing this course students will be able to:

CO1: Students can understand the Indian Federal System.

CO2: Students can understand the Structure of Election Commission.

CO3: Students can understand the Origin, Ideology and Programme of Political Parties.

CO4: Students can understand the Influencing Factors on Indian Politics.

Semester-III

(Introduction to Political Theory)

After completing this course students will be able to:

CO1: Students can understand the meaning, nature, scope and importance of Political Theory.

CO2: Students can understand the meaning and types of Liberty.

CO3: Students can understand the meaning and types of Equality.

CO4: Students can understand the meaning, types and importance of Social Justice.

Semester-III

(Modern Indian Political Thought)

After completing this course students will be able to:

CO1: Students can understand the thoughts about social reforms, political thoughts and the role of Raja Rammohan Roy in Indian renaissance.

CO2: Students can understand the thoughts about views about British Rule, Nationalism and four-fold Programme of B.G. Tilak.

CO3: Students can understand the thoughts about Satya, Ahimsa, Satyagraha, concept of Swaraj and theory of Trusteeship of Mahatma Gandhi.

CO4: Students can understand the thoughts about Secular Nationalism, Democratic Socialism and Non-Alignment and Panchasheel of Jawaharlal Nehru.

Semester-III

(Public Administration - IDS)

After completing this course students will be able to:

CO1: Students can understand the Public Administration (a) Meaning, Definition. (b) Nature, Scope and Importance. (c) Public and Private Administration.

CO2: Students can understand the Principles of Organization

CO3: Students can understand the Units of Organization

CO4: Students can understand the 4) Public Corporations (a) Characteristics. (b) Ministerial and Parliamentary control over Public Corporation (c) Challenges of Privatization in front of Public Corporation.

Semester-IV

(Introduction to Political Theory)

After completing this course students will be able to:

CO1: Students can understand the meaning and types of Power.

CO2: Students can understand the meaning, kinds and features of Authority.

CO3: Students can understand the meaning and bases of Legitimacy.

CO4: Students can understand the meaning, features and kinds of Democracy.

Semester-IV

(Modern Indian Political Thought)

After completing this course students will be able to:

CO1: Students can understand the thoughts about Religion, Politics, Nationalism and Democracy of Maulana Abul Kalam Azad.

CO2: Students can understand the thought about Radical Democracy and New Humanism of M.N. Roy.

CO3: Students can understand the thought about Social thought, State Socialism and views on Democracy of Dr. B.R. Ambedkar.

CO4: Students can understand the thoughts about Caste, Language, Four pillars of state and ideas about Democratic Socialism of R.M. Lohia.

Semester-IV

(Public Administration - IDS)

After completing this course students will be able to:

CO1: Students can understand the Financial Administration (With reference to India) (a) Preparation and Passing of Budget (b) Financial Committees (1) Estimate Committee (2) Public Accounts Committee (3) Committee on Public Undertakings

CO2: Students can understand the Public Policy (a) Definition, (b) Characteristics and Models

CO3: Students can understand the Citizen and Administration interface A) RTI B) Lokpal C) Citizens Charter and E-Governance.

CO4: Students can understand the Social Welfare Policies

• Education: Right to Education • Health: National Health Mission • Food: Right to food Security • Employment: MNREGA

Semester-V

(Government and Politics of Maharashtra - **VII**)

After completing this course students will be able to:

CO1: Students can understand the Sanyukta Maharashtra Movement.

CO2: Students can understand the Social and Economic Determinants of Politics of Maharashtra.

CO3: Students can understand the ideology and programme of major Political parties in Maharashtra.

CO4: Students can understand the Politics of Coalitions in Maharashtra.

Semester-V

(Political Sociology - **VIII**)

After completing this course students will be able to:

CO1: Students can understand the meaning, definition, nature and scope of Political Sociology.

CO2: Students can understand the Approaches to Study Political Sociology.

CO3: Students can understand the Meaning, definition, classification, importance and influencing factors of Political Culture.

CO4: Students can understand the meaning, definition, features, importance and agencies of Political Socialization

Semester-V

(Introduction to International Politics – **IX**)

After completing this course students will be able to:

CO1: Students can understand the nature, scope, idealistic theories and realistic theories of International Politics.

CO2: Students can understand the Elements of National Powers.

CO3: Students can understand the objectives and determinants of Foreign Policy.

CO4: Students can understand the meaning, kinds, changing nature of Diplomacy and functions of diplomats.

Semester-V

(Comparative Government and Politics – **X**)

After completing this course students will be able to:

- CO1: Students can understand the meaning, nature and scope of Comparative Politics.
- CO2: Students can understand the Approaches to the Study of Comparative Politics.
- CO3: Students can understand the Characteristics of United Kingdom, USA and Switzerland's Constitutions.
- CO4: Students can understand the composition and functions of executive (UK, USA and Switzerland.)

Semester-V

(Western Political Thought – **XI**)

After completing this course students will be able to:

- CO1: Students can understand the thoughts about justice, education and ideal state of Plato.
- CO2: Students can understand the thoughts about nature, classification of states, citizenship and revolution of Aristotle.
- CO3: Students can understand the thoughts about human nature, role of king, politics and morality of Machiavelli.
- CO4: Students can understand the thoughts about social contract theory and concept of sovereignty of Hobbes.
- CO5: Students can understand the thoughts about social contract theory and concept of sovereignty of Locke.

Semester-VI

(Government and Politics of Maharashtra – **XII**)

After completing this course students will be able to:

- CO1: Students can understand the Legislative Assembly, Legislative Council and Law making process of Maharashtra.
- CO2: Students can understand the Executive Council and Judiciary System of Maharashtra..
- CO3: Students can understand the Local Self Government in rural Areas of Maharashtra and 73rd Constitutional Amendment. .
- CO4: Students can understand the Local Self Government in Urban Areas of Maharashtra and 74th Constitutional Amendment.

Semester-VI

(Political Sociology – XIII)

After completing this course students will be able to:

CO1: Students can understand the meaning, definition, nature, different stages, problems and means of Political Participation.

CO2: Students can understand the meaning, definition, nature, means, importance of Political Communication and Karl.W.Deutsch's Theory.

CO3: Students can understand the meaning, definition, factors responsible for emergence of Elites and Political Elites and Democracy

CO4: Students can understand the meaning, definition, nature, importance and factors influencing of Political Change.

Semester-VI

(Introduction to International Politics – XIV)

After completing this course students will be able to:

CO1: Students can understand the meaning, characteristics, techniques of Balance of Power and Balance of terror.

CO2: Students can understand the achievements, failure of United Nations and meaning, sources and limitations of International Law.

CO3: Students can understand the New World Order.

CO4: Students can understand India's relation with neighboring Countries.

Semester-VI

(Comparative Government and Politics – XV)

After completing this course students will be able to:

CO1: Students can understand the composition and functions UK, USA and Switzerland's Legislature.

CO2: Students can understand the judicial review in USA and Intendence of Judiciary.

CO3: Students can understand the Unitary And Federal Systems of USA and Switzerland CO4: Students can understand the party systems in UK, USA and Switzerland

Semester-VI

(Western Political Thought – XVI)

After completing this course students will be able to:

CO1: Students can understand the thoughts about social contract, concept of general will and concept of sovereignty of Rousseau.

CO2: Students can understand the thoughts about historical materialism, theory of surplus value, proletarian revolution and communism of Karl. Marx.

CO3: Students can understand the thoughts about concept of imperialism, concept of revolution and concept of party organization of Vladimir Lenin.

CO4: Students can understand the thoughts about utilitarianism, concept of liberty and representative government of J.S. Mill.

CO5: Students can understand the thoughts about pluralistic theory of sovereignty, liberty, equality and democratic socialism of Harold Laski.

Name of Department: Psychology

Name of Programme: B.A. Psychology

Program Outcomes (PO's) - Not applicable

Program Specific Outcomes (PSO's) - Not applicable

Course Outcomes (CO's)

Semester-I

(Introduction to psychology – I)

After completing this course students will be able to:

CO1: Define psychology

CO2: Understand historical background of psychology

CO3: Develop knowledge about nervous system and endocrine system, consciousness, motivation, emotions.

CO4: Discuss about research methods in psychology

CO5: Apply psychological principles in daily life.

CO6: Discriminate different factors that determine human behaviour such as biological factors and cognitive factors.

CO7: Make comparison between knowledge of psychology and knowledge of other subjects.
CO8: Make hypothesis about human behaviour.

Semester-II

(Fundamentals of psychology – II)

After completing this course students will be able to:

- CO1: Read about learning intelligence, memory, forgetting and personality.
- CO2: Describe different theories of personality.
- CO3: Apply mnemonics for memory improvement.
- CO4: Compare different levels of intelligence
- CO5: Assess learning principles.
- CO6: Combine cumulative knowledge for own personality development.

Semester

(Development of adolescence and early adulthood - III)

After completing this course students will be able to:

- CO1: Examine own stage of adolescence
- CO2: Distinguish between adolescence and early adulthood
- CO3: Collect knowledge about psychological theories of adolescent stage and early adulthood stage.
- CO4: Analyse in detail physical, cognitive, social and personality development in adolescence and early adulthood stage of development
- CO5: Discriminate between different approaches regarding adolescence and early adulthood stage of development.

Semester-III

(Psychology of adjustment – IV)

After completing this course students will be able to:

- CO1: Define applied psychology and psychology of adjustment
- CO2: Discuss about roots of happiness in life.
- CO3: Apply stress management techniques
- CO4: Correlate the terms – self-concepts, self-esteem, self-regulation and self-presentation.
- CO5: Discriminate between gender stereotypes of men and women.
- CO6: Create awareness in society about psychological principles and their applications.

Semester IV

(Development of middle adulthood and late adulthood - V)

After completing this course students will be able to:

- CO1: Describe middle adulthood and late adulthood stage of development
- CO2: Discuss about physical cognitive social and personality development in middle and late adulthood stage.
- CO3: Determine different problems in middle adulthood and late adulthood stage.
- CO4: Compare theories of late adulthood with each other.
- CO5: Decide how to take care for own future stages of middle adulthood and late adulthood.
- CO6: Create awareness about successful aging.

Semester IV

(Modern Applied Psychology - VI)

After completing this course students will be able to:

- CO1: Read about communication process and nonverbal communication in detail
- CO2: Explain the friendship, love, marriage and divorce.
- CO3: Develop knowledge about physical health and mental health.
- CO4: Classify communication problems.
- CO5: Consider different models of career choice and developments.
- CO6: Formulate good habits, healthy life style and health.

Name of Department: History

Name of Programme: B.A.History

Program Outcomes (PO's)

After completing B.A.Historyprogramme, students will be able to:

PO1: Understand the the real history of Chhtrapati Shivaji Maharaj, chhtrapati Sambhaji Maharaj, Chhtrapati Rajaram Maharaj and Maharani Tarabai's Period.

PO2: Study and understand the socio-economic and political development in other European Countries. And understand the contemporary Europe in the light of its background History.

PO3: Students understand the major events of India's freedom struggle, its legacy and its Contribution to the making of modern India. To instil the spirit of Nationalism among Students.

PO4: To acquaint the students with social change process in modern Maharashtra. To Generate curiosity to detail study the work of social reformers.During the 19th and 20th centuries a series of social reform movementstool placein Maharashtra.

PO5: Identify the rulers and their administration in Ancient India.

PO6: To know the impact of Mughal rule on Indian polity and society.

PO7: analyse the Marathas policy of expansionism.

PO8: Study of the Modern World (1870 - 2000 A.D.)

PO9: Students can understand the fundamental Principles in the Research Methodology.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn About the History of Marathas under the Chhtrapati Shivaji Maharaj.

PSO2: Gain Knowledge about the History of the Europe(1750-1871AD.)

PSO3: Understand the major events of India's freedom strugglemovement.

PSO4: Learn About the social reforms movements and social reformers in the - Maharashtra.

PSO5: Understand the Ancient Indian History.

PSO6: Understand the overall developments in Mughal History between 1526-1707 AD.

PSO7: To gain knowledge about the Maratha Empire Expansion under the Peshwa - period.

PSO8: Understand the major events in the Modern World.

PSO9: Learn Historical research process, Historical Places and Historical Sources.

Course Outcomes (CO's)

Semester-I

Rise of the Maratha Power(1630-1707 AD.)

After completing this course students will be able to:

CO1: Know the historical background for the rise of the Maratha power.

CO2: Study the Contribution of Shahajiraje Bhosale.

CO3: Study the Contribution of Rajmata Jijabai.

CO4: understand the early activities of Chhtrapati Shivaji Maharaj.

Semester-II

Rise of the Maratha Power(1630-1707 AD.)

After completing this course students will be able to:

CO1: Students get knowledge about the early life of the Sambhaji Maharaj.

CO2: Understanding the Chhtrapati Rajaram Maharaj, Maharani Tarabai.

CO3: Learn about Central, Provincial, Local Administration of Maratha Period.

CO4: Study Military and Judicial System of the Maratha Period.

Semester-III

Paper No – III

History Modern Europe (1750 – 1871 A.D.)

After completing this course students will be able to:

CO1: Know the concept of Industrial Revolution.

CO2: Understand the various aspects of the French Revolution, 1789 AD.

CO3: able to understand the Rise and Conquests of Napoleon Bonaparte in Europe.

CO4: Gain knowledge of the Political Works done by the Metternich between 1815-1848 AD.

Semester-IV

History Paper No – V

History of Modern Europe (1750 – 1871 A.D.)

After completing this course students will be able to:

- CO1: able to understand the Revolutionary Movements in France.
- CO2: Discuss on the Internal and External Policy of the French Emperor Napoleon III
- CO3: Learn Unification Process of Italy and Germany in the mid 19th Century.
- CO4: Understand and define the concepts like Imperialism, Nationalism and Socialism.

Semester – III

History Paper No – IV

History of Indian Freedom Movement (1857 - 1950 A.D.)

After completing this course students will be able to:

- CO1: Learn the Background and Causes, Course and failure, Effects of the Revolt of 1857 AD.
- CO2: Get information of the social Reformers in British Modern India. for e.g. Rajarammohan Roy, Swami Dayanand Saraswati and Mahatma Jyotiba Phule.
- CO3: Discuss on the Indian Nationalism.
- CO4: Study and analyze the works related to Lokmanya Tilak.

Semester-IV

History Paper No – VI

History of Indian Freedom Movement (1857 - 1950 A.D.)

After completing this course students will be able to:

- CO1: Learn Contribution of Revolutionaries in Indian Freedom Movement.
- CO2: Study the Non Co – operation Movement, Civil Disobedience Movement, Quit India Movement.
- CO3: Evaluate the Morley–Minto Act, 1909 and Montford Act, 1919 and Subhashchandra Bose and Indian National Army.
- CO4: Capable of understand the Indian Independence and Partition of India.
- CO5: Study of the various aspects of the Indian Constitution and their silent features.

Inter Disciplinary Subject

Semester – III

History of Social Reforms in Maharashtra (1818 – 1970 A.D.)

After completing this course students will be able to:

CO1: : Describe the Social, Religious, Economic Condition during the Maharashtra in the early 19th century.

CO2: Capable of understanding the Early Reforms in British Period.

CO3: Understand the Early Reformers in the 19th century Maharashtra.

CO4: Evaluate the Life and Work of Mahatma Jotiba Phule.

Semester – IV

History of Social Reforms in Maharashtra (1818 – 1970 A.D.)

After completing this course students will be able to:

CO1: Understand the Life and Work of Maharshi Chhatrapati Shahu Maharaja.

CO2: Discuss the Social Reformers in Maharashtra.

CO3: Memorize the Women Reformers in Maharashtra.

CO4: Get information of the Life and Work of Dr. Babasaheb Ambedkar.

Semester – V

History Paper No-VII

Ancient India (Pre-Historic Period to 650 A.D.)

After completing this course students will be able to:

CO1: Understand the Sources of Ancient Indian History.

CO2: Able to learn Pre-Historic Age in India.

CO3: Capable of understanding the various aspects of Indus Valley Civilization.

CO4: Study the Vedic Period.

Semester-VI

History Paper No-XII

Ancient India (Pre-Historic Period to 650 A.D.)

After completing this course students will be able to:

CO1: Understand the Political, Social, Religious Condition of India During 6th B.C.

CO2: To gain knowledge of the Formation of Mauryan Empire.

CO3: Analyze the features of art and architecture of Ancient India.

CO4: Students will be able to explain our heritage through cultural aspects of Ancient India.

Semester-V

History Paper No – VIII

Mughal India (1526A.D. - 1707A.D.)

After completing this course students will be able to:

CO1: Analyse the impact of Mughal rule on Indian polity and society.

CO2: Assess the economy and religion of Mughal rule.

CO3: learn more about the wars between Humayun and Shershaha

CO4: Study of the Akbar and his Early Life ,Expansion of Mughal Empire and also the Rajput Policy.

Semester-VI

History Paper No - XIII

Mughal India (1526A.D.-1707A.D.)

After completing this course students will be able to:

CO1: Study Jahangir and Shahajahan Period.

CO2: Evaluate the Aurangzeb.

CO3: Students will be able to examine social, economic and religious condition in Medieval Period.

CO4: Analyse the features of art and architecture of Mughal period.

Semester-V

History Paper No - IX

Expansion and Downfall of the Maratha Power (1707 -1818 A.D.)

After completing this course students will be able to:

CO1: Gain complete knowledge about Chhatrapati Shahu Maharaja and Civil war.

CO2: Learn about the Peshwa Bajirao – I and his Expeditions in North & South India.

CO3: Analyse the Period of Peshwa Balaji Bajirao (Nanasaheb)

CO4: Learn about the Third Battle of Panipat, 1761 A.D. and its Causes, Effects.

Semester-VI

History Paper No - XIV

Expansion and Downfall of the Maratha Power (1707 - 1818 A.D.)

After completing this course students will be able to:

CO1: Learn about the Restoration of the Maratha Power under the Peshwa Madhavrao- I.

CO2: Analyses the Political works under the Period of Barbhai.

CO3: Analyse the forces that led to the downfall of the Maratha power.

CO4: To understand basic components of the Maratha administration system.

Semester-V

History Paper No - X

Modern World (1870 - 2000A.D.)

After completing this course students will be able to:

CO1: Critically examine the works of Bismarck.

CO2: understand the Concept of the New Imperialism.

CO3: Know the First world war and its causes, effects and also Treaty of Versailles & League of Nations.

CO4: Learn the Russian Revolution,1917 and its Causes, Course, Effects.

Semester-VI

History Paper No - XV

Modern World (1870 - 2000 A.D.)

After completing this course students will be able to:

CO1: Express the views on the Rise of the Dictatorship in Germany, Italy,Japan.

CO2: Understand the relations between the nations in the world.

CO3: Students understand the consequences of the World War I, World War II and Cold Warregarding the present global crises.

CO4: Analyse the streamline the role of UNO.

Semester-V

History Paper No – XI

Historical Sources, Research and Places

After completing this course students will be able to:

CO1: Understand the Nature and Scope of History.
CO2: Explain the Importance of sources, Types of sources and Evaluation of sources.
CO3: Understand the Research Process in the History.
CO4: Understand the importance of the Footnotes, Chronology and Index , Bibliography in the History Writing Process.

Semester-VI

History Paper No – XVI

Historical Sources, Research and Places

After completing this course students will be able to:

CO1: Understand and Evaluate the Importance of forts, Types of forts, Structure of fort.
CO2: Explain the Importance and Types of Museum.
CO3: Describe the Importance of Historical Tourism in India.
CO4: Analysis the contribution of the Maratha Historians like V.K. Rajwade, G.S. Sardesai, V.C. Bendre in the Maratha Period History writing.

PO, PSO, CO - 2021 -2022

Name of Department: SANSKRIT

POs-

After completing B.A. Sanskrit programme, students will be able to:

- PO 1 - Get aware about the knowledge in Sanskrit and its relevance in modern days from the point of career building
- PO 2 - Know about Vedas and their literary beauty
- PO 3 - Understand Philosophy in Sanskrit, Knowledge of creation, fundamentals of universe
- PO 4 - Know the Political Science in Sanskrit
- PO 5 - Know the glory and heritage of Ancient Indian Culture and poetic beauty in Sanskrit language

PO 6 - Get expertise in Grammar in Sanskrit at UG level

PO 7 - Know about ancient scripts

PO 8 - Know the Poetics in Sanskrit Language

1 TITLE OF COURSE (NAME OF PAPER) SANSKRIT MAYUKHA (Compulsory SEM I)

CO1 - know importance of Unity

CO2 - Know about the duties of ruler or administrator

CO3 - know about modern poetry in Sanskrit

CO4 - Converse in formal Sanskrit

2 TITLE OF COURSE (NAME OF PAPER) SANSKRITVIHAR (Optional Paper I)

CO1 - know importance of Atman and the short way to know everything

CO2 - Know about the duties of ruler or administrator

CO3 - know about modern poetry in Sanskrit

CO4 - can communicate in Sanskrit

3 TITLE OF COURSE (NAME OF PAPER) SANSKRIT MAYUKHA (Compulsory SEM II)

CO1 - know the soft skills of speaker and the listener

CO2 - Know and analyze the various types of trees and botanical description of the same

CO3 - Get mastery on pronunciation in Sanskrit

CO4 - Create own writing in Sanskrit

4 TITLE OF COURSE (NAME OF PAPER) SANSKRITVIHAR (Optional Paper II)

CO1 - know the science in Sanskrit

CO2 - know idioms in Sanskrit as the origin of idioms i Marathi language

CO3 - Get mastery on pronunciation in Sanskrit

CO4 - Create own writing in Sanskrit

**5 TITLE OF COURSE (NAME OF PAPER) Prachin Bharatiya Vijnyan
Prachin Bharatiya Jalashastra (Optional Paper III)**

CO1 - know the Water related Science in Sanskrit

CO2 - know knew theory of forecasting the rain water

CO3 - Knowthe techniques to find out groundwater

CO4 - Create own writing in Sanskrit

6 TITLE OF COURSE (NAME OF PAPER) Karak Prakarana (Optional Paper IV)

- CO1 - Know about Karakas from Paniniya Sutra
- CO2 - Understand the relation between Karak and Vibhakti (Case)
- CO3 - Demonstrate Sutra
- CO4 - Choose correct Karak to express
- CO5 - Judge Karakas
- CO6- Design a workshop/project

7 TITLE OF COURSE (NAME OF PAPER) Bhagavadgeeta (Paper V)

- CO1 - Understand Geeta
- CO2 - Demonstrate Geeta
- CO3 - Criticize day to day life with reference to Bhagavadgeeta
- CO4 - Interpret Geeta
- CO5 - Evaluate Geeta doctrines in present scenario
- CO6 - Write an Article / Create project in PPT form

8 TITLE OF COURSE (NAME OF PAPER) Kavya Shastra (Paper VI)

- CO1 - Know Kavya Shastra and Kavya Prakaasha
- CO2 - Understand the Vaakya Shastra.
- CO3 - Understand Alankaras
- CO4 - Demonstrate Alankaras
- CO5 - Compare Alankaras
- CO6 -Design project in PPT form

9 TITLE OF COURSE (NAME OF PAPER) □ □ □ □ □ □ □ (Paper VII)

- CO1 - Know Veda literature.
- CO2 - Know about the Vaidic Devatas and their contribution in the creation
- CO3 - Understand the style of Veda Literature
- CO4 - Demonstrate Richas and Yajus
- CO5 - Write the critical review on Sukta
- CO6 - Design project in PPT form

10 TITLE OF COURSE (NAME OF PAPER) □ □ □ □ □ □ □ (Paper VIII)

- CO1 - Know Nyaya literature
- CO2 - Know about Pramanas and types of knowledge.
- CO3 - Understand fundamentals of universe
- CO4 - Illustrate fundamentals of universe
- CO5 - Solve problems
- CO6 - Design project in PPT form

11 TITLE OF COURSE (NAME OF PAPER) □ □ □ □ □ □ □ □ (Paper IX)

- CO1 - Know Manusmruti
- CO2 - Learned duties and necessities of the king
- CO3 - Understand the need of Government

CO6 - Design project in PPT form

[illegible]

CO6 - Design project in PPT form

(Paper XI)

CO6 - Design project in PPT form

CO6 - Design project in PPT form

CO6 - Design project in PPT form

CO4 - Understand and interpret the Aadhyas

CO5 - Solve problems
CO6 - Design project in PPT form

17 TITLE OF COURSE (NAME OF PAPER) □ □ □ □(Paper XV)

CO1 - Understand Drama literature in Sanskrit
CO2 - Criticize the drama according to Poetics
CO3 - Learn Drama
CO4 - Practice translation
CO5 - Write critical article on Shakuntal
CO6 - Design project in PPT form

**18 TITLE OF COURSE (NAME OF PAPER) □ □ □ □ □ □ व □ □ □ □ □ □ □ □ □ □
(Paper XVI)**

CO1 - Know about Karakas from Paniniya Sutra
CO2 - Demonstrate Sutra
CO3 - Judge Karakas
CO4 - GetExpertise in Samasa
CO5 - Write own articles
CO6- Design a workshop/project

Name of Department: Hindi

Name of Programme: B.A.– Hindi

Program Outcomes (PO's)

After completing B.A. Hindi programme, students will be able to:

- PO1: हिंदी भाषा के छात्र हिंदी भाषा के महान साहित्य परंपरा से परिचित हो जाते हैं।
PO2: छात्रों में आलोचना अध्ययन करने की क्षमता जागृत होती है।
PO3: छात्र हिंदी की प्रादेशिक बोलियों से परिचित हो जाते हैं।
PO4: छात्रों में हिंदी भाषा में व्यवहार /वार्तालाप करने की क्षमता अधिक विकसित होती है।
PO5: आधुनिक जनसंचार माध्यमों में हिंदी के बढ़ते प्रयोग एवं संभावनाओं से छात्र अवगत हो जाते हैं।
PO6: हिंदी भाषा के ज्ञान के आधार पर रोजगार के विविध अवसरों से छात्र परिचित हो जाते हैं।
PO7: छात्र भाषाविज्ञान की विभिन्न संकल्पना से परिचित हो जाते हैं।
PO8: भाषा की शुद्धता के प्रति छात्र जागृत हो जाते हैं।
PO9: छात्रों को साहित्य के द्वारा नैतिक मूल्यों को अपने जीवन उतारने की प्रेरणा मिलती है।

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: हिंदी साहित्य के विभिन्न शाखाओं से परिचित हो जाते हैं।
PSO2: हिंदी साहित्य के विभिन्न साहित्यकारों से परिचित हो जाते हैं।
PSO3: हिंदी साहित्य काव्यशास्त्र संकल्पनाओं समझ लेते हैं।
PSO4: हिंदी साहित्य का इतिहास समझ लेते हैं।

PSO5: हिंदी साहित्य के अंतर्गत प्रयोजनमूलक हिंदी की संकल्पनाओं का ज्ञान प्राप्त करता है।

PSO6: हिंदी साहित्य के अंतर्गत भाषाविज्ञान हिंदी की संकल्पना ज्ञान प्राप्त करता है।

Course Outcomes (CO's)

Semester-I

Sem-I Hindi opt.-Paper-I □ □ □ □ □ □ □ □ □ □

CO1: छात्र हिंदी गद्यकार तथा कवियों से परिचित कराना ।

CO2: Nk=ksa esa fganh lkfgR; ds izfr #fp o`f/nxr djukA

CO3: छात्रों में राष्ट्र प्रेम एवं सामाजिक प्रतिबद्धता की भावना विकसित करना।

Sem-II Hindi opt.-Paper-II □ □ □ □ □ □ □ □ □ □

CO4: छात्रों में हिंदी वर्णमाला, अंक लेखन , शब्द भेद , कारक , लिंग , वचन काल आदि की पहचान कराना ।

CO5: वृत्तांत लेखन, आवेदन पत्र, साक्षात्कार, स्ववृत्त लेखन इन कौशलों को विकसित करना।

Sem-III Hindi opt.-Paper-III

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C02:

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CO4: _____ और _____ वक्कभसत
_____|

Sem-III Hindi opt.- Paper-IV

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C01:

अवगत

CO2: 

C03: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ रस ☐ ☐
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CO4:

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Sem-Iv Hindi opt.-Paper-v

CO4: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

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C01: □ □ □ □ □ ▮ □ □ □ □ □ ववववध □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

CO₂: ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ भलवप ☐ ☐ ☐ ☐ ☐ ☐ और ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

☐ ☐ ☐ ☐ ☐

C03: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☐ ☐ और ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

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CO4:

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CO₂: \ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☐ ☐ ☐ ☐

C03: 

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C02: ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☒ ☒ अवगत ☐ ☐ ☐ ☐ ☐

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CO4:

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C01:

CO2: 

CO3:

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CO4:

[illegible]

Sem-VI Hindi opt.- Paper- Xv

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CO1: □ □ □ □ □ □ □ □ □ □ और □ □ □ □ □ □ अवगत □ □ □ □ □ □

CO2: □ □ □ □ □ □ □ □ □ □ और □ □ □ □ □ □ □ □ □ □ □ □ □ □ □

CO3: □ □ □ □ □ और □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ वक्कभसत □ □ □ □

CO4: □ वक्कभसत
□ □ □ □ □

Sem-VI Hindi opt.- Paper- XVI

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CO1: □

CO2: □

CO3: □

CO4: □

Name of Department: History

Name of Programme: B.A.History

Program Outcomes (PO's)

After completing B.A.History programme, students will be able to:

PO1: Understand the the real history of Chhtrapati Shivaji Maharaj, chhtrapati Sambhaji Maharaj, Chhtrapati Rajaram Maharaj and Maharani Tarabai's Period.

PO2: Study and understand the socio-economic and political development in other European Countries. And understand the contemporary Europe in the light of its background History.

PO3: Students understand the major events of India's freedom struggle, its legacy and its Contribution to the making of modern India. To instil the spirit of Nationalism among Students.

PO4: To acquaint the students with social change process in modern Maharashtra. To Generate curiosity to detail study the work of social reformers .During the 19th and 20th centuries a series of social reform movements tool place in Maharashtra.

PO5: Identify the rulers and their administration in Ancient India.

PO6: To know the impact of Mughal rule on Indian polity and society.

PO7: analyse the Marathas policy of expansionism.

PO8: Study of the Modern World (1870 - 2000 A.D.)

PO9: Students can understand the fundamental Principles in the Research Methodology.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn About the History of Marathas under the Chhtrapati Shivaji Maharaj.

PSO2: Gain Knowledge about the History of the Europe (1750-1871AD.)

PSO3: Understand the major events of India's freedom struggle movement.

PSO4: Learn About the social reforms movements and social reformers in the –
Maharashtra.

PSO5: Understand the Ancient Indian History.

PSO6: Understand the overall developments in Mughal History between 1526-1707 AD.

PSO7: To gain knowledge about the Maratha Empire Expansion under the Peshwa –
period.

PSO8: Understand the major events in the Modern World.

PSO9: Learn Historical research process, Historical Places and Historical Sources.

Course Outcomes (CO's)

Semester-I

Rise of the Maratha Power (1630-1707 AD.)

After completing this course students will be able to:

CO1: Know the historical background for the rise of the Maratha power.

CO2: Study the Contribution of Shahajiraje Bhosale.

CO3: Study the Contribution of Rajmata Jijabai.

CO4: understand the early activities of Chhtrapati Shivaji Maharaj.

Semester-II

Rise of the Maratha Power (1630-1707 AD.)

After completing this course students will be able to:

CO1: Students get knowledge about the early life of the Sambhaji Maharaj.

CO2: Understanding the Chhtrapati Rajaram Maharaj, Maharani Tarabai.

CO3: Learn about Central, Provincial, Local Administration of Maratha Period.

CO4: Study Military and Judicial System of the Maratha Period.

Semester-III

Paper No – III

History Modern Europe (1750 – 1871 A.D.)

After completing this course students will be able to:

CO1: Know the concept of Industrial Revolution.

CO2: Understands the various aspects of the French Revolution, 1789 AD.

CO3: able to understand the Rise and Conquests of Napoleon Bonaparte in Europe.

CO4: Gain knowledge of the Political Works done by the Metternich between 1815-1848 AD.

Semester-IV

History Paper No – V

History of Modern Europe (1750 – 1871 A.D.)

After completing this course students will be able to:

CO1: able to understand the Revolutionary Movements in France.

CO2: Discuss on the Internal and External Policy of the French Emperor Napoleon III

CO3: Learn Unification Process of Italy and Germany in the mid 19th Century.

CO4: Understand and define the concepts like Imperialism, Nationalism and Socialism.

Semester – III

History Paper No – IV

History of Indian Freedom Movement (1857 -1950 A.D.)

After completing this course students will be able to:

CO1: Learn the Background and Causes, Course and failure, Effects of the Revolt of 1857 AD.

CO2: Get information of the social Reformers in British Modern India. for e.g. Rajammohan Roy, Swami Dayanand Saraswati and Mahatma Jyotiba Phule.

CO3: Discuss on the Indian Nationalism.

CO4: Study and analyze the works related to Lokmanya Tilak.

Semester-IV

History Paper No – VI

History of Indian Freedom Movement (1857 -1950 A.D.)

After completing this course students will be able to:

CO1: Learn Contribution of Revolutionaries in Indian Freedom Movement.

CO2: Study the Non Co – operation Movement, Civil Disobedience Movement, Quit India Movement.

CO3: Evaluate the Morley–Minto Act, 1909 and Montford Act, 1919 and Subhashchandra Bose and Indian National Army.

CO4: Capable of understand the Indian Independence and Partition of India.

CO5: Study of the various aspects of the Indian Constitution and their silent features.

Inter Disciplinary Subject

Semester – III

History of Social Reforms in Maharashtra (1818 – 1970 A.D.)

After completing this course students will be able to:

CO1: : Describe the Social, Religous, Economic Condition during the Maharashtra in the early 19th century.

CO2: Capable of understand the Early Reforms in British Period.

CO3: Understand the Early Reformers in the 19th century Maharashtra.

CO4: Evaluate the Life and Work of Mahatma Jotiba Phule.

Semester – IV

History of Social Reforms in Maharashtra (1818 – 1970 A.D.)

After completing this course students will be able to:

CO1: Understand the Life and Work of Rajarshi Chhatrapati Shahu Maharaja.

CO2: Discuss the Social Reformers in Maharashtra.

CO3: Memorize the Women Reformers in Maharashtra.

CO4: Get information of the Life and Work of Dr.Babasaheb Ambedkar.

Semester – V

History Paper No-VII

Ancient India (Pre-Historic Period to 650A.D.)

After completing this course students will be able to:

CO1: Understand the Sources of Ancient Indian History.

CO2:Able to learn Pre-Historic Age in India.

CO3: Capable of understanding the various aspects of Indus Valley Civilization.

CO4: Study the Vedic Period.

Semester-VI

History Paper No-XII

Ancient India (Pre-Historic Period to 650A.D.)

After completing this course students will be able to:

CO1: Understand the Pilitical,Social, Religious Condition of India During 6th B.C.

CO2: To gain knowledge of the Formation of Mauryan Empire.

CO3: Analyze the features of art and architecture of Ancient India.

CO4: Students will be able to explain our heritage through cultural aspects of Ancient India.

Semester-V

History Paper No – VIII

Mughal India (1526A.D. - 1707A.D.)

After completing this course students will be able to:

CO1: Analyse the impact of Mughal rule on Indian polity and society.

CO2: Assess the economy and religion of Mughal rule.

CO3: learn more about the wars between Humayun and Shershaha

CO4: Study of the Akbar and his Early Life ,Expansion of Mughal Empire and also the Rajput Policy.

Semester-VI
History Paper No - XIII
Mughal India (1526A.D.-1707A.D.)

After completing this course students will be able to:

CO1: Study Jahangir and Shahajahan Period.

CO2: Evaluate the Aurangzeb .

CO3: Students will be able to examine social, economic and religious condition in Medieval Period.

CO4: Analyse the features of art and architecture of Mughal period.

Semester-V
History Paper No - IX
Expansion and Downfall of the Maratha Power (1707 -1818 A.D.)

After completing this course students will be able to:

CO1: Gain complete knowledge about Chhatrapati Shahu Maharaja and Civil war.

CO2: Learn about the Peshwa Bajirao – I and his Expeditions in North & South India.

CO3: Analyse the Period of Peshwa Balaji Bajirao (Nanasaheb)

CO4: Learn about the Third Battle of Panipat, 1761 A.D. and its Causes, Effects.

Semester-VI
History Paper No - XIV
Expansion and Downfall of the Maratha Power (1707 -1818 A.D.)

After completing this course students will be able to:

CO1: Learn about the Restoration of the Maratha Power under the Peshwa Madhavrao- I.

CO2: Analyses the Political works under the Period of Barbhai.

CO3: Analyse the forces that led to the downfall of the Maratha power.

CO4: To understand basic components of the Maratha administration system.

Semester-V
History Paper No - X
Modern World (1870 - 2000A.D.)

After completing this course students will be able to:

CO1: Critically examine the works of Bismarck.

CO2: understand the Concept of the New Imperialism.

CO3: Know the First world war and its causes, effects and also Treaty of Versailles & League of Nations.

CO4: Learn the Russian Revolution,1917 and its Causes, Course, Effects.

Semester-VI
History Paper No - XV
Modern World (1870 -2000 A.D.)

After completing this course students will be able to:

CO1: Express the views on the Rise of the Dictatorship in Germany, Italy, Japan.

CO2: Understand the relations between the nations in the world.

CO3: Students understand the consequences of the World War I, World War II and Cold War regarding the present global crises.

CO4: Analyse the streamline the role of UNO.

Semester-V
History Paper No – XI
Historical Sources, Research and Places

After completing this course students will be able to:

CO1: Understand the Nature and Scope of History.

CO2: Explain the Importance of sources, Types of sources and Evaluation of sources.

CO3: Understand the Research Process in the History.

CO4: Understand the importance of the Footnotes, Chronology and Index , Bibliography in the History Writing Process.

Semester-VI
History Paper No – XVI
Historical Sources, Research and Places

After completing this course students will be able to:

CO1: Understand and Evaluate the Importance of forts, Types of forts, Structure Of fort.

CO2: Explain the Importance and Types of Museum.

CO3: Describe the Importance of Historical Tourism in India.

CO4: Analysis the contribution of the Maratha Historians like V.K. Rajwade, G.S. Sardesai, V.C. Bendre in the Maratha Period History writing.

Name of Department: Philosophy

Name of Programme: B.A. Philosophy

Program Outcomes (PO's)

After completing B.A. Philosophy programme, students will be able to:

PO1: Bachelor of Arts graduates are also able to go into non-Arts related professions via graduate coursework study including law, teaching, journalism and media.

PO2: Bachelor of Arts students study ideas, movements and theories in culture, society, history, language, reasoning and more. Extensive reading and research helps arts students to form a broad understanding about the world around them and the ways in which humans connect and interact.

PO3: Bachelor of Arts degree graduates are able to synthesize complex information and communicate it concisely both orally and in written form.

PO4: Bachelor of Arts students develop strong analytical skills – the ability to break ideas and issues down into their component parts and drill down to the root of problems while considering possible solutions.

PO5: Bachelor of Arts students know how to find information, and have the discernment to distinguish between good, authoritative information and poor quality, unreliable information. As part of their studies, arts students are required to find and research a large number of primary and secondary resources, and distil and analyze the most relevant points to create a clear argument.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Students will be able to explain philosophical texts and positions accurately,

PSO2: Students will be able to identify and apply philosophical research methods consistently,

PSO3: Students will be able to apply their philosophical learning to important public issues.

PSO4: Students will learn to recognize and articulate fundamental questions about what exists, what we can know and how we should live our lives.

PSO5: Students will be able to describe the ways in which the formal techniques of logic are important to philosophical research.

PSO6: Students will be able to explain and discriminate between major approaches to moral philosophy such as deontology and virtue ethics.

PSO7: Students will be able to explain epistemological concepts such as the nature of knowledge, justification, evidence and scepticism.

PSO8: Students will be able to explain metaphysical concepts such as necessity, reality, time, God and free will, and to summarize and evaluate major philosophical positions in relation to each.

Course Outcomes (CO's)

Semester-I

(Problems of Philosophy – I)

After completing this course students will be able to:

CO1: Students will be able to analyze, synthesize and evaluate ideas and apply analytical skills to solve problems.

CO2: Students will learn to read, analyze and reflect on primary philosophical texts to formulate their own understanding.

CO3: Students will be able to analyze the ideas of the major philosophers.

CO4: Students will be able to apply philosophical knowledge to real-world problems

Semester-II

(Outlines of Indian Darsanas – II)

After completing this course students will be able to:

CO1: Students know the different views of ultimate reality of different Darsanas.

CO2: Students can understand materialism. They know what heterodox Darsana is. Students can understand what the way of Nirvana is. Students will know the means of knowledge according to Nyaya Darsana.

CO3: Students will learn the classification of Padarthas and root cause of universe. Students will understand difference between purusa and prakriti.

CO4: Students can experience of Samadhi through Yoga. Students can understand concepts of Vedas and Vedanta.

Semester-III

(Indian Ethics – III)

After completing this course students will be able to:

CO1: Students realize what morality is.

CO2: Students will know what is good and what is right and other basic moral concepts.

CO3: Students understand concepts of Indian normative ethics.

CO4: Students know Buddhist ethical concepts.

Semester-III

(Ancient Greek Philosophy – IV)

After completing this course students will be able to:

CO1: Students know how Cosmologists scientifically think.

CO2: Students can understand knowledge of nature of world is not sufficient and they understand virtue is also important.

CO3: Students can imagine ideal world.

CO4: Students know form and matter are two different aspects.

Semester-IV

(Western Ethics – V)

After completing this course students will be able to:

CO1: Students know why we are acting in certain situation.

CO2: Students know what my duty is.

CO3: Students know the different kinds of punishments.

CO4: Students can decide about ethical issues.

Semester-IV

(Modern western Philosophy – VI)

After completing this course students will be able to:

CO1: Students can understand how react our body and mind.

CO2: Students know the nature of reality in the view of rationalism.

CO3: Students know that what empiricism is.

CO4: Students know the scientific causation.

Semester-V
(Contemporary Indian Philosophy – VII)

After completing this course students will be able to:

CO1: Students know the difference between ancient Indian philosophy and contemporary Indian philosophy.

CO2: Sri Aurobindo's world-view gives each individual a meaningful place in a progressive cosmic unfolding of human Endeavour in a new and purposeful perspective.

CO3: Students can understand that there is not much significant difference amongst the ideas, thoughts and views expressed by Sri Aurobindo, and S. Radhakrishnan.

CO4: Students can understand of human consciousness.

Semester-V
(Epistemology– VIII)

After completing this course students will be able to:

CO1: Students will have known what valid knowledge is and what invalid knowledge is.

CO2: Students can understand the different means of knowledge.

CO3: Students know the different views of validity of the world.

CO4: Students aware from different errors.

Semester-V
(Philosophy of Religion – IX)

After completing this course students will be able to:

CO1: Students can understand what exact meaning of religion is and its relation to theology and philosophy.

CO2: Students know the nature of other religions.

CO3: Students can understand relation between yoga and religion.

CO4: Students know the nature and importance of other religions.

Semester-V
(Social philosophy– X)

After completing this course students will be able to:

CO1: Students can understand the difference between sociology and social philosophy.

CO2: Students know the exact meaning of family, education and work.

CO3: Students know that how can progress our society.

CO4: Students can avoid the different kinds of social evils.

Semester-V
(Deductive logic– XI)

After completing this course students will be able to:

- CO1: Students know the difference between form and matter of arguments.
- CO2: Students can understand the constituents of inference.
- CO3: Students know how we can draw the conclusion from single premise.
- CO4: Students know how we can draw the valid conclusion from two premises.

Semester-VI

(Contemporary Western Philosophy – XII)

After completing this course students will be able to:

- CO1: Students know the meaning of existentialism which is one of the methods of philosophy.
- CO2: Students will learn appearance and reality.
- CO3: Students will get philosophical problems arise from misunderstandings of the logic or language.
- CO4: Students get scientific knowledge.

Semester-VI

(Outlines of Aesthetics– XIII)

After completing this course students will be able to:

- CO1: Students will come to know different concepts of aesthetics.
- CO2: Students will know the different Marathi thinkers' views of aesthetic experience.
- CO3: Students can evaluate of types of art and literature.
- CO4: Students will come to know regarding different problems of aesthetics.

Semester-VI

(Philosophy of Saints– XIV)

After completing this course students will be able to:

- CO1: Students will know what is cult.
- CO2: Students know the spiritual knowledge of Kabir and Meerabai.
- CO3: Students know the contribution of Dnyaneshwara and Tukaram.
- CO4: Students can understand what is prapancha and Paramartha.

Semester-VI

(Political philosophy– XV)

After completing this course students will be able to:

CO1: Students can well understand the difference between political science and political philosophy.

CO2: Students know political ideology.

CO3: Students know which political action is valid.

CO4: Students know the different concepts of political ideals.

Semester-VI

(Scientific Method– XVI)

After completing this course students will be able to:

CO1: Students can understand characteristics of science.

CO2: Students know that without assuming grounds of science we cannot establish any conclusion.

CO3: Students well know how we can research scientifically.

CO4: Students can understand law in our daily life.

Name of Department: ECONOMICS

Name of Programme: B. A. ECONOMICS

Program Outcomes (PO's)

After completing B.A. Economics programme, students will be able to:

- PO1: Analyse the Demand Function and Supply Function.
- PO2: Understand the basic functions of commercial banks.
- PO3: Acquaintance to E- banking and ATM, credit card and debit card.
- PO4: Understand the process of credit creation of commercial banks.
- PO5: Analysis of basic principles of public finance.
- PO6: Know the basics of Indian economy.
- PO7: Understand the agricultural problems in India.
- PO8: Analysis of the basic principles of Micro and Macro Economics.
- PO9: Able to study the theories of economic development.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: Understanding the basic concepts and theories that form a part of this programme.
- PSO2: Analysing the economic problems and suggestions for policy measures for the development of the economy
- PSO3: Get entire knowledge of fundamentals of Economics.

Course Outcomes (CO's)

Semester-I

INDIAN ECONOMY (PAPER I)

The students will be able to get knowledge such as: CO1: Understand various characteristics of Indian economy.

- CO2: Explain the problem of rising population in India.
- CO3: Analyse the basic problems like poverty, unemployment and overpopulation in India economy.
- CO4: Measurement the agricultural productivity.
- CO5: Remember the causes of low agricultural productivity in India.
- CO6: Understand the features of green revolution in India.

Semester-II

INDIAN ECONOMY (PAPER II)

Name of Department: Chemistry

Name of Programme: M. Sc. Physical Chemistry

Program Outcomes (PO's)

After completing M.Sc. Physical Chemistry programme, students will be able to:

- PO1: Understand the fundamental principles and laws of physical chemistry
- PO2: Study and understand the properties of materials
- PO3: Design and testing of electrochemical cells and electrochemical properties of materials
- PO4: Understand forces responsible for various types of structure property correlations
- PO5: Study of physicochemical properties of novel materials including nanomaterials
- PO6: Solid material design, property measurements, structural analysis and application testing
- PO7: Understand the need and development of Quantum mechanics
- PO8: Analyse the physical approach to various molecular spectroscopies
- PO9: Empowering the students to do independent research of high calibre

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn about the potential uses of various branches of physical Chemistry

PSO2: Gather attention about the physical aspects of atomic structure, dual nature, reaction pathways, various energy transformations, molecular assembly at micro/nano level, etc.

PSO3: Gain complete knowledge about all fundamental laws of physical chemistry

Course Outcomes (CO's)

Semester-I

HCT-101 (Inorganic Chemistry-I)

The students will be able to get knowledge such as:

CO1: General characteristic properties and coordination chemistry of transition elements

CO2: Understand the basic principles of Ligand field theory and its parameters

CO3: Grasp the facts behind the Stereochemistry and Bonding

CO4: Basic theory, mechanism and application of inorganic materials

CO5: Nuclear reaction and analysis techniques

CO6: Classification of metal clusters, Structures of Carbonyl Clusters

CO7: Classification of carbonyl complexes and preparation, properties & structures of mono, di & trinuclear carbonyl complexes

HCT-102(Organic Chemistry – I)

After completing this course students will be able to:

CO1: Remembering nature of bonding in organic molecules.

CO2: Understand the reaction mechanism, intermediates, structure and reactivity.

CO3: Understand the Curtin-Hammett principle, Hammett equation and Taft equation.

CO4: Applying aliphatic nucleophilic and electrophilic substitution reaction.

CO5: Understand the stereochemistry of compounds having nitrogen, sulphur, phosphorus.

CO6: Evaluate the stereoselective and stereospecific reactions.

HCT-103 (Physical Chemistry – I)

After completing this course students will be able to:

CO1: Know historical development of quantum mechanics in chemistry

CO2: Understand the basic principles of thermodynamics and statistical mechanics

CO3: Understand of the laws of thermodynamics and their applications

CO4: Physical significance of distribution Law

CO5: Understand the concept of fugacity and its determination

CO6: Evaluate the partial thermodynamic properties and excess functions

SCT-104 (Analytical Chemistry – I)

After completing this course students will be able to:

CO1: Know different types of errors and sampling techniques

CO2: Understand the basic principles and working atomic absorption and inductively coupled plasma spectroscopy

- CO3: Understand of the polarography technique for determination of half wave potential.
 CO4: Explain the instrumentation of polarography and amperometry.
 CO5: Apply various software like Chem Sketch, Chem Draw etc. required for chemists
 CO6: Apply the concepts like linear regression, X-Y plots etc.

Part-I Semester-II
HCT-201 (Inorganic Chemistry-II)

The students will be able to get knowledge such as:

- CO1: Chemistry of non-transition elements
 CO2: Apprehend the organometallic chemistry of transition elements
 CO3: Grasp the facts Metal- Ligand equilibria in solution
 CO4: Chemistry of Lanthanides and Actinides
 CO5: Occurrence, extraction, properties and applications of metals

HCT-202(Organic Chemistry – II)

After completing this course students will be able to:

- CO1: Difference between aromatic nucleophilic and electrophilic substitution reactions..
 CO2: Able to study addition to carbon-carbon bond, Michael addition, Sharpless asymmetric epoxidation.
 CO3: Able to study carbon-Hetero multiple bond, Mannich, Benzoin, Perkin, Stobbe reactions.
 CO4: Understand elimination reactions, E1, E2, E1cb mechanism and pyrolytic elimination.
 CO5: Capable of understand the oxidation reactions, different oxidative processes, Oxidation with Ruthenium tetroxide, Iodobenzene diaacetate and Thallium (III) nitrate.
 CO6: Understand the reduction reactions, different reductive processes.

SCT-203 (Physical Chemistry – II)

After completing this course students will be able to:

- CO1: Difference between thermal and photochemical processes.
 CO2: Able to study photochemical and photophysical phenomena
 CO3: Photochemical reactions: photosynthesis, photolysis, photocatalysis, photosensitization
 CO4: Various photochemical phenomena like fluorescence and phosphorescence, Chemiluminescence,
 CO5: Capable of understand the electrochemical aspects of materials, ionic processes
 CO6: Understand the Storage batteries: acid and alkali storage cells

OET-205(Analytical Chemistry – II)

- CO1: Understand Infra-red spectroscopy of various functional groups and its applications.
 CO2: Applying NMR spectroscopy and Karplus equation and spin systems.
 CO3: Understand C¹³ NMR spectroscopy, FT technique, analogy with ¹H NMR

CO4: Understand 2D-NMR spectroscopy, techniques COSY, NOESY, DEPT, APT, INEPT
CO5: Able to study Mass spectrometry, ion production, fragmentation, molecular ion peaks.
CO6: Able to solve the problems based on joint application of IR, NMR, Mass spectroscopy.

HCP-107(Organic Chemistry Practical)

SCP-109(Organic Analytical Practical)

After completing this course students will be able to:

CO1: Understand to separate binary mixtures using ether and to prepare derivatives.
CO2: Identify the given binary mixture components using various steps.
CO3: Able to handle steam distillation, Soxhlet extraction method.
CO4: Able to analyse pharmaceutical tablet.
CO5: Determine uric acid/creatinine in urine.
CO6: By applying Beer-Lamberts law determine concentration of dye colorimetrically.

HCP-208(Organic Chemistry Practical)

OEP-211(Organic Analytical Practical)

After completing this course students will be able to:

CO1: Able to perform one stage preparation using Aldol condensation, sandmeyer reaction..
CO2: Able to perform two stage preparation of Acetanilide, acetophenone, phthalic anhydride.
CO3: Understand and estimate the iodine value of an oil/fat.
CO4: Understand and estimate the hydroxyl group, amine by acetylation method.
CO5: Isolate and determine percentage of caffeine in tea powder.
CO6: Determination of percentage purity of given olefinic compound by bromination method.

HCP-108 (Physical Chemistry Practical)

SCP-209 (Physical Chemistry Practical)

After completing this course students will be able to:

CO1: Prepare solutions of desired concentrations like in molar, normal, ppm, etc.
CO2: Know the principle and handling of pHmeter, Potentiometer, Conductometer, Colorimeter, Refractometer, etc.
CO3: Determine the unknown concentration and thermodynamic parameters using conductometer
CO4: Estimate the order of reaction and plot accurate graphs of the desired scale
CO5: Estimate refractive index and molecular weights of species.
CO6: Understand waste management and maintain laboratory ethics, safety and cleanliness

HCP- 106(Inorganic Chemistry Practical)

HCP-207 (Inorganic Chemistry Practical)

After completing this course students will be able to:

CO1: Analysis of specific ore exhibits separation metal constitutes
CO2: Gravimetric and volumetric analysis determine quantity of metal in ore analysis
CO3: Separation process and analysis techniques of alloy

- CO4: Preparation process of coordinate compounds
CO5: Determination of percentage purity inorganic compounds
CO6: Understand waste management and maintain laboratory ethics, safety and cleanliness

Part-II Semester-III

HCT- 3.1 (Quantum Chemistry)

After completing this course students will be able to:

- CO1: Know historical development of quantum mechanics in chemistry and explain the differences between classical and quantum mechanics
CO2: Describe the De Broglie hypothesis and the uncertainty principle
CO3: Evaluate the operators of interests like position, momentum and energy
CO4: Derive the Schrodinger equation for 1D, 2D and 3D model
CO5: Summarize Schrodinger equation for rigid rotator, harmonic oscillators and one electron system
CO6: Learners will be capable to solve and apply semi-empirical approximate methods like Variation principle and Perturbation theory

HCT-3.2 (Electrochemistry)

After completing this course students will be able to:

- CO1: Students will be able to recall the basic principles of electrochemistry
CO2: Discuss the basics of ion solvent interactions
CO3: Calculations of heats of hydration of ions and the concept of hydration number (Van Arkel, de Boer's and Bernal- Fowler method etc.)
CO4: student will be able to evaluate Decomposition potentials and hydrogen and oxygen overvoltage
CO5: Study of electrode electrolyte interfaces based on the properties of material shows the energetically viability of electron transfer
CO6: Fundamental equation of electrostatics to study the reversible charge transfer behavior in the materials electrolyte interfaces.

SCT-3.1 (Molecular Structure – I)

After completing this course students will be able to:

- CO1: Recall basics principles and laws of spectroscopy.
CO2: Explain symmetry operations and groups theory for probing the detail spectral detail of molecule
CO3: Understand the fundamental modes of oscillations of molecules based on the properties like dipole movement of the molecules
CO4: Applications of rotational and vibrational spectroscopy
CO5: Connect the concept of polarizability of molecules and Raman active modes

CO6: Justify the principles of Electronic spectroscopy, progression, sequencing and Birge Spooner plots

CO7: Express the Instrumentation and applications of the Electronic spectroscopy for structural elucidation.

OET-3.1 (Solid State Chemistry)

After completing this course students will be able to:

CO1: provide an introduction to the concepts underlying solid state chemistry.

CO2: Describe specific crystal structures by applying basic crystallographic concepts

CO3: Understand generation of X-ray radiation and its effects of on matter as well Bragg's diffraction equation to find out structural information of solid materials

CO4: Correlate the atomic and electronic structure, electric conductivity, optical property, magnetism of solid materials.

CO5: Decide the properties of nanomaterials, their synthesis methods and characterization

CO6: Generalize the preparation methods of single crystals and their uses

Practical –V

HCP 3.1, HCP-3.2, SCP-3.1 and OEP-3.1

After completing this course students will be able to:

CO1: In-depth training on laboratory solution preparations on all concentration scales

CO2: Training on laboratory safety and lab ethics in scientific work

CO3: Training on planning, designing and execution of experiments

CO4: Training on uncertainty estimations for experimentally measured and derived properties of solutions

CO5: Training on buffer preparations, equilibrium studies and spectral analysis.

CO6: Know the principle and handling of pHmeter, Potentiometer, Conductometer, spectrophotometer, Polarimeter, Polarography, etc.

Part-II semester-IV

HCT-4.1 (Statistical Mechanics and Thermodynamics)

After completing this course students will be able to:

CO1: Memorize the mathematical principles required to understand statistical mechanics

CO2: Learn principles of statistics to understand and estimate bulk thermodynamic properties of materials.

CO3: Understand how microscopic properties where quantum effects are predominant can be correlated to macroscopic properties where classical thermodynamics is important through an ensemble theories and statistical distribution laws.

CO4: Evaluate the thermodynamic properties of systems of quantum particles such as bosons and fermions.

CO5: Students will learn applicability of principles of thermodynamics where irreversible effects or near equilibrium phenomena exists.

CO6: Knowledge gained on entropy production and entropy flow in chemical and biological systems will help learners to understand coupling reactions mostly existing in living organisms.

HCT-4.2 (Chemical Kinetics)

After completing this course students will be able to:

CO1: Recall the basic principles of Kinetics

CO2: Describe different theories of rates of reaction

CO3: Learn from fundamental to advanced theories and applications of chemical kinetics

CO4: Different mechanistic aspects of surface reaction and industrial applications

CO5: Understand the kinetics of complex reactions like parallel reactions, chain reactions etc.

CO6: Solve the kinetics of homogeneous and enzymatic catalysis

HCT-4.3 (Molecular Structure – II)

After completing this course students will be able to:

CO1: Memorize the basic principles and laws of electronic spectroscopy.

CO2: Discuss the electronic and magnetic properties of materials

CO3: Applications of Magnetic properties measurements to the coordination complexes

CO4: Brief study of magnetic properties of materials.

CO5: Structural investigations of the material based on the NMR radiations and various theories of peak splitting

CO6: Express applications of Mossbauer spectroscopy w.r.t fine and hyperfine electron energy splitting and instrumentation

SCT-4.1 (Surface Chemistry)

After completing this course students will be able to:

CO1: Recall the surface phenomenon's like adsorption, mechanism of adsorption, factors affecting adsorption.

CO2: Describe adsorption mechanism for removal of industrial effluents and purification of materials studied in detail.

CO3: Explain the link between liquid surface tension and contact angle, and demonstrate how certain experimental techniques can be used for the assessment of liquid surface tension

CO4: Apply knowledge on thermodynamics of micellization in surfactant solutions describe the influence of physical variables such as temperature, molecular structure of surfactant, and solvent characteristics on parameters such as critical micellization concentration (CMC), association number, micelle structure etc.

CO5: Describe and explain different types of colloidal systems and interactions between colloidal particles

CO6: Express instrumentation of BET surface area and adsorption isotherms to determine surface area of catalysts which is one of the important criteria to select catalyst in industries

Practicals

HCP 4.1, HCP-4.2, HCMP-4.3 and SCP-4.1

After completing this course students will be able to:

CO1: Training on scientific literature search, defining the objective of the work, research skills, data representation in tabular and graphical form etc.

CO2: Training on experimental verification of fundamental theories, comparison of data with literature and scientific discussion on any deviation of data from expected theoretical values or reported literature.

CO3: Training on electrochemical analysis of different physicochemical aspects of materials

CO4: Training on estimation of protonation states of acidic, neutral and basic natural amino acids

CO5: Interpret TGA curves, diffractograms

CO6: analysis for understanding the rotational-vibrational spectra of simple molecules like HCl and DCl.

Name of Department: Chemistry

Name of Programme: M.Sc. Pharmaceutical Chemistry

Program Outcomes (POs):-

After completing M.Sc. Pharmaceutical Chemistry programme, students will be able to:

PO1: Use the suitable reagent, reaction conditions for desired synthesis.

PO2: Use the various heterocycles in the area of medicinal chemistry research.

PO3: understand the major area which includes physical and applied pharmaceuticals, drug deposition and dynamics and drug development.

PO4: Will achieve the goal to explore the chemical space for new molecule with the help of CADD.

PO5: Student will aware about natural product as a medicine.

PO6: Understand the need and application of spectroscopic techniques.

PO7: Students will gain a strong knowledge of human body, its related diseases, analytical skills, drug molecules (API) along with excipients, ADME studies of drugs, natural drug resources, toxicity and impurity profile, studies of dosage forms, designing and development of formulations etc.

PO8: Students can apply the knowledge in research field to make novel drug molecules.

PO9: Various dosage forms can be prepared by the pharmaceutical students in industry for the ease of patients.

PO10: Modern methods usage: The student will learn to handle many instruments related to their studies which will help them to work in Pharmaceutical Industry.

PO11: Communication: Communicate effectively on pharmaceutical activities with the community and with society.

PO12: Gain the multidisciplinary approach in every context which empowers the students to do independent research of high calibre.

Program Specific Outcomes (PSO's)

The Program Specific Outcomes (PSO's) are specific statements that describe the professional career accomplishments that the program is designed. The PSO's of the M.Sc. Program in Pharmaceutical Chemistry are designed in such a way that at the end:

PSO 1: Students will be able to understand the basic concepts related with organic chemistry covering various organic reagents and various types of reactions along with their mechanisms. Along with this student will also learn practical aspects of organic chemistry especially elemental analysis and functional groups.

PSO 2: Students will learn herein analytical techniques and their applications in structural determination of various organic compounds, and active pharmaceutical ingredients (API).

PSO 3: Students will gain the knowledge of Heterocyclic chemistry, Drug design and development, pharmaceutical technology which will improve their career in the research area of pharmaceutical chemistry. Here student will learn various organic reactions involved in API and their applications in pharmaceutical industry.

Course Outcomes (CO's)
Semester-I
HCT-101 (Inorganic Chemistry-I)

The students will be able to get knowledge such as:

CO1: General characteristic properties and coordination chemistry of transition elements

CO2: Understand the basic principles of Ligand field theory and its parameters

CO3: Grasp the facts behind the Stereochemistry and Bonding

CO4: Basic theory, mechanism and application of inorganic materials

CO5: Nuclear reaction and analysis techniques

CO6: Classification of metal clusters, Structures of Carbonyl Clusters

CO7: Classification of carbonyl complexes and preparation, properties & structures of mono, di & trinuclear carbonyl complexes

HCT-102 (Organic Chemistry – I)

After completing this course students will be able to:

CO1: Remembering nature of bonding in organic molecules.

CO2: Understand the reaction mechanism, intermediates, structure and reactivity.

CO3: Understand the Curtin-Hammett principle, Hammett equation and Taft equation.

CO4: Applying aliphatic nucleophilic and electrophilic substitution reaction.

CO5: Understand the stereochemistry of compounds having nitrogen, sulphur, phosphorus.

CO6: Evaluate the stereoselective and stereospecific reactions.

HCT-103 (Physical Chemistry – I)

After completing this course students will be able to:

- CO1: Know historical development of quantum mechanics in chemistry
- CO2: Understand the basic principles of thermodynamics and statistical mechanics
- CO3: Understand of the laws of thermodynamics and their applications
- CO4: Physical significance of distribution Law
- CO5: Understand the concept of fugacity and its determination
- CO6: Evaluate the partial thermodynamic properties and excess functions

SCT-104 (Analytical Chemistry – I)

After completing this course students will be able to:

- CO1: Know different types of errors and sampling techniques
- CO2: Understand the basic principles and working atomic absorption and inductively coupled plasma spectroscopy
- CO3: Understand of the polarography technique for determination of half wave potential.
- CO4: Explain the instrumentation of polarography and amperometry.
- CO5: Apply various software like Chem Sketch, Chem Draw etc. required for chemists
- CO6: Apply the concepts like linear regression, X-Y plots etc.

Part-I Semester-II

HCT-201 (Inorganic Chemistry-II)

The students will be able to get knowledge such as:

- CO1: Chemistry of non-transition elements
- CO2: Apprehend the organometallic chemistry of transition elements
- CO3: Grasp the facts Metal- Ligand equilibria in solution
- CO4: Chemistry of Lanthanides and Actinides
- CO5: Occurrence, extraction, properties and applications of metals

HCT-202(Organic Chemistry – II)

After completing this course students will be able to:

- CO1: Difference between aromatic nucleophilic and electrophilic substitution reactions..
- CO2: Able to study addition to carbon-carbon bond, Michael addition, Sharpless asymmetric epoxidation.
- CO3: Able to study carbon-Hetero multiple bond, Mannich, Benzoin, Perkin, Stobbe reactions.
- CO4: Understand elimination reactions, E1, E2, E1cb mechanism and pyrolytic elimination.
- CO5: Capable of understand the oxidation reactions, different oxidative processes, Oxidation with Ruthenium tetroxide, Iodobenzene diacetate and Thallium (III) nitrate.
- CO6: Understand the reduction reactions, different reductive processes.

SCT-203 (Physical Chemistry – II)

After completing this course students will be able to:

CO1: Difference between thermal and photochemical processes.

CO2: Able to study photochemical and photophysical phenomena

CO3: Photochemical reactions: photosynthesis, photolysis, photocatalysis, photosensitization

CO4: Various photochemical phenomena like fluorescence and phosphorescence, Chemiluminescence,

CO5: Capable of understand the electrochemical aspects of materials, ionic processes

CO6: Understand the Storage batteries: acid and alkali storage cells

OET-205(Analytical Chemistry – II)

CO1: Understand Infra-red spectroscopy of various functional groups and its applications.

CO2: Applying NMR spectroscopy and Karplus equation and spin systems.

CO3: Understand C¹³ NMR spectroscopy, FT technique, analogy with 1H NMR

CO4: Understand 2D-NMR spectroscopy, techniques COSY, NOESY, DEPT, APT, INEPT

CO5: Able to study Mass spectrometry, ion production, fragmentation, molecular ion peaks.

CO6: Able to solve the problems based on joint application of IR, NMR, Mass spectroscopy.

HCP-107 (Organic Chemistry Practical)

SCP-109 (Organic Analytical Practical)

After completing this course students will be able to:

CO1: Understand to separate binary mixtures using ether and to prepare derivatives.

CO2: Identify the given binary mixture components using various steps.

CO3: Able to handle steam distillation, Soxhlet extraction method.

CO4: Able to analyse pharmaceutical tablet.

CO5: Determine uric acid/creatinine in urine.

CO6: By applying Beer-Lamberts law determine concentration of dye colorimetrically.

HCP-208(Organic Chemistry Practical)

OEP-211(Organic Analytical Practical)

After completing this course students will be able to:

CO1: Able to perform one stage preparation using Aldol condensation, sandmeyer reaction..

CO2: Able to perform two stage preparation of Acetanilide, acetophenone, phthalic anhydride.

CO3: Understand and estimate the iodine value of an oil/fat.

CO4: Understand and estimate the hydroxyl group, amine by acetylation method.

CO5: Isolate and determine percentage of caffeine in tea powder.

CO6: Determination of percentage purity of given olefinic compound by bromination method.

HCP-108 (Physical Chemistry Practical)

SCP-209 (Physical Chemistry Practical)

After completing this course students will be able to:

- CO1: Prepare solutions of desired concentrations like in molar, normal, ppm, etc.
- CO2: Know the principle and handling of pHmeter, Potentiometer, Conductometer, Colorimeter, Refractometer, etc.
- CO3: Determine the unknown concentration and thermodynamic parameters using conductometer
- CO4: Estimate the order of reaction and plot accurate graphs of the desired scale
- CO5: Estimate refractive index and molecular weights of species.
- CO6: Understand waste management and maintain laboratory ethics, safety and cleanliness

HCP- 106 (Inorganic Chemistry Practical)

HCP-207 (Inorganic Chemistry Practical)

After completing this course students will be able to:

- CO1: Analysis of specific ore exhibits separation metal constitutes
- CO2: Gravimetric and volumetric analysis determine quantity of metal in ore analysis
- CO3: Separation process and analysis techniques of alloy
- CO4: Preparation process of coordinate compounds
- CO5: Determination of percentage purity inorganic compounds
- CO6: Understand waste management and maintain laboratory ethics, safety and cleanliness

Part-II Semester-III

HCT- 3.1 (Advanced Organic Chemistry-I)

After completing this course students will be able to:

- CO1: Know the different types of reactions and reagents
- CO2: Classify the various kinds of reactions and reagents.
- CO3: Predict the products, reagents and name of the reaction
- CO4: Understand the mechanism involved in different reactions and rearrangements.
- CO5: Establish the correlation between the structure, stability and reactivity of intermediates involved in the different reactions and rearrangements.
- CO6: Understand the use suitable reagent for desired transformation.

HCT-3.2 (Chemistry of Bioactive Heterocycles)

After completing this course students will be able to:

- CO1: Recall the basic concepts of heterocyclic chemistry.
- CO2: Discuss the nomenclature, synthesis, reactivity, aromatic character and medicinal importance of different heterocycles.
- CO3: Classify the 3-/4-/5-/6-memebereed or fused heterocycles
- CO4: Understand the use of heterocycles in drug synthesis.

CO5: Design the drug molecules on the basis of knowledge of heterocycles.

CO6: Understand the interdisciplinary approach of heterocyclic chemistry.

SCT-3.1 (Drug Development)

After completing this course students will be able to:

CO1: Know the concept of drug and its physicochemical parameters.

CO2: Understand the basics of Computer Aided Drug Design (CADD).

CO3: Understand the role of CADD in Drug development on the basis of structure activity relationship (SAR).

CO4: Analyse the action of drug on the basis of pharmacokinetics

CO5: Predict the potency, efficacy and toxicity of drugs.

CO6: Evaluate the drugs based on target drug delivery.

OET-3.1 (Medicinal Chemistry)

After completing this course students will be able to:

CO1: Know the various types of drugs based on mode of action.

CO2: Classify the various types of drugs.

CO3: Understand structure activity relationship (SAR) of drugs.

CO4: Design the synthetic route for different drugs.

CO5: Predict the mechanism of action based on SAR

CO6: Get idea to practice the use of different drugs.

Practical –V

HCP 3.1, HCP-3.2, SCP-3.1 and OEP-3.1

After completing this course students will be able to:

CO1: In-depth training on laboratory solution preparations on all concentration scales

CO2: Training on laboratory safety and lab ethics in scientific work

CO3: Training on planning, designing and execution of experiments

CO4: Handling of 2/3 stage organic preparations and the knowledge of TLC for the confirmation of products.

CO5: Acquire the skill of isolation of different constituents from natural sources and Practicing the synthesis of medicinally important compounds.

CO6: Hands-on training on chemistry related softwares and literature survey work for their projects.

Part-II semester-IV

HCT-4.1 (Photochemistry and Pericyclic Reactions)

After completing this course students will be able to:

CO1: Know Molecular orbital, its stability and energy calculations for different systems.

CO2: Understand features of pericyclic and photochemical reactions.

CO3: Classify the pericyclic and photochemical reactions

- CO4: Understand the symmetries of molecular orbitals of reactant as well as products.
CO5: Predict the precise stereochemistry in pericyclic and photochemical reactions.
CO6: Design the mechanism involved in pericyclic and photochemical reactions.

HCT-4.2 (Advanced Organic Chemistry-II)

After completing this course students will be able to:

- CO1: Know the nomenclature of fused and bridged ring compounds.
CO2: Acquire the knowledge of protection and deprotection of functional groups.
CO3: Understand the stereochemistry of cyclic compounds and different rules and models.
CO4: Get the idea of various asymmetric syntheses and their applications.
CO5: Gain the knowledge of disconnection approach.
CO6: Adopt the skill of disconnection of target molecule to be synthesized.
CO7: Design the perfect routes for the organic transformations.

HCT-4.3 (Pharmaceutical Dosage Forms)

After completing this course students will be able to:

- CO1: Know the types of dosages
CO2: Distinguish the different types of dosages
CO3: Understand the concept drug formulation
CO4: Get the idea of designing the drug formulation
CO5: Know the fundamentals of novel drug delivery system
CO6: Understand various types of drug delivery systems.

SCT-4.1 (Pharmaceutical Technology)

After completing this course students will be able to:

- CO1: Know the industrial process involved for manufacture of API
CO2: Understand the different unit processes involved in drug industry.
CO3: Adopt the skills involved for the unit operations in tableting
CO4: Prepare the master plan for validation
CO5: Know the regulatory guidelines for the validation
CO6: Enhance his industrial approach.

Practical –VI

HCP 4.1, HCP-4.2, HCP-4.3 and SCP-4.1

After completing this course students will be able to:

CO1: Identify the Pharmaceutically important Intermediates by the analysing of their spectra.

CO2: Understand the working procedure of research project as well as in plant training

CO3: Training on laboratory safety and lab ethics in scientific work

CO4: Training on planning, designing and execution of experiments

CO5: Analyse the different types of tablets and capsules.

CO6: Acquire the skills of pharmaceutical technology and formulations.

Name of Department: Physics

Name of Programme: M. Sc. Physics (Solid State)

Program Outcomes (PO's)

After completing M.Sc. Physics solid state programme, students will be able to:

PO1: Understand the fundamental principles and laws of Physics (solid state)

PO2: Study and understand the characteristics and properties of materials

PO3: Design, prepare and testing of material properties as structural, electrical, magnetic etc.

PO4: Acquire problem solving, initiative and enterprise skills that contribute to productive and innovative outcomes.

PO5: Demonstrate the ability to design and conduct experiments, demos, create models to analyse and interpret data

PO6: Solid material design, property measurements, structural analysis and application testing

PO7: Design and perform experiments related to scientific and computational theories and conceive potential technological applications.

PO8: Demonstrate ability for collaborative research and scientific communication through projects, internship and on-site training.

PO9: Conceive the ways and means to address various social, economic, environmental, human rights and other critical issues faced by humanity at the local, national and global levels.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: To understand all the three formulations of classical mechanics are related

PSO2: The student should be able to understand basic concepts of vector, tensor analysis and functions of complex variables

PSO3: Gain complete knowledge about all fundamental laws of physics

Course Outcomes (CO's)
Semester-I
HCT-1.1 (Mathematical Physics)

The students will be able to get knowledge such as:

CO1: They can work with vectors

CO2: Understand the linear equations, vector spaces, matrices, linear transformations, determinants, eigenvalue, eigenvectors, etc.

CO3: Use different methods for second order differential equations with constant coefficients.

CO4: Learn to use Laplace transform methods to solve differential equations

CO5: The student will learn the basics and applications of Fourier series, Fourier and Laplace transforms, their inverse transforms etc

HCT-1.2 (Solid State Physics)

After completing this course students will be able to:

CO1: The student is expected to have a basic knowledge of crystal systems and be able to account for how crystalline materials are studied using diffraction, including concepts like reciprocal lattice and Brillouin zones

CO2: Student can calculate thermoelectrical properties in the free-electron model

CO3: To know the fundamentals of dielectric and ferroelectric properties of materials.

CO4: Learn to explain superconductivity using BCS theory

CO5: To study fundamentals of superconductivity.

HCT-1.3 (Analog & Digital Electronics)

After completing this course students will be able to:

CO1: Students understood the operations of different applications of op-amp.

CO2: Learned to distinguish between analogue and digital systems.

CO3: Analyse dc circuits and relate ac models of semiconductor devices with their physical Operation

CO4: Learned and understood the basics of digital electronics, Boolean algebra, and able to design the simple logic circuits and test/verify the functionality of the logic circuits

CO5: Able to write assembly language program for microprocessors.

CO6: Able to draw and describe architecture of 8085

SCT-1.1 (Classical Mechanics)

After completing this course students will be able to:

CO1: Students learned different conservation laws

CO2: Understand results of Lagrangian and Hamiltonian formulation are invariant

CO3: HJ can be incorporated to solve the mechanics problems.

CO4: Explain Poisson's brackets and their properties.

CO5: To give introduction to transformation between coordinate systems

CO6: Experienced to solve numerical problems.

Part-I Semester-I

HCP-1.1/1.2/1.3/SCP-1.1 (Practical)

After completing this course students will be able to:

CO1: Training on research skills, data representation and analysis in tabular and graphical form using Origin software.

CO2: Practice on origin software for data analysis and representation.

CO3: To study the theoretical concepts using experiments.

CO4: To study the concepts those are helpful for research like electrical resistivity and thermoelectric power using custom designed setups.

Part-I Semester-II

HCT-2.1 (Quantum Mechanics)

The students will be able to get knowledge such as:

CO1: Understand the idea of wave function

CO2: Understand and explain the differences between classical and quantum mechanics

CO3: Learn the wave mechanics and its application to ground state of the hydrogen and hydrogen like atom.

CO4: Student learn the concept of wave function of many electrons systems

CO5: It will let students appreciate the quantum mechanics in the form of the Born approximation and its validity

HCT-2.2 (Electrodynamics)

After completing this course students will be able to:

CO1: Understand the basic mathematical concepts related to electromagnetic vector fields

CO2: Understand the concepts related to Faraday's law, induced emf and Maxwell's equations.

CO3: Able apply the principles of magneto statics to the solutions of problems relating to magnetic field and magnetic potential, boundary conditions and magnetic energy density.

CO4: Apply the laws of electrostatics to the solutions of problems relating to electric field and electric potential, boundary conditions and electric energy density through different gauges.

CO5: Formulate and solve EM numerical with the help of electrodynamic potentials, and make a detailed account for gauge transformations and their use.

SCT-2.1 (Statistical Physics)

After completing this course students will be able to:

CO1: Student identifies the relationship and correct usage of infinitesimal work, work, energy, heat capacity, specific heat, latent heat, and enthalpy.

CO2: Student can compute entropy by counting the number of allowed states for simple systems such as the ideal gas (Sakur-Tetrode equation).

CO3: Student uses either Fermi-Dirac or Bose-Einstein statistics with the knowledge of the spin of the particles

CO4: Student recognizes the difference between temperature and heat,

CO5: To impart knowledge of phase transitions and how these transitions are distinguished

CO6: To introduce advanced concepts related to Quantum Statistical Mechanics.

OET-2.2 (Conventional & Nonconventional Energy)

CO1: Understood the working principle of different resources of energy.

CO2: Able to predict the performance of solar photovoltaic device and analyse its performance.

CO3: The students will be able to assess the biomass resource, appropriate conversion technology for the given biomass resource & end use

CO4: Identify potential solution to supply limitation & environmental issues related with biomass waste energy resources.

CO5: Studied the nuclear energy is the future of thrust of energy need.

CO6: Able to learn the role of nuclear energy in future and expectation to advanced reactors.

HCP 2.1/2.2/ OEP 2.2/ SCP 2.1(Practical)

After completing this course students will be able to:

CO1: Able to find the particle size and lattice parameters of the nano materials using practical knowledge.

CO2: Understand the Beer-Lambert's law.

CO3: Able to calculate the strain in the materials.

CO4: Able to understand the basics of Op- Amp.

CO5: Able to understand and calculate the Op- Amp parameters.

CO6: Understand the basics of some material deposition techniques.

CO7: Using four probe method to determine the resistivity of the material.

CO8: Able to determine the crystal structures through the knowledge of crystallographic practical.

CO9: Able to understand the magnetic effect on semiconductor materials through Hall effect experiments.

CO10: Able to understand the characteristics of photovoltaic cell in dark and light.

Course Outcomes (CO's)

Part-II Semester-III

HCT - 3.1: SEMICONDUCTOR PHYSICS

The students will be able to get knowledge such as:

- CO1: General characteristic properties & basic concepts of energy bands, Quantum Well, Fermi Level and high field effect
- CO2: Concepts of optical absorption, Steady state carrier generation
- CO3: The Basic theory, mechanism and application Quasi-Fermi level and diffusion process
- CO4: The electron in periodic motion, group velocity and dynamics of electron and holes.
- CO5: Concepts of Thermal conductivity, expansion and Schottky Barrier
- CO6: Nucleation and growth theory, atomic bonding Stability of nuclei, VPE, MBE and Supersaturation.

HCT-3.2 (Atomic and Molecular Physics)

After completing this course students will be able to:

- CO1: Understand the concept of Hydrogen atom: Quantum states, Fine structure of Hydrogen atom, electron spin.
- CO2: Understand the concept of spectroscopic term and solving the problems on Lande's g Factor
- CO3: Concept of selection rule, Stern-Gerlach experiment, electron spectra, relativistic correction
- CO4: Concept of exchange symmetry of wave function, Pauli's exclusion principle, Hund's rule, L-S and J-J coupling
- CO5: Physical significance and problem solving based on atomic structure and spectra
- CO6: Concepts of diatomic, Poly atomic molecules and its spectra, Zeeman Effect, Paschen Back Effect & Stark Effect
- CO7: Concepts of Raman effect, Raman Spectra, EPR and its application

SCT-3.3 (Experimental Techniques for Physics)

After completing this course students will be able to:

- CO1: Understanding the measurement system of some electronic instruments, integrated circuit technology like power supply, SMPS, UPS, Inverters., etc
- CO2: Concepts of LASER system and its types
- CO3: Understood optoelectronic devices like Solar Cell, LDR, LCD, CCD, LED., etc
- CO4: Evaluate the concept of X-Ray generator, scattering and diffraction and its application

CO5: Understood concept of XPS, XRF and its application production of low pressure and low temperature

CO6: Understood Analytical instruments like SEM, AFM, STM UV-Vis, FTIR., etc

OET-3.2 (Energy Harvesting Devices)

After completing this course students will be able to:

CO1: Understanding the characterisation techniques & types of Solar cells like Cd-Te, CdS, CdInSe₂, Dye Sensitised, Organic., etc

CO2: Understood characterisation, various types and application of Super capacitors

CO3: Understood characterisation, various types and application of Fuel cells.

CO4: Understood Piezoelectric materials, power generators and power storage circuits.

CO5: Gain the knowledge applicable to energy storage devices

M.Sc. II SEM-III Practical

HCP 3.1, 3.2, SCP 3.1 and OEP 3.1/3.2 (Practical)

After completing this course students will be able to:

CO1: Understanding characteristics and behavior of a silicon diode, thermocouple, temp sensor

CO2: Understanding characteristics and behavior of thermal diffusivity of Brass, temperature coefficient of resistance

CO3: Understanding the thin film deposition techniques by CBD, SILAR and electrodeposition method

CO4: Gain knowledge of micrographs.

CO5: Understanding the concepts of IR, Raman, NMR spectra

CO6: Understanding the dielectric constants of non-polar liquid and dipole moment of organic molecule

CO7: Gain knowledge of AC Bridges and Passive filters

CO8: Gain knowledge about Origin software for curve fitting and plotting the graph.

CO9: Understanding the measurement of low resistance and mutual inductance.

Part-II Semester-IV

HCT-4.1 (Semiconductor Devices)

The students will be able to get knowledge such as:

CO1: Concepts of carrier transport phenomena in semiconductor solids

CO2: Understood Einstein relation, Temperature dependence of semiconductors conductivity and Shockley-Read-Hall theory, MIS, MOSFETS and CMOS devices

CO3: Understood the construction and I-V characteristics of SCR, types of thyristors like DIAC, TRIAC, GTO, MOS, IGBT, SUS., etc

CO4: Understood the construction, working and application of Charge Coupled Devices (CCD), Gunn domain and its operation modes

CO5: Understanding the Concepts of optoelectronic and advanced solid state devices like LED,

LASER, Photodiode, Visible and IR LEDs., etc

HCT-4.2 (Nuclear and Particle Physics)

After completing this course students will be able to:

CO1: Properties of Nucleus and Nuclear Forces, Yukawa's hypothesis and Meson theory of Nuclear Forces

CO2: Understood Nuclear various Models like Liquid drop, shell, collective nuclear, superconductivity., etc.

CO3: Understood types of nuclear reactions like Direct reaction, nuclear transmutation reaction and Nuclear Fission and Fusion.

CO4: understood the concept of particle physics, Cosmic rays, particle accelerators and detectors.

CO5: Capable of understanding the concepts of nuclear and particle physics & its problem

HCT-4.3 (Thin Film Physics and Technology)

After completing this course students will be able to:

CO1: Concepts of chemical methods of thin film synthesis CVD, CBD, Electrodeposition, Spray pyrolysis, IAD, Sol-gel., etc.

CO2: Understood the physical methods of thin film synthesis like Thermal evaporation and Sputtering process

CO3: Understood the mechanism of thin film formation and its properties

CO4: Understood the Physics of Surfaces, Interfaces and thin films

CO5: Understood a Dielectric deposition of various Silicon precursors & its application in electronic devices

CO6: Understanding technology of thin film physics and its applicability

SCT-4.1 (Materials Characterization Techniques)

CO1: Understood the basic concept of optical microscopy & various types of optical Microscopy and advantages of electron microscopy over light microscopy

CO2: Understood Scanning electron microscopy, Sample preparation, Electronics Image analysis and size of histogram.

CO3: Understand Transmission electron microscopy, Sample preparation, Electronics Image analysis and size of histogram

CO4: Understood Scanning tunneling microscopy and AFM

CO5: Understand electron emission, Instrumentation, energy analyser and spectral analysis in XPS and its elemental analysis

CO6: Understood AES (Basic principle, Auger transition, Instrumentation and data analysis)

CO7: Understood Resonance Spectroscopy (NMR and EPR) and its spectra.

SEM-IV- MP 4.3- Major Project

CO1: Gain basic idea of research work.

CO2: Identify problems, skill of critical thinking and innovative ideas.
CO3: Familiarize with plagiarism.
CO4: Learn how to write dissertation/project report with references.
CO5: Prepare power point presentation.
CO6: Gain presentation skills of project/research work in English.
CO7: Familiarize with research paper and conference presentation.

Name of the Department – Botany

Name of Programme- M. Sc. Botany

Programme Outcomes (PO's)-

After completing M. Sc. I Botany programme, students will be able to :

- PO 1- Understand types of fungi, bacteria, lichens & viruses
- PO 2- Study & Understand modes of classification of fungi, bacteria,
- PO 3- Understand life cycles of different fungi
- PO 4- Understand economic importance of fungi, bacteria, virus
- PO 5- Understand methods of identification of fungi, bacteria, viruses
- PO6- Understand types of algae, bryophytes, Pteridophytes & gymnosperms
- PO7- Understand classification system & methods of identification of algae, bryophytes & Pteridophytes & gymnosperms
- PO8- Understand plant taxonomy terms, identification methods of plants
- Po9- understand different molecular techniques & instrumentation

Programme Specific Outcome (PSO's):

After completing this course, students will be able to:

PSO 1-Gain complete knowledge about fungi, bacteria & viruses, algae, bryophytes & Pteridophytes& their identification methods

PSO2- To gain knowledge about plant taxonomy its various branches

PSO3- To get knowledge about different molecular techniques & instrumentation

Course Outcome (CO's)

Semester I

HCT 1.1 Biology & Diversity of Fungi, Bacteria, Viruses & Lichens

After completing this course, students will be able to:

CO 1- Understand types & economic importance of fungi, bacteria

CO 2- Understand the various types of viruses

CO 3- Understand life cycles & methods of identification of different fungi, bacteria

Course Outcome (CO's)

Semester I

HCT 1.2 Biology & Diversity of Algae, Bryophytes & Pteridophytes

After completing this course, students will be able to:

CO 1- Understand types , classification systems of algae, bryophytes & pteridophytes

CO 2- Understand identification & preservation methods of algae, bryophytes & pteridophytes

CO 3- Understand economic importance of algae, bryophytes & pteridophytes

Course Outcome (CO's)

HCT 1.3 Plant Ecology

After completing this course, students will be able to:

CO 1- Understand plant ecology & terms in plant ecology

CO 2- Understand importance of plant ecology & types of pyramids

CO 3-Understand factors affecting ecology

Course Outcome (CO's)

SCT 1.1. Taxonomy of Angiosperms

After completing this course, students will be able to:

CO 1- Understand different terms in taxonomy with different branches of taxonomy

CO 2- Understand methods of classification of plant

CO 3- Understand methods of identification of plants

CO 4-. Understand methods of preservation in plants

Course Outcome (CO's)

Semester II

HCT 2.1 Biology & Diversity of Gymnosperms & paleobotany

- CO 1- Understand characters of gymnosperms
- CO 2- Understand classification, identification & economic importance of gymnosperms
- CO 3-. Understand anatomy & morphology of gymnosperms with fossile genera

HCT 2.2 Tools & Techniques in botany

After completing this course, students will be able to:

- CO 1- Understand different terms related to instrumentation
- CO 2- Understand role of chemicals & instruments
- CO 3-. Understand principle, technique & working of biotechnological instruments

HCT 2.3 Cell & Molecular Biology

After completing this course, students will be able to:

- CO 1- Understand internal organization of cell
- CO 2- Understand terms in molecular biology
- CO 3- Understand techniques of isolation of cell organelles
- CO 4-. Understand functions of cell organelles

Course Outcome (CO's)

OET 2.1 Advances in plant pathology

After completing this course, students will be able to:

- CO 1- Understand disease casing agents in plants
- CO 2- Understand symptoms of diseases
- CO 3- Understand preventive measures of diseases
- CO 4-. Understand types of nutrients of growth of plant

HCT 1.1, HCT 1.2, HCT1.3, SCT1.1

M. Sc. I Practical

- CO 1- Understand Techniques of identification of fungi, bacteria, viruses, gymnosperms & fossil
- CO 2- Understand Techniques of identification of algae, bryophytes, Pteridophytes
- CO 3- Understand Techniques of identification of plant families with preservation techniques
- CO 4- Study the various types of soil & water testing methods
- CO 5- Study the various types of biotechnological methods & instrumentation

Part II sem III

Semester III

HCT 3.1 Plant Embryology & Palynology

After completing this course, students will be able to:

- CO 1- Understand terms in plant embryology & process of embryo formation
- CO 2- Understand technique of apomixes, types of pollens
- CO 3- Understand types & advantages of polyembryony
- CO 4- Understand process of micro & megasporogenesis

HCT 3.2 Cytogenetics & Crop improvement

After completing this course, students will be able to:

- CO 1- Understand techniques in cytogenetics
- CO 2- Understand role of different enzymes in molecular biology
- CO 3- Understand genetics terms & genetic engineering
- CO 4- Understand method of somatic embryogenesis
- CO 5- Understand tools in bioinformatics

SCT 3.1 Advances in plant metabolism & Biochemistry

After completing this course, students will be able to:

- CO 1- Understand about plant metabolism
- CO 2- Understand biochemical terms
- CO 3- Understand cycles in plant biochemistry their roles in plant development
- CO 4- Understand biosynthetic pathways

OET 3.1 Plant growth & development

After completing this course, students will be able to:

- CO 1- Understand process of plant growth
- CO 2- Understand methods of preservation of fruits & vegetables
- CO 3- Understand role of plant growth regulators
- CO 4- Understand use of Biofertilizer & its benefits on crop improvement

HCT 3.1, HCT 3.2, HCT3.3, OCT 3.1

M. Sc. II Practical

- CO 1- Understand Techniques of identification of fertile pollens
- CO 2- Understand Techniques of identification of pollen morphotypes
- CO 3- Understand Techniques of pollen germination
- CO 4- Study the various apomictic plants & polyembryonic plants
- CO 5 – Understand method of Karyotype analysis
- CO 6 – Understand gel electrophoresis technique
- CO 7 – Understand biotechnological instruments & methods of gene transfer
- CO8- Understand methods of production of genetically modified plants

CO9-Understand effect of different growth regulators on plant growth
CO10-understand effect of different herbicides

Semester IV

HCT 4.1 Phytogeography & conservation biology

After completing this course, students will be able to:

- CO 1- Understand phytogeographical regions of India
- CO 2- Understand RET plants, types of vegetation
- CO 3-. Understand methods of conservation of plants
- CO5- Understand importance of biodiversity & its role

HCT 4.2 Plant tissue culture, green house technology & hydroponics

After completing this course, students will be able to:

- CO 1- Understand different terms in plant tissue culture
- CO 2- Understand methods of sterilization
- CO 3- Understand different media composition & inoculation techniques
- CO 4-. Understand types of green houses its role
- CO5- Understand process of hydroponics, media used & applications

SCT 4.1 Environmental plant physiology

After completing this course, students will be able to:

- CO 1- Understand role of environmental conditions on plant physiology
- CO 2- Understand process of plant growth
- CO 3- Understand different physiological cycles
- CO 4-. Understand applications of plant physiology

Semester IV

OET 4.1 Crop Physiology

After completing this course, students will be able to:

- CO 1- Understand growth curve
- CO 2- Understand physiology of plant
- CO 3- Understand different physiological cycles
- CO 4-. Understand use of Biofertilizer, applications of herbicides on plant growth

Name of Department: Zoology

Name of Programme: M.Sc Zoology

Program Outcomes (PO's)

After completing M.Sc. Zoology programme, students will be able to:

PO1: Understand the fundamental principles, the properties and Concepts of Zoological terms

PO2: Adapt to critically read, analyze and critique current literature will be developed in required core course

PO3: Classify the biological, chemical, and physical feature of environments. And explained how animals' function and interact with respect to all above subject processes in nature

PO4: Understood and describe the applied biological science or economic zoology for their career opportunities

PO5: Use scientific literacy and knowledge of zoology to analyse contemporary social, cultural and environmental issues and contribute to informed option.

PO6: Develop the technical skill in biochemistry, biotechnology, bioinformatics and biostatistics.

PO7: Empowering the students to do independent research of high calibre

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn about the technical skill uses of various branches of zoology

PSO2: Gather attention about the zoological aspects of genetics, evolution, principles of biochemistry, endocrinology, developmental biology, ecology, molecular biology and microbiology in cellular level, etc.

PSO3: Gain complete knowledge about all concept of zoology

Course Outcomes (CO's)

Part I Semester-I

HCT1.1 Biosystematics

After completing this course students will be able to:

CO1: Develop understanding on the diversity of life with regard to protists, non-chordates and chordates.

CO2: Develop critical understanding how animals changed from a primitive cell to a collection of simple cells to form a complex body plan.

CO3: Understand how morphological change due to change in environment helps drive evolution over a long period of time.

CO4: Examine the diversity and evolutionary history of a taxon through the construction of a basic phylogenetic/ cladistics tree.

Course Outcomes (CO's)

Part I Semester-I

HCT 1.2 Tools and techniques in Biology

After completing this course students will be able to:

CO1: Understand the purpose of the technique, its proper use and possible modifications/ improvement.

CO2: Learn the maintenance laboratory equipment's/ tools, safety hazards and precautions.

CO3: Understand the technique of cell and tissue culture. Learn the preparation of solution of given percentage and molarity.

CO4: Construct the experimental setups

CO5: Understand the process of preparation of buffer. Learn the techniques of separation of amino acids, proteins and nucleic acids.

Course Outcomes (CO's)

Part I Semester-I

HCT 1.3 Cell and Molecular Biology

After completing this course students will be able to:

CO1: Acquire the detailed knowledge of different pathways related to cell signalling and apoptosis thus enabling them to understand the anomalies in cancer

CO2: Develop an understanding how cells work in healthy and diseased states and to give a 'health forecast' by analyzing the genetic database and cell information

CO3: Apply their knowledge in problem solving and future course of their career development in higher education and research.

CO4: Get new avenues of joining research in related areas such as therapeutic strategies or related opportunities in industry.

Course Outcomes (CO's)

Part I Semester-I

SCT 1.1 Population Genetics and Evolution

After completing this course students will be able to:

CO1: Acquire an in-depth knowledge on the diversity and relationships in animal world.

CO2: Develop a holistic appreciation on the phylogeny and adaptations in animals.

CO3: Develop an interest in the debates and discussion taking place in the field of evolutionary biology. Understand the uses and limitations of phylogenetic trees.

CO4: Appreciate the complexities and difficulties of various species concepts

Course Outcomes (CO's)

Part I Semester-I

Practical's: HCP1.1 Biosystematics,

After completing this course students will be able to:

CO1: Classification of the invertebrates.

CO2: Classify vertebrates specimens.

CO3: Classification of Phylogenetic tree

CO4: Calculation diversity indices to zooplankton

HCP 1.2 Tools and techniques in Biology

CO1: Study of different laboratory equipments

CO2: Know the principle and handling of different laboratory equipment's such as, PCR, electrophoresis, Colorimeter, etc.

CO3: Understand the isolation and estimation technique in cellular level

CO4: Study of different laboratory equipments

HCP 1.3 Cell and Molecular Biology,

- CO:1 Demonstration of collagen in Liver section
- CO:2 Metaphasic chromosome preparation of mitosis
- CO3: Construct the phylogenetic trees based on DNA and RNA nucleotide sequence

SCP 1.1 Population Genetics and Evolution

- CO: 1 Isolation influenced examples identification with pictures.
- CO: 2 Evolution influenced examples identification with pictures.
- CO: 3 Estimation of genes & genotypic frequencies in light of Hardy Weinberg law.
- CO: 4 Construction of Phylogenetic trees based on DNA and RNA.
- CO: 5 Prezygotic Isolation in some Sp. of Drosophila.
- CO4: Develop and design the zoogeographical distribution map

Course Outcomes (CO's)

Part I Semester-II

HCT2.1 Developmental Biology

After completing this course students will be able to:

- CO1: Understand how developmental processes and gene functions within a particular tissue or organism can provide insight into functions of other tissues and organisms.
- CO2: Examine the evolutionary history of the taxa based on developmental affinities.
- CO3: Realize that very similar mechanisms are used in very diverse organisms; and development is controlled through molecular changes resulting in variation in the expression and function of gene networks.
- CO4: Understand the relevance of developmental biology in medicine or its role in development of diseases.

Course Outcomes (CO's)

Part I Semester-II

HCT2.2 General and Comparative endocrinology

After completing this course students will be able to:

- CO1: Understand neurohormones and Mechanism.
- CO3: Understand about different endocrine glands and their disorders.
- CO4: Understand the mechanism of hormone action.

Course Outcomes (CO's)

Part I Semester-II

SCT2.1 Environmental Physiology

After completing this course students will be able to:

CO1: Realize that very similar physiological mechanisms are used in very diverse organisms.

CO2: Understand what makes the scientific study of animal ecology a crucial and exciting endeavour.

CO3: Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.

CO4: Solve the environmental problems involving interaction of humans and natural systems at local or global level.

Course Outcomes (CO's)
Part I Semester-II
OET 2.1 Computational Biology

After completing this course students will be able to:

CO1: Able to construct data statistical way

CO2: Analyse the data statistically and interpreted the results.

CO3: Design research work by using key words.

CO4: Formulate Tests and simple hypothesis

Course Outcomes (CO's)
Part I Semester-II
Practical's: HCP2.1 Developmental Biology

After completing this course students will be able to:

CO1: Understand developmental stages of chick embryo.

CO2: Study different types of cleavage

CO3: Study different types of metamorphosis

.HCT2.2 General and Comparative endocrinology,

CO2: Study different endocrine glands of vertebrates and invertebrate.

CO3: Study staining techniques

SCT2.1 Environmental Physiology,

CO3: Study and estimate physiological effects on other animals.

OET 2.1 Computational Biology

CO4: Constructing new design by using different statistical tools.

CO5: Collect of different effects data and assemble it.

Course Outcomes (CO's)
Part II Semester-III

HCT -3.1 Molecular Cytogenetics

After completing this course students will be able to:

CO1: Understand how DNA encodes genetic information and the function of mRNA

CO2: Understand the cause and effect of alterations in chromosome number and structure.

CO3: Apply the principles of Mendelian inheritance.

CO4: Discuss and analyse the epigenetic modifications and imprinting.

Course Outcomes (CO's)

Part II Semester-III

HCT 3.2 Biochemistry

After completing this course students will be able to:

CO1: Understand complete knowledge about structure and function of different biomolecules found in living cells.

CO2: Understand pathways, regulation and importance of metabolic pathways

CO3: Describe the knowledge of enzyme, its function, and regulation.

CO4: Understand of biochemistry with respect to pathology, clinical and pharmacology.

Course Outcomes (CO's)

Part II Semester-III

SCT 3.1 Comparative Animal Physiology's

After completing this course students will be able to:

CO1: Understand the mechanism and regulation of breathing, oxygen consumption and determination of respiratory quotient.

CO2: Understand the process of different physiological process like digestion and excretion, etc.

CO3: Learn the determination of haemoglobin content, blood groups and blood pressure.

CO4: Understand the physiology at cellular and system levels.

Course Outcomes (CO's)

Part II Semester-III

OET 3.1 Wild life and Conservation Biology

After completing this course students will be able to:

CO1: Develop the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues

CO2: Develop the ability to work collaboratively on team-based projects

CO3: Develop an ability to analyze, present and interpret wildlife conservation management information.

CO4: Develop an understanding of how animals interact with each other and their natural environment.

Course Outcomes (CO's)

Part II Semester-III

Practical's: HCT -3.1 Molecular Cytogenetics, HCT 3.2 Biochemistry, SCT 3.1 Comparative Animal Physiology's 3.1 Wild life and Conservation Biology

After completing this course students will be able to:

CO1: Understanding Molecular concept students Collect and analysis of genetical disease data

CO2: Estimate biomolecules by using separation, preparation, colorimetric method

CO3: Learn the determination of Haematological analysis like, haemoglobin content, blood groups and blood pressure, BMI

CO4: Ability to analyze, present and interpret wildlife conservation management information.

Course Outcomes (CO's)

Part II Semester-VI

HCT4.1 Animal Biotechnology

After completing this course students will be able to:

CO1: Develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning.

CO2: Develop future course of their career development in higher education and research with a sound base.

CO3: Apply their knowledge with problem solving approach to recommend strategies of genetic engineering for possible applications in Biotechnology and allied industry.

Course Outcomes (CO's)

Part II Semester-VI

HCT4.2 Applied Zoology

After completing this course students will be able to:

CO1: This course will provide students with recent knowledge of Immunology.

CO2: At the end of the course, successful students able to understand and explain the concepts of innate and adaptive immune response and techniques for clinical diagnosis including immunotechnology, applications and limitations.

CO3: Students were able to apply learned knowledge to their future research

Course Outcomes (CO's)

Part II Semester-VI

HCT-4.3 Environmental biology and toxicology

After completing this course students will be able to:

CO1: Analyze microbiology of waste water and its implications

CO2: Understand different causes of environmental pollution and their remedies

CO3: Evaluate the implications of international legislations, policies for environmental protection

Course Outcomes (CO's)

Part II Semester-VI

SCT4.1 Zoo keeping and Animal house management

After completing this course students will be able to:

CO1: Understand Animal behaviour in captivity learn Zoo architecture

CO2: Understand different managements strategies of zoo keeping

CO3: Analyze basic Structure and function of ecosystem

CO4: Study animal care and ethics.

CO5: Educate and awareness on biodiversity

Course Outcomes (CO's)

Part II Semester-VI

Practical's: Project Work

PO

- Develop awareness & knowledge of different organization requirement and subject knowledge through varied subjects and training methodology in students.
- To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians, industry leaders and policy.
- To provide an intensive and in-depth learning to the students in field of microbiology.
- Beyond simulating, learning, understanding the techniques, the course also addresses the underlying recurring problems of disciplines in today scientific and changing business world.
- To develop awareness & knowledge of different organization requirement and subject knowledge through varied subjects and training methodology in students.
- To train the students to take up wide variety of roles like researchers, scientists, consultants, entrepreneurs, academicians, industry leaders and policy.

PROGRAMME SPECIFIC OUTCOME

M.Sc. (Microbiology)

On completion of M.Sc. (Microbiology), students are able to:

- ❖ Instill the intellectual skills to analyze the molecules using advance biophysical techniques such as HPLC, GC, AAS, and PCR etc.
- ❖ Perform the quantitative/ qualitative analysis of Biomolecules and understand various biochemical pathways
- ❖ Acquire knowledge and understanding the concepts of Microbial genetics, Molecular biology, Immunology, Enzymology.
- ❖ Explore the scientific literature effectively and use computational tools such as bio-statistical and bioinformatics
- ❖ Role of microorganisms in eco system and impact created by microbes in agricultural development.

- ❖ Implement the knowledge in industry with regard to scale up, production, scale down and quality control of the various microbial products
- ❖ Conduct the basic research related to industry-environmental issues and use of agricultural for sustainable products
- ❖ Students will communicate scientific concepts, experimental results and Analytical arguments clearly and concisely, both verbally and in writing.
- ❖ Relationship between human disease and microorganisms, pathogenicity, laboratory diagnosis and treatment method.
- ❖ basic knowledge about the microorganisms, Microbial Physiology.

HCT 1.1: Cytology and Taxonomy of Microorganisms

After completing this course students will be able to:

CO1: Define algae, Protozoa, mycorrhiza, Fungi, Lichens, Actinomycetes, Cyanobacteria, Numerical taxonomy, Chemotaxonomy.

CO2: Classify algae, Protozoa, mycorrhiza, Fungi, Lichens, Actinomycetes, Cyanobacteria, Numerical taxonomy, Chemotaxonomy.

CO3: Decide the use Bergey's manual of determinative bacteriology and systemic bacteriology.

CO4: Analyze the general characters for the purpose of their application for human right.

CO: Compare different classes of microorganisms.

CO5: Construct the phylogenetic tree.

HCT 1.2: Microbial chemistry, physiology and enzymology

After completing this course students will be able to:

CO1: Define osmosis, reverse osmosis, coenzyme, prosthetic group, cofactor, activation energy, reversible and irreversible inhibition.

CO2: Classify amino acids, proteins, lipids, vitamins, carbohydrates.

CO3: Construct Ramchandran plot, M-M equation, Lineweaver- Burk, Eadie- Hofstee, Hanes and Eisenthal and Cornish-Bowden equation.

CO4: Analyze the drug metabolism and detoxification, Factors enhancing the catalytic efficiency, and Catalytic mechanism in chemistry.

CO5: Compare different Chymotrypsin, Lysozyme and Isomerase, Alkanes and alkenes – alpha, beta, and omega oxidation pathway, Aromatic hydrocarbons degradation pathway.

CO6: Evaluate Significance of microbial hormones and mechanism of oxygen toxicity and Hypothesize MWC and KNF models in enzymes.

HCT – 1.3: Recent trends in virology

After completing this course students will be able to:

CO1: Describe various sites for egg inoculation techniques.

CO2: Understand the process isolation of coliphages from sewage and will be able describe the method of titration of phages.

CO3: Apply hemagglutination and ELISA for purification of viruses.

CO4: Correlate the phage typing and identification of bacterial phages.

CO5: Evaluate the plaque, end point assays, and infectivity assays of plant viruses.

CO6: Design the one step growth curve experiment.

SCT 1.1 ResearchMethodologyandScientificWriting

After completing this course students will be able to:

CO1: Describe and define empirical science, theory, law, inductive and deductive reasoning and hypothesis.

CO2: Compare and contrast between different types of scientific literature.

CO3: Choose the search engines for searching scientific literature.

CO4: Analyze research articles and scientific literature.

CO5: Decide how to communicate the scientific research through oral and poster presentation also will be able to publish original research.

CO6: Hypothesize research problem and find the solution.

HCP1.1: Cytology and Taxonomy of Microorganisms

After completing this course students will be able to:

- CO1: Identify and observe algae, Protozoa, mycorrhiza, Fungi, Lichens, etc.
- CO2: Compare behavior of microorganism with respect to magnetic and electric field.
- CO3: Prepare bacterial and yeast protoplast.
- CO4: Analyze different chromatographic techniques.
- CO5: Discriminate lysozyme from egg white, single cell and single spore and ascospore.

HCP – 1.2: Microbial Chemistry, physiology and Enzymology

After completing this course students will be able to:

- CO1: Describes the buffers with different pH.
- CO2: Estimate the concentration of carbohydrates, proteins, lipids, RNA and DNA.
- CO3: Determine K_m , V_{max} , optimum pH, optimum temperature, effect of metal ions and immobilization on amylase activity.
- CO4: Explain the isolation procedure and partially purify the amylase enzyme, estimate the enzyme activity.
- CO5: Evaluate the levels of lactate dehydrogenase, alkaline phosphatase in serum; and also cellulase and pectinase activity.

HCP – 1.3: Recent trends in virology

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- CO1: Describe various sites for egg inoculation techniques.
- CO2: Understand the process isolation of coliphages from sewage and will be able describe the method of titration of phages.
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- CO6: Design the one step growth curve experiment.

SCP 1.1 ResearchMethodologyandScientificWriting

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- CO1: Describe and define empirical science, theory, law, inductive and deductive reasoning and hypothesis.
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- CO3: Choose the search engines for searching scientific literature.
- CO4: Analyze research articles and scientific literature.
- CO5: Decide how to communicate the scientific research through oral and poster presentation also will be able to publish original research.
- CO6: Hypothesize research problem and find the solution.

COURSE NUMBER (PAPER NUMBER) : HCT – 2.1

TITLE OF COURSE (NAME OF PAPER) : HCT 2.1: Microbial Genetics

After completing this course students will be able to:

- CO1: define and describe structure, characteristic and forms of DNA.
- CO2: Understand how replication, modification, mutation damage and repair of DNA happen
- CO3: Apply theoretical knowledge of gene transfer transposons and plasmid in practical manner when asked to do so.
- CO4: analyze molecular aspects of gene expression and regulation and how genomics used for analysis purpose.
- CO5: debate various microbial genetic terminologies present in the theory syllabus.
- CO6: simulate phage genetics learned terms.

COURSE NUMBER (PAPER NUMBER) : HCT – 2.2

TITLE OF COURSE (NAME OF PAPER) : HCT 2.2 Microbial ecology and diversity

After completing this course students will be able to:

- CO1: define and describe microbial ecology, microbial diversity, anoxygenic and Oxygenic photosynthesis.
- CO2: Understand what is Bioluminescence and nitrogen fixation, Microbial fossils and uncultured Organism.
- CO3: Apply theoretical knowledge of gained during learning process to better understand Microbial interaction on planet earth.
- CO4: Distinguish extremophiles from the other microorganism and their role in microbial ecology.
- CO5: debate on microbial ecology and diversity
- CO6: justify various terminologies related to microbial ecology and diversity.

COURSE NUMBER (PAPER NUMBER) : SCT – 2.2

TITLE OF COURSE (NAME OF PAPER) : Medical Microbiology

After completing this course students will be able to:

- CO1: define and describe virulence and epidemiology.
- CO2: Understand how disease pathogenesis, control, transmission prevention.
- CO3: Apply methods learned regarding clinical microbiology.
- CO4: explain chemotherapy and animal tissue culture and their application.
- CO5: defend terms learned during course effectively.
- CO6: able to compile disease information effectively to good use.

COURSE NUMBER (PAPER NUMBER) : OET – 2.1

TITLE OF COURSE (NAME OF PAPER) : OET2.1: Bioinformatics & Biostatistics

After completing this course students will be able to:

CO1: define and describe Bioinformatics. Recall databases related to bioinformatics.

CO2: Describe taxonomy and phylogeny.

CO3: collect and employ genome sequence in various bioinformatics databases available on the world wide web.

CO4: compare genomic and proteomic sequence available with students on various databases for analytical purpose.

CO5: evaluate genomic and proteomics sequences after running query in databases like NCBI, DDBJ, SWISSPROT for similarities , dissimilarities etc.

CO6: simulate protein models available in database in 3D using RasMol and PDB databank.

COURSE NUMBER (PAPER NUMBER): HCP– 2.1

TITLE OF COURSE (NAME OF PAPER): HCP 2.1: Microbial Genetics

After completing this course students will be able to:

CO1: observe and isolate DNA from bacteria and yeasts.

CO2: experiment with chemical mutagens to observe antibiotic resistance.

CO3: test transformation, transfection, conjugation, transduction, protoplast fusion in Bacteria

CO4: Validate various results obtained through experiments.

CO5: test purification of genetic material obtained through isolation procedures.

CO6: report and validate outcomes of experiment performed during the course.

COURSE NUMBER (PAPER NUMBER) : HCP – 2.2

TITLE OF COURSE (NAME OF PAPER) : HCP 2.2 Microbial ecology and diversity

After completing this course students will be able to:

CO1: identify microorganisms based on kind of roles they performed in ecology.

CO2: discover novel characteristic present in microorganism for benefits to humans.

CO3: employ learned cultivation technique for isolation as well as enrichment of microorganisms effectively.

CO4: explain complex phenomenon like bioluminescence, methane production with the help of experiment conducted during the course.

CO5: find errors in the methodology obtained by them while performing experiment.

CO6: Integrate skills acquired during practical course to welcome better outcome.

COURSE NUMBER (PAPER NUMBER) : SCP – 2.2

TITLE OF COURSE (NAME OF PAPER) : SCP 2.2 Medical Microbiology

After completing this course students will be able to:

CO1: identify pathogens susceptible to various generations of antibiotics.

CO2: Understand various antibiotic sensitivity test like kirby Baur-method, diffusion method through experimental demonstration.

CO3: Determine MIC (minimum inhibitory concentration) by tube, disc and plate method

CO4: deduce how antibiotic resistance shown at different concentration by different pathogenic organism.

CO5: compare MIC, MIB, Kirby-Bour, diffusion method used to judge response of pathogen to available antibiotic.

CO6: compile the data after performing various experiments to make appropriate conclusions.

COURSE NUMBER (PAPER NUMBER) : OEP – 2.1

TITLE OF COURSE (NAME OF PAPER) : OEP 2.1 Bioinformatics and Statistics

After completing this course students will be able to:

CO1: examine biological data by running a query or database search using bioinformatics tools

Like BLAST, FASTA, Clustal Omega.

CO2: Describe how scientific search performed using Boolean operators on Pub Med /Medline/Pub Med Central for biological information

CO3: employ bioinformatics tool available in databases for various task like alignment purpose, Visualizing protein molecules in 3D mode etc..

CO4: connect results obtained using one informatics tool to other informatics tool to obtain more Clarity regarding a specific query (BLAST results further used in Clustal W)

CO5: Assess feasibility of available informatics tool like Clustal W, RasMol etc...

CO6: compile data using MS-Excel at same time processing the data using statistical formula Like mean mode median.

COURSE OUTCOME

M.Sc. II Sem III

HCT 3.1 Molecular Biology and Genetic Engineering.

CO1 Summarize different techniques like blotting, DNA sequencing, PCR, etc.

CO2 Describe the cell cycle, cancer, cancer markers, mechanism behind cancer, apoptosis as well as treatment of cancer.

CO3 Explain protein and metabolic engineering.

CO4 Designing the tools and vectors required for genetic engineering as well as construction of rDNA.

CO5 Compare the Insertion methods of rDNA like Transformation, transfection, electroporation, lipofection, microinjection, protoplast fusion, biolistic transformation and gene gun.

CO6 Analyze the screening techniques of rDNA like colony hybridization, phage plaque assay, blue-white screening, immuno screening, direct and indirect screening.

CO7 Establish the genetic engineering techniques in agriculture, industries, human health and in pollution control.

COURSE OUTCOME

HCT 3.2: Bioprocess Technology and Fermentation Technology

CO1: Recall bioreactor design and monitor its different process variables.

CO2: Discuss downstream process like Centrifugation, Filtration, Precipitation, Solvent extraction, Chromatography, Ultra Filtration, Crystallization, and whole broth processing for different products.

CO3: Modify the growth of microorganism by improving the strain for enhance product fermentation.

CO4: Explain and analyze biosafety, bioethics and IPR.

CO5: Validate different quality control tests like assay testing, sterility testing, pyrogenicity testing, toxicity and allergy, carcinogenicity testing for various products.

CO6: Adapt and design guidelines for microbiological practices and quality assurance test.

COURSE OUTCOME

SCT3.3A : Immunology and Immunotechnology

CO1: Define the innate and acquired immunity.

CO2: Describe immune response for different infectious diseases.

CO3: Explain major histocompatibility complex.

CO4: Classify and differentiate primary and secondary immunodeficiency disorders.

CO5: Summarize transplantation immunology.

CO6: Generalize the different immunological techniques like agglutination, ELISA, RIA et

COURSE OUTCOME

OEP 3.1 Environment and Waste management.

CO1: Define environment, ecosystem and eutrofication.

CO2: Examine the different characterization of industrial waste.

CO3: Discuss the hazardous waste management.

CO4: Plan and explain different novel methods of pollution control.

CO5: Measure the EIA, EA, water tracing method etc.

CO6: Explain global warming, acid rain and its significance.

PRACTICAL OUTCOME

HCP 3.1 Molecular Biology and Genetic Engineering

- CO1: Differentiate conjugation, transformation, transduction.
- CO2: Assemble agarose gel electrophoresis, SDS PAGE , formaldehyde gel electrophoresis and blotting techniques.
- CO3: Analyze the RFLP, RAPD technique for selectable markers.
- CO4: Select specific PCR amplification technique as per requirement (Real time PCR, Reverse transcriptase PCR, Normal PCR)

PRACTICAL OUTCOME

HCP 3.2: Bioprocess Technology and Fermentation Technology

- CO1: Examine the effect of different antibiotics by different assay method.
- CO2: Discuss different fermentation and production.
- CO3: Calculate the MIC and LD 50 of different antibiotics.
- CO4: Analyze sterility testing using microorganism.
- CO5: Design procedure for treating bacterial cell with phenol and Cetrimide.

PRACTICAL OUTCOME

SCP 303 A: Immunology and Immunotechnology

- CO1: Understand and explain rocket electrophoresis, immunoelectrophoresis of given sample.
- CO2 :Test the given sample for presence of antigen by ELISA and latex agglutination test.
- CO3 :Calculate the phagocytic index.
- CO4 :Test the given blood smear sample for identification of leucocytes by Giemsa / Leishman's method.
- CO5 :Analyze different clinical samples by using commercial kits e.g pregnancy kit.
- CO6 :Test the quantitative precipitation assay and western blotting.

PRACTICAL OUTCOME

OEP 3.1: Environment and Waste management

- CO1: Estimate the total solid, total dissolved solid, total suspended solid of given sewage sample.
- CO2: Estimate the BOD, COD of different effluent.
- CO3: Record the bacterial reduction of nitrate from ground water.
- CO4: Tests for the microbial degradation products of aromatic compounds.
- CO5: Select the proper microbial consortium for solid waste treatment.

M.Sc. II Sem IV

HCT 4.1 Pharmaceutical microbiology

- CO1 Summarize different Good Manufacturing Practices (GMP) and Good Laboratory Practices (GLP) in pharmaceutical industry
- CO2 Describe the Microbial contamination and spoilage of pharmaceutical products
- CO3 Explain Molecular Principles of drug targeting, Drug delivery system in gene therapy
- CO4 Apply knowledge for Designing of Microbiology laboratory in industry, New vaccine technology, and Vaccine clinical trials.
- CO5 Compare different types of vaccines and their production ways.
- CO6 Analyze the action of antimicrobial agents and their application and mechanism of resistance development
- CO7 Establish the genetic engineering techniques in agriculture, industries, human health and in pollution control.

HCT 4.2 Food and Dairy Microbiology

After completing this course students will be able to:

- CO 1- define and memorize food properties, food spoilage and methods of food preservation
- CO 2- understand and compare different fermented food products and their applications.
- CO 3- Study about milk borne diseases and antimicrobial systems in milk.
- CO 4- analyze and correlate various pasteurization methods.
- CO 5- learn about food adulteration, chemical and microbiological examination of milk. Sanitation and regulation in food and dairy industry.

HCT4.3 Principles of Bioinstrumentation and Techniques

After completing this course students will be able to:

- CO 1: -Students will be able to recall the introduction to Electrochemistry pH and Buffers Potentiometric and Conductometric titration
- CO 2: - Discuss the concept of spectroscopy
- CO 3: - Differentiate the various characters of blotting techniques
- CO 4: - Explain the types of electron microscopes
- CO 5: -Express the biophysical methods for analyzing the biopolymer structure
- CO 6: -Write Electrophoresis, Principle, and application of Native, SDS Agarose, and 2D gel Electrophoresis.

SCT4.1B Recombinant DNA Technology

- CO1: List the different enzymes used in recombination.
- CO2: Explain the different gene cloning vectors and its expression.
- CO3: Compute the different methods to construct genomic and cDNA libraries.
- CO4: Write the different screening method for protein expression.
- CO5: Differentiate the different types of PCR.
- CO6: Choose the different tools and techniques involved in genetic engineering.

Practical
HCP 4.1. Pharmaceutical Microbiology

CO1. determine MIC, LD₅₀ of antibiotics, D value, Z value for heat sterilization in pharmaceuticals
CO2 Explain Sampling of pharmaceuticals for microbial contamination and load
CO3. perform Sterility testing by Bacillus stearothermophilus
CO4. Analyze different Spectrophotometric/Microbiological methods for the determination of Griseofulvin.
CO5. Design Bioassay method for determination of antibiotic yield .
CO6. Create methods for determination of leaky substances of bacterial cell.

HCP 4.2 Food and dairy Microbiology

After completing this course students will be able to:

CO 1. understand different methods of physical and chemical analysis of milk.
CO 2. study to examine milk by different platform test for grading of milk
CO 3. examine various food materials for adulteration
CO 4. learn detection of aflatoxin.

HCP 4.3: on HCT 4.3. Bioinstrumentation: Techniques and Applications
Practical

After completing this course students will be able to:

CO 1: -Observe the chromatographic Separation of amino acids, sugars, dyes, and plant materials using paper by various Chromatographic techniques
CO 2: -Estimate proteins and nucleic acids by gel electrophoresis
CO 3: - Determine the molecule characters UV – visible spectrophotometry & atomic absorption spectroscopy
CO 4: -Analyse the polysaccharide and glycoprotein, lipoproteins by electrophoresis.
CO 5:- Estimate the sample by Immunochemical techniques Immunodiffusion, immunoelectrophoretic, radioimmunoassay,
CO 6: - Prepare the sample for Beer and Lambert's laws, extinction coefficient, and molar extinction coefficient.

SCP 4.1B: Recombinant DNA Technology

CO1: Assemble the Agarose gel electrophoresis.
CO2: Perform the isolation of RNA and DNA by different techniques like blotting, restriction digestion, etc.
CO3: Test the amplification of DNA by PCR.
CO4: Analyze different methods for selection of recombinant DNA.
CO5: Summarize different recombinant techniques like RFLP, restriction digestion, DNA cloning, etc.
CO6: Test and adapt different methods like Sanger and other for DNA sequencing

Name of Department: Mathematics

Name of Programme: M. Sc Mathematics

Program Outcomes (PO's)

After completion of M. Sc. Mathematics programme, students will be able to:

PO1: describe different algebraic structures, various topologies, normed linear spaces, integrable functions, various types of graphs.

PO2: discuss theoretical aspects of algebraic structures, methods to solve ordinary and partial differential equations, estimate singularities and solutions of integral equations.

PO3: describe Lagrangian and Hamiltonian for numerous systems, computational aspects of number theory, types of surfaces, methods to find approximate solutions of functions.

PO4: apply theorems of group theory to finite groups, apply techniques to solve congruence relations, determine measurability of sets and functions, calculate extremal for different cases.

PO5: develop abstract thinking, logical approach and analytical perspective for different areas of Mathematics.

PO6: categorize different types of spaces in functional analysis, compare numerical methods to solve the problems.

PO7: devise logical framework and abstract approach required for proving the results in Mathematics

PO8: evaluate solutions for congruence relations, evaluate solutions of ordinary and partial differential equations, solutions to integral equations and curvatures for different surfaces.

PO9: create and design new problems based on the content.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: apply abstract approach, logical thinking, analytical and computational techniques learned from various papers in the course to the problems/results.

PSO2: estimate solutions to problems from applied Mathematics and analyze the solutions.

PSO3: gain in-depth knowledge about different branches of Mathematics.

Course Outcomes (CO's)

Semester-I

HCT 1.1 Algebra-I

After completion of this course, students will be able to

CO1: Identify normal, subnormal, composition and principal series.

CO2: Classify nilpotent and solvable groups.

CO3: Deduce class equation for various finite groups.

- CO4: Conclude why and how some groups are simple using Sylow's theorem.
 CO5: Distinguish between ED, PID and UFD.
 CO6: Apply Eisenstein's criteria to decide irreducibility of polynomials.

HCT – 1.2 Real Analysis – I

After Completion of this course, students will be able to

- CO – 1: Define Riemann Integrability of functions, Directional Derivatives, Continuity, Total Derivatives and Jacobi Matrix.
 CO – 2: Express the Total derivative in terms of Partial derivatives.
 CO – 3: Calculate Integrability of bounded functions by using Darboux's theorem, Conditions of integrability and Integral as limit of sums, calculates the Taylor's formula for functions from \mathbf{R}_n to \mathbf{R}_1 and also calculates extrema of real valued functions of one variable.
 CO – 4: Compare the difference between Directional derivatives and Total derivatives.
 CO – 5: Distinguish the theories of conditions of Integrability of functions.
 CO – 6: Create an examples which are Riemann integrable.

HCT 1.3 Differential Equations

After completion of this course, students will be able to

- CO1: recall methods to solve the ordinary differential equations with constant coefficients.
 CO2: compute dependence and independence of solutions using Wronskian.
 CO3: calculate solutions of ordinary linear differential equations with constant and variable coefficients.
 CO4: classify regular singular points and singular points of the differential equations.
 CO5: estimate Lipschitz constant for given functions.
 CO6: calculate series solutions for the given differential equations.

HCT 1.4 Classical Mechanics

After Completion of this course, students will be able to

- CO1: identify generalized coordinates of the system and degrees of freedom, recall various principles for the physical systems
 CO2: estimate Lagrangian and Hamiltonian for the system
 CO3: describe Routh's procedure, Brachistochrone problem, rigid body motion
 CO4: calculate extremals for the various cases, deduce results for different cases of the physical systems
 CO5: classify conservative and non-conservative systems
 CO6: evaluate solutions to different problems in Classical Mechanics

SCT – 1.1 Number Theory

After Completion of this course, students will be able to

- CO – 1: Define the GCD, Diophantine equations and Congruence.

- CO – 2: Explain the Euclidean algorithm for finding the GCD of integers, Fermat's factorization method, Properties of Congruence and the Theory of Indices.
- CO – 3: Calculate the GCD of an integers, Primitive roots, Order of an integer modulo n, Primitive roots primes.
- CO – 4: Analyze the difference between Linear congruence and Non linear congruence.
- CO – 5: Summarize methods of finding the GCD, methods of solving the Linear congruence and their system and method of solving Non linear congruence.
- CO – 6: Express the methods of finding GCD, solving the Linear congruence, and their system and solving the Non- linear congruence.

HCP 1.1 LaTeX Introduction (Practical)

After the completion of this course, students will be able to

- CO1: list various syntax, input files, steps in process of installation.
- CO2: describe usage of different document classes.
- CO3: develop all types of documents using different packages.
- CO4: construct fractions, equations, integrals using commands.
- CO5: develop various types of documents containing matrices, equations, tables and figures.
- CO6: develop documents with references having different reference styles.

HCP 1.2 LaTeX (Practical)

After the completion of this course, students will be able to

- CO1: recall commands to write equations, tables, matrices, insert figures etc.
- CO2: apply commands to create table of contents, numbering of equations within the section.
- CO3: apply commands to create list of tables, list of figures.
- CO4: develop new commands as per need.
- CO5: develop ability to create index page, to create fancy header and footer.
- CO6: create all types of mathematical documents such as letter, report, articles, books, presentations.

HCT 2.1 Algebra-II

After the completion of this course, students will be able to

- CO1: recall finite extension, algebraic extension, degree of a field extension, splitting field, splitting field.
- CO2: calculate splitting fields for the given polynomials.
- CO3: determine Galois groups for given polynomials.
- CO4: describe which elements are constructible.
- CO5: construct finite fields of given order.
- CO6: classify given extensions in finite extension, algebraic extension, separable extension, normal extension

HCT – 2.2 Real Analysis - II

After Completion of this course, students will be able to

- CO – 1: Define Lebesgue measure, Measurable set, Non measurable set, Convex set.
- CO – 2: Describe Measurable functions and their properties and states Egoroff's theorem
- CO – 3: Apply the Egoroff's theorem and the Fatou's lemma and solves the examples based on these.
- CO – 4: Conclude Differentiation of Monotone functions and functions of bounded variation.
- CO – 5: Evaluate the Lebesgue integral of non negative measurable functions and the differentiation of an integral.
- CO – 6: Generalize absolute continuity of functions.

HCT 2.3 General Topology

After the completion of this course, students will be able to

- CO1: recall definition of limit points, open set, closed set, continuous function, separation spaces.
- CO2: explain why given sets are open, closed, why a point is limit point of the set, how a function between two topological spaces is continuous.
- CO3: establish compactness of given sets.
- CO4: classify topological spaces in $T_0, T_1, T_2, T_3, T_{3\frac{1}{2}}, T_4$ spaces.
- CO5: conclude the reasons why some spaces are separation axiom spaces and not others.
- CO6: analyze interrelations between different separation axiom spaces.

OET – 2.1 Fundamentals In Mathematics

After Completion of this course, students will be able to

- CO – 1: Define Types of Matrices, Determinants, Rank of the Matrix, Vector Spaces, Subspaces, Basis, Dimension, Null Spaces, and Range Spaces.
- CO – 2: Understand the elementary matrix operations and the elementary matrices.
- CO – 3: Construct the Linear Transformations and Matrix representation of Linear Transformation.
- CO – 4: Classify the Linear Dependence and Linear Independence of set.
- CO – 5: Evaluate the problems based on systems of homogeneous and non homogeneous linear equations.
- CO - 6: Create the Matrix representation of Linear Transformation.

HCP 2.1 LaTeX Beamer

After the completion of this course, students will be able to

- CO1: recall commands for different beamer themes.
- CO2: explain use of beamer presentation over power point presentation.
- CO3: employ different syntax to develop presentation in various designs.
- CO4: develop presentations on mathematical contents.
- CO5: apply all available beamer themes for creating presentations.
- CO6: devise own commands to write a question paper.

OEP 2.1 Fundamentals in Mathematics (Practical)

After the completion of this course, students will be able to

- CO1: examine subsets of vector space to be subspaces.
- CO2: differentiate between linearly dependent and linearly independent sets
- CO3: deduce criteria for linear dependence and independence and span of the sets with 2 and 3 elements, apply rank-nullity theorem for finding rank and nullity of the transformation
- CO4: develop tricks to check the sets for spanning sets
- CO5: examine functions for linear transformation, estimate kernel and range of the linear transformation
- CO6: create linearly dependent and independent sets, design linear transformations

Semester-III

HCT 3.1 Functional Analysis

After the completion of this course, students will be able to

- CO1: define Cauchy sequence, complete space, normed linear space, closed set, Banach space.
- CO2: explain why given normed linear spaces are Banach and not others.
- CO3: establish boundedness of linear transformations, apply open mapping theorem for examples.
- CO4: differentiate between Banach and Hilbert space and their consequences.
- CO5: describe normal, unitary and self adjoint operators.
- CO6: apply Banach fixed point theorem to examples.

HCT 3.2 Advanced Discrete Mathematics

After Completion of this course, students will be able to

- CO – 1: Define Lattice, Graph and Tree, Types of Graphs.
- CO – 2: Classify the Types of Graphs.
- CO – 3: Apply the Modular and Distributive Lattice, Bipartite graph in theorems.
- CO – 4: Classify the types of graphs and draw the diagram of posets.
- CO – 5: Evaluate the spanning trees and solve the examples related to principle of inclusion and exclusion
- CO-6: Create spanning from a given tree.

HCT 3.3 Linear Algebra

After the completion of this course, students will be able to

- CO1: recall definitions of linear transformation, linear functional, dual space, annihilating polynomial, annihilator of subspace.
- CO2: describe triangulizability, diagonalizability of linear transformation, why an operator is normal, self-adjoint, unitary.
- CO3: compute rational form, Jordan Canonical form, Companion matrix for a linear transformation.

CO4: establish invariance of subspaces, orthogonality, orthonormality of set of vectors.
CO5: estimate cyclic decomposition of subspaces.
CO6: compare properties of normal operators, unitary operators and interrelations between them.

SCT 3.1 Differential Geometry

After Completion of this course, students will be able to

CO – 1: Define Tangent vector, Tangent vector field, Isometries, Translations, Orthogonal Transformations, Surface and Patch computation.
CO – 2: Explain the reparametrization of the curves, Isometries in E^3 , Differentiable functions and tangent vectors, Shape operator and Normal Curvature.
CO – 3: Calculate the Directional Derivatives, Speed of curves, Frenet formulas for the unit speed and arbitrary speed curves.
CO – 4: Differentiate the methods of finding the Directional Derivatives, Frenet apparatus formulas for the unit speed and arbitrary speed curves.
CO – 5: Summarize the ways of finding the Directional Derivative, Covariant Derivative.
CO – 6: Express the importance of Curvature in determining the Shapes of Surfaces.

OEP – 3.1 Numerical Techniques

After Completion of this course, students will be able to

CO – 1: Define errors, forward difference backward difference and central difference
CO – 2: Explain the methods of finding the roots of equations.
CO—3: Deduce relation between Forward difference, Backward difference and Shift operator.
CO – 4: Apply the Interpolation formulae to interpolate various functions based on a given data.
CO – 5: Evaluate the Integration using Numerical Methods.
CO - 6: Apply Euler's Method and Euler's Modified method to solve ODE of first order

HCT 3.1 SCILAB (Practical)

After the completion of this course, students will be able to

CO1: recall process of installation of the software, recall the syntax to generate matrices, syntax for algebra of matrices.
CO2: locate scilab workspace and working directory.
CO3: explain importance of SCILAB as an interactive calculator.
CO4: calculate addition, subtraction, multiplication, powers of given matrices, rank of the matrices.
CO5: develop scilab codes for various calculations related to matrices
CO6: compare ease that scilab gives to other calculators available.

OEP 3.1 Numerical Techniques (Practical)

- CO1: Find errors using different formulae and general error formula.
- CO2: Evaluate roots of transcendental equation using various methods.
- CO3: Estimate functions using interpolation formula.
- CO4: Apply various method to solve system of linear equations.
- CO5: Evaluate definite integrals using numerical methods.
- CO6: Apply Euler's method and modified Euler's method to solve ODE.

Semester-IV

HCT 4.1 Measure Integration

After Completion of this course, students will be able to

- CO1: Define Measure spaces, Measurable functions, Outer measure, Inner Measure and Borel Measures.
- CO2: Describe the Signed measure, Hahn Decomposition, Jordan Decomposition.
- CO3: Explain the Product of measures, Fubini's theorem and Tonelli's theorem.
- CO 4: Focus on Baire Borel sets and positive linear functions.
- CO 5: Apply Radon – Nikodym theorem and Lebesgue Decomposition theorem.
- CO6: Generalize the Monotone and Lebesgue decomposition.

HCT 4.2 Partial Differential Equations

After completion of this course, students will be able to

- CO1: Define Partial differential equations, types of PDEs, types of integrals.
- CO2: Describe Integral surfaces through given curves, Green's theorem, Harnacks theorem.
- CO3: Explain Charpit's method, Jacobi method, Maximum and minimum principles
- CO 4: Apply Dirichlet's and Neumann problems for circle and solve examples
- CO5: evaluate solutions to second order partial differential equations.
- CO6: Develop computational attitude for solving PDE using various methods.

HCT 4.3 Integral Equations

After the completion of this course, students will be able to

- CO1: locate first kind, second kind and third kind of Fredholm and Volterra integral equations, recall properties of Green's function.
- CO2: convert IVP to Volterra integral equations and BVP to Fredholm integral equations and vice versa.
- CO3: compute iterated kernel, resolvent kernel for Volterra, Fredholm integral equations, compute solution of integral equation using method of successive approximation, compute solution of integral equation using separable kernel, using initial approximation
- CO4: compute solutions of integral equation using Laplace transform, Fourier transform.
- CO5: compute solutions of Volterra integral equation using method of successive approximation, method of initial approximations.
- CO6: conclude which boundary value problems have Green's function and which don't!

HCT 4.4 Operation Research

After Completion of this course, students will be able to

- CO – 1: Define convex set , LPP, SLPP, Duality QPP and theory of games.
- CO – 2: Identify the examples of Method of LPP and QPP.
- CO – 3: Construct the tables for LPP and QPP.
- CO – 4: Explain the examples of games and convex sets.
- CO – 5: Evaluate the examples of LPP, Wolf's and beales method.
- CO – 6: Create an examples of simple algorithm and draws the graphs of given games.

HCT 4.4 Probability Theory

After Completion of this course, students will be able to

- CO – 1: Define Classes of sets, sequence of sets, limsup., liminf., and limit of sequences of sets
- CO – 2: Explain about measurable functions, random variable, distribution of random variable.
- CO -3: State the Borel – Cantelli's lemma, Characteristics functions to prove further results and proves the simple properties based on characteristics function.
- CO - 4: Differentiate between simple random variable and proves the properties based on the simple and elementary random variable.
- CO – 5: Apply almost sure convergence to prove further results.
- CO – 6: Derive the theorems based on the convergence of sequence of random variables.

HCP 4.1 Advanced SCILAB

After the completion of this course, students will be able to

- CO1: recall all syntax used for computation.
- CO2: estimate probability and mean, mode and median for the given data.
- CO3: develop script files and function files for solving the problems.
- CO4: construct 2D and 3D graphs for given functions.
- CO5: develop file operations for solving the problems.
- CO6: conclude importance of SCILAB over other calculators.

HCP 4.2 Project

After the completion of this course, students will be able to

- CO1: recall definitions required for the project title
- CO2: visualize the results from research papers through examples
- CO3: interpret the results from published research papers
- CO4: estimate solutions to the problems assigned in the project
- CO5: illustrate the results/solutions obtained through examples
- CO6: create own problems from research paper or own solutions to the problems in reference books

Name of Department: English
Name of Programme: MA (Special English)
2021-2022

Program Outcomes (PO's)

After completing MA (special English) programme, students will be able to:

- PO1. Students are acquainted with different languages and social sciences.
- PO2. Students are eligible to appear for various state and national level competitive examinations.
- PO3. They are eligible to enter post graduate program of their interest / specialization.
- PO4. Scope for overall development of their personality.
- PO5. They are acquainted with various communication skills.
- PO6. Development of social aspects of their personality.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: Students are able to convey their message verbally.
- PSO2: Ability to write clearly and effectively.
- PSO3: students are able to comprehend and review various texts in English of them.
- PSO4: they are acquainted with texts of British, Indian, Afro- American, Russian literature.
- PSO5: understanding of the development of the English language as used in works of literature.
- PSO6: understanding of the development of the historical and cultural range of literature written in English.

Course Outcomes (CO's)

Part I Semester-I
British Literature (Paper I)

- CO1. The students will be able to get knowledge such as:
- CO2. To provide students with the opportunity to study Literature within its cultural context.
- CO3. To enable them to comprehend literary works in the historical context.
- CO4. To introduce and acquaint students with major trends and major writers in British literature.
- CO5. To make the students curious readers of Poetry, Drama and Novel.

British Literature (Paper I)

After completing this course students will be able to:

- CO1. Able to understand the western culture and traditions
- CO2. Able to understand the British literary pieces.
- CO3. Students will gain knowledge of features of British Drama.
- CO4. Students will gain knowledge of features of British poet

Course Outcomes (CO's)

Part I Semester-I

Indian English Literature (Paper II)

The students will be able to get knowledge such as:

CO1. To introduce students to later phases of development of Indian English Literature and to familiarize them with ethos of India

CO2. To offer students a wider vision of Indian writing in English by including larger range of authors and genres.

CO3 To introduce the students to different themes, styles, genres as reflected in poetry, drama, prose, novel prescribed.

CO4 To create literary sensibility and emotional response to the literary texts and implant sense of appreciation of literary text

Indian English Literature (Paper II)

After completing this course students will be able to:

CO1. students will get acquainted with thematic plurality, genres handled and style reflected in seminal texts of poetry, fiction drama

CO2 At the end of the course the students will get acquainted with later phases of development of Indian English Literature and familiar with Indian ethos as reflected in texts prescribed.

CO3 At post-graduation level, students will enjoy reading of a number of authors and important literary genres as practiced by select Indian English figures.

Course Outcomes (CO's)

Part I Semester-I

Introduction to Language and Linguistics (Paper III)

The students will be able to get knowledge such as:

CO1. To develop an interest in language studies among students

CO2. To acquaint the students with language as a mechanism and linguistic theories

CO3. To introduce the basic concepts in linguistics to the students

CO4. To introduce the various branches of linguistics.

Introduction to Language and Linguistics (Paper III)

After completing this course students will be able to:

CO1. Students will be Interested in the language

CO2. Students will be Familiar with some of the mechanism and theories of linguistics

CO3. Students will be able to know the basic concepts in linguistics.

CO4. Students will be able to know language mechanism.

Course Outcomes (CO's)
Part I Semester-I
Comparative Literature (DSE)(Paper IV)

The students will be able to get knowledge such as:

CO1. To introduce the students to the discipline of comparative literature

CO2. To familiarize them with the definition, nature, scope, concepts, issues, and methodologies

of comparative literature

CO3. To promote the ideal of one world by appreciation of comparative literature beyond regional and national boundaries so as to rise above separate identities of single national literature

CO4. To spread the concept of VishwaSahitya, as visualized by Tagore and Goethe

Comparative Literature (DSE)(Paper IV)

CO1. After completing this course students will be able to:

CO2. Students will analyse critically the novel

CO3. Students will gain knowledge of features of comparative literature

CO3. Students will be able to analyze and comprehend the general topics

Course Outcomes (CO's)
Part I Semester-II
British Literature (Paper IV)

The students will be able to get knowledge such as:

CO1. To provide students with the opportunity to study Literature within its cultural context.

CO2. To enable them to comprehend literary works in the historical context.

CO3. To introduce and acquaint students with major trends and major writers in British literature.

CO4. To make the students curious readers of Poetry, Drama and Novel.

British Literature (Paper IV)

CO1. After completing this course students will be able to:

CO2. Students will analyse critically the novel.

CO3. Students will be able to analyze and comprehend the essays.

CO3. Students will gain knowledge of features of British Drama.

CO4. Students will gain knowledge of features of British poetry

Course Outcomes (CO's)
Part I Semester-II
Indian English Literature (Paper V)

The students will be able to get knowledge such as:

CO1. To offer students a wider vision of Indian writing in English by including larger range of authors and genres

CO2. To introduce students to later phases of development of Indian English Literature and to familiarize them with ethos of India

CO3. To introduce the students to different themes, styles, genres as reflected in poetry, drama, prose, novel prescribed

CO4. To create literary sensibility and emotional response to the literary texts and implant sense of appreciation of literary text

Indian English Literature (Paper V)

After completing this course students will be able to:

CO1. Students will analyse critically the novel.

CO2. Students will be able to analyze and comprehend the non fiction

CO3. Students will gain knowledge of features of Indian English Drama

CO4. Students will gain knowledge of features of Indian English poetry

Course Outcomes (CO's)

Part I Semester-II

Introduction to Applied Linguistics (Paper VI)

The students will be able to get knowledge such as:

CO1. To introduce the concept of applied linguistics to the students

CO2. To enable the students to apply linguistic theories to different types of text

CO3. To acquaint the students with different types of registers of language

Introduction to Applied Linguistics (Paper VI)

After completing this course students will be able to:

CO1. Students will be able to know the concept of applied linguistics.

CO2. Students will be able to gain knowledge of different branches of applied linguistics.

CO3. Students will be able to acquire the different registers of language.

Course Outcomes (CO's)

Part I Semester-II

Comparative Literature (Paper VI)

The students will be able to get knowledge such as:

CO1. To introduce the students to the discipline of comparative literature

CO2. To familiarize them with the definition, nature, scope, concepts, issues, and methodologies

of comparative literature

CO3. To promote the ideal of one world by appreciation of comparative literature beyond regional and national boundaries so as to rise above separate identities of single national literature

CO4. To spread the concept of VishwaSahitya, as visualized by Tagore and Goethe

Comparative Literature (Paper VI)

After completing this course students will be able to:

CO1.Students will analyse critically the novel.

CO2.Students will gain knowledge of features of comparative literature

CO3.Students willable to analyze and comprehend the general topics

Course Outcomes (CO's)

Part I Semester-I & II

Enhancing Soft Skills and Personality Development (Paper IV)

The students will be able to get knowledge such as:

CO1.To enable students to adopt different soft skills.

CO2. Soft Skills are highly demanded at work place

CO3. To develop a sense of comprehensibility by exposure through soft skills.

CO4. To improve the linguistic competence along with the literary competence of students.

Enhancing Soft Skills and Personality Development (Paper IV)

After completing this course students will be able to:

CO1. The students will adopt the different soft skills.

CO2. Students will develop the sense for comprehensibility by exposure through soft skills.

CO3. Students will improve the linguistic competence and literary competence.

Course Outcomes (CO's)

Part II Sem III

Contemporary Critical Theories

The students will be able to get knowledge such as:

CO1. To introduce to the learners contemporary critical theories.

CO2. To familiarize the learners with various contemporary critical theorists and their essays.

CO3. To sensitize the learners to contemporary critical approaches.

CO4. To enable the learners to appreciate literary texts critically.

Contemporary Critical Theories

After completing this course students will be able to:

- CO1. Understand how various critical theories developed in the course of the 20th Century.
- CO2. Read & contextualize contemporary theories to the best of their ability.
- CO3. Develop competency to mark differences and similarities in these theories and schools.
- CO4. Develop an ability to apply the critical theories to literary texts.

Course Outcomes (CO's)

Part II Sem III

Post-Colonial Literature

The students will be able to get knowledge such as:

- CO1. To introduce the students to the study of Postcolonial Literature.
- CO2. To help students get acquainted with major issues in postcolonial literature.
- CO3. To introduce the students to colonialism and its effects on cultures and societies.
- CO4. To motivate students to read colonial and postcolonial texts and analyze them from the postcolonial perspective.

Post-Colonial Literature

After completing this course students will be able to:

- CO1. Analyze and interpret the colonial and postcolonial texts applying the postcolonial literary theory.
- CO2. Define the key concepts in postcolonial studies.
- CO3. Read, comprehend and engage with postcolonial literary criticism.
- CO4. Know how race, class, gender, history and identity are presented and problematized in the literary texts

Course Outcomes (CO's)

Part II Sem III

Research Methodology

The students will be able to get knowledge such as:

- CO1. Demonstrate knowledge of basic concept and framework of research and its methodologies.
- CO2. Develop an understanding of various research designs and techniques.
- CO3. Identify various sources of information for literature review and data collection.
- CO4. Develop an understanding of the ethical dimensions of conducting applied research.

Research Methodology

After completing this course students will be able to:

- CO1. Students are able to understand what is research.
- CO2. Students are familiar with types of research.
- CO3. Students are familiar with different types of genres.

Course Outcomes (CO's)

Part II Sem III

Translation Studies

The students will be able to get knowledge such as:

- CO1. To introduce students to translation studies as a separate discipline of knowledge
- CO2. To increase their awareness related to the nature and scope of translation studies
- CO3. To introduce students contemporary theoretical issues in Translation Studies
- CO4. To help students comprehend major issues and methods in Literary Translation

Translation Studies

After completing this course students will be able to:

- CO1. Comprehend translation studies as a separate discipline of knowledge
- CO2. Comprehend the nature, scope and theoretical issues in translation studies
- CO3. Comprehend major issues and methods in literary studies

Part II Sem III

21st Century Skills

The students will be able to get knowledge such as:

- CO1. To enable students to adopt different soft skills such as critical thinking and problem solving.
- CO2. To develop a sense of comprehensibility by exposure through soft skills.
- CO3. To develop qualities such as civic & ethical literacy
- CO4. To enable to students to learn through discipline

21st Century Skills

After completing this course students will be able to:

English is the world language. It is spoken worldwide. Students of the postgraduate level should use English in their future life. With the help of soft skills students can develop their personality in an effective way for better life.

Course Outcomes (CO's)

Part II Sem IV

Contemporary Critical Theories

The students will be able to get knowledge such as:

- CO1. To introduce the learners with contemporary critical approaches and theories.
- CO2. To familiarize the learners with various contemporary critical theories and ideologies.
- CO3. To sensitize the learners about contemporary critical approaches.
- CO4. To enable the learners to critically appreciate literary texts

Contemporary Critical Theories

After completing this course students will be able to:

CO1.Students will analyse critically the text

CO2.To help students to comprehend and analyse the terms

CO3.To help students to comprehend and analyse the general topics

Course Outcomes (CO's)

Part II Sem IV

Post-Colonial Literature

The students will be able to get knowledge such as:

CO1. To introduce and acquaint students with major trends and major writers in Postcolonial Literature.

CO2. To enable students to read and appreciate the works of major Postcolonial authors.

CO3. To develop a sense of comprehensibility by exposure through Postcolonial literature.

CO4. To create literary sensibility and emotional response to the literary texts and impart sense of appreciation of literary texts.

Post-Colonial Literature

After completing this course students will be able to:

CO1.Students will analyse critically the novel.

CO2.To help students to comprehend and analyse the essays

CO3.Students will gain knowledge of features of postcolonial poetry

CO4.To help students to comprehend and analyse the short story

Course Outcomes (CO's)

Part II Sem IV

Research Methodology

The students will be able to get knowledge such as:

CO1. To acquaint the students with the concept of research.

CO2. To introduce to the students the types of research.

CO3. To enable students to prepare research articles, papers and projects.

Research Methodology

After completing this course students will be able to:

- CO1.Students are able to understand what is research
- CO2. Students are familiar with types of research.
- CO3.Students are known to theory based research
- CO4. Students are familiar with different types of genres.

Course Outcomes (CO's)

Part II Sem IV

Translation Studies

The students will be able to get knowledge such as:

- CO1. To increase their awareness related to the nature and scope of translation studies
- CO2. To introduce students contemporary theoretical Issues in Translation Studies
- CO3. To help students comprehend major issues and methods in Literary Translation
- CO4. To enhance the students' knowledge of the warp and weft of different languages

Translation Studies

After completing this course students will be able to:

- CO1.Students will analyse critically the novel.
- CO2.To help students to comprehend and analyse the poetry
- CO3. To help students to comprehend and analyse the general topic

Course Outcomes (CO's)

Part II Sem IV

21st Century Skills

The students will be able to get knowledge such as:

- CO1.To enable students to adopt different soft skills such as critical thinking and problem solving.
- CO2.To develop a sense of comprehensibility by exposure through soft skills.
- CO3. To develop qualities such as civic & ethical literacy
- CO4.To enable to students to learn through discipline

21st Century Skills

After completing this course students will be able to:

English is the world language. It is spoken worldwide. Students of the postgraduate level should use English in their future life. With the help of soft skills students can develop their personality in an effective way for better life.

Name of Department: Economics (PG)

Name of Programme: M.A. Economics (2021-22)

Program Outcomes (PO's)

After completing M.A. Economics programme, students will be able to:

- PO1: Apply the knowledge practically to understand the real economic problems.
- PO2: Develop own thinking regarding current national, international policies and issues.
- PO3: Acquire academic excellence with an aptitude for higher studies and research in economics.
- PO4: Strengthen the proficiency to appear for NET, SET and for other competitive examinations.
- PO5: Understand and analyse the fundamental concept of economics and economic behaviour in practice.
- PO6: To initiate careers in Stock markets, banking and insurance sectors, private and public organization.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

- PSO1: The students of Economics are able to analyse consumer behaviour and consumers theories.
- PSO2: Able to study the economic problems and suggest policy measures for the development of the economy.
- PSO3: Understand the research methodology and preparing the research dissertation.

Course Outcomes (CO's)

Semester-I

H.C.T. 1.1 MICRO ECONOMIC ANALYSIS

The students will be able to get knowledge such as:

- CO1: Know the basic concepts in Micro Economics.
- CO2: Able to Understand the Utility concepts.
- CO3: Analyse the indifference curves and also understand its applications.
- CO4: Understand how factors of production can be used optimally to produce goods and services as they are the building blocks of the economy.
- CO5: Measure the cost of production and draw the curves.
- CO6: Analyse the characteristics and pricing methods under monopoly, Monopolistic competition, duopoly and duopoly.

H.C.T. 1.2 ECONOMICS OF GROWTH & DEVELOPMENT

After completing this course students will be able to:

- CO1: Understand the concepts and approaches to economic development.
- CO2: Analyse various growth models.
- CO3: Able to study the theories of economic development.
- CO4: Understand classical and Schumpeterian theory of development.
- CO5: Know the indicators of economic development.
- CO6: Illustrate the vicious circle of poverty.

H.C.T. 1.3 ECONOMICS OF ENVIRONMENT

After completing this course students will be able to:

- CO1: Understand about the nature and scope of environmental economics.
- CO2: Interpret the cost-benefit analysis.
- CO3: Understand the role of people in environment protection.
- CO4: Know Role of Environmental Movements in Environmental Protection.
- CO5: Understand the concepts of social costs and social benefits.
- CO6: Able to study environmental audit.

D.S.E. 1.1 PRINCIPLES & PRACTICE OF COOPERATION

After completing this course students will be able to:

- CO1: Know the evolution of cooperation.
- CO2: Analyse development of cooperative movement in the world.
- CO3: Able to study the structure and progress of rural credit cooperatives.
- CO4: Understand the role of cooperatives in micro finance.
- CO5: Able to study the marketing cooperatives and consumers cooperatives.
- CO6: Know the functioning of housing cooperatives and labour cooperatives.

S.C.T. 1.1 FINANCIAL INSTITUTIONS AND MARKETS

After completing this course students will be able to:

- CO1: Understand the nature and scope of financial system.
- CO2: Analyse the financial markets and financial institutions.
- CO3: Understand about mutual funds.
- CO4: Know the structure of interest rate.
- CO5: Able to study the functions of central bank and its monetary policy.
- CO6: Understand the concepts of investment banking, merchant banking, e banking, core banking, retail banking etc.

Part-I Semester-II

H.C.T. 2.1 MICRO ECONOMIC ANALYSIS

The students will be able to get knowledge such as:

- CO1: Know the models of the firm and its application.
- CO2: Understood how the rent, wages, interest and profit are determined.
- CO3: Understand the Macro Theories of Distribution.
- CO4: Analyse the welfare economics with different concepts of welfare.
- CO5: The students identified the concepts of uncertainty, risk, insurance and information.
- CO6: Study the Economics of Information.

H.C.T. 2.2 ECONOMICS OF GROWTH & DEVELOPMENT

After completing this course students will be able to:

- CO1: Pattern of industrialization, appropriate technology and infrastructure.
- CO2: Understood the role of monetary and fiscal policy in developing countries.
- CO3: Analyse the Macro – economic Policies and Development.
- CO4: Able to study the post GATT international economic order.
- CO5: Need for Investment Criteria in Developing Countries.
- CO6: Understand the concepts of shadow prices, cost-benefit analysis, project evaluation.

H.C.T. 2.3 ECONOMICS OF ENVIRONMENT

After completing this course students will be able to:

- CO1: Study of impact of population on the environment, society, and development.
- CO2: Understand the Population Growth & Environmental Degradation, Agricultural Growth & Environmental Degradation, Industrial Development & Environmental Degradation.
- CO3: Describe the effects of Deforestation.
- CO4: Know the effects of Noise Pollution.
- CO5: Understand the New Economy Policy & Environment.
- CO6: Analyse the functions of Pollution Control Board.

S.C.T. 2.1 PRINCIPLES & PRACTICE OF COOPERATION

After completing this course students will be able to:

- CO1: Understand the cooperative movement in India & world
- CO2: Get familiarize with role of national agencies in the development of cooperative movement.
- CO3: Know the functioning of various cooperatives in foreign countries
- CO4: Evaluate the role of RBI, NABARD, SBI in cooperative development.
- CO5: Acquaintance with government's support extended to cooperatives
- CO6: Understand the professionalization of cooperative management
- CO7: Evaluate the Indian cooperative movement.

O.E.T. 2.1 FINANCIAL INSTITUTIONS AND MARKETS

After completing this course students will be able to:

- CO1: Understand the meaning and types of non-bank financial institutions.
- CO2: Evaluate the role of SEBI.
- CO3: Know the role of non-banking financial intermediaries.
- CO4: Understand the concept of international liquidity.
- CO5: Analyse the basic concepts in stock exchanges in India.
- CO6: Able to study the Exchange rates, risk hoarding and futures in exchange rates.

Part-II Semester-III

HCT 3.1 MACRO ECONOMIC ANALYSIS

After completing this course students will be able to:

- CO1: Introduction to circular flow of income.
- CO2: Understand Keynes's Psychological Law of consumption.
- CO3: Know the marginal efficiency of capital and investment.
- CO4: Describe the derivation of IS and LM function.
- CO5: Able to study money supply and open economy.
- CO6: Describe the significance of Absolute Income hypothesis and Relative income hypothesis.

HCT 3.2 PUBLIC ECONOMICS

After completing this course students will be able to:

- CO1: Know the role of the Government in Economy- changing perspective.
- CO2: Classify the private goods and public goods.
- CO3: Understand the stabilization policy.
- CO4: Know private and public mechanism for allocation of resources and relevant economic theory.
- CO5: Analyse the theories of public expenditure.
- CO6: Able to study the classical and Keynesian views on public expenditure.

HCT 3.3 RESEARCH METHODOLOGY

After completing this course students will be able to:

- CO1: Understand research methodology.
- CO2: Know hypothesis and its importance.
- CO3: Able to study the stages of research.
- CO4: Understand the sources of data collection.
- CO5: Able to study the report writing.
- CO6: Understand the concept of research design.

SCT 3.2 AGRICULTURAL DEVELOPMENT OF INDIA

After completing this course students will be able to:

- CO1: Review the land reforms programme in India.
- CO2: Understand the changing cropping pattern and land utilization.
- CO3: Know the role of agriculture in globalized Indian economy.
- CO4: Understand the Land reforms in India.
- CO5: Able to study the Green revolution, White revolution (Dairy), Blue revolution (Fisheries).
- CO6: Evaluate land reforms in India.
- CO6: Critically assess the impact of WTO on Indian agriculture.

OET 3.2 ADVANCED BANKING

After completing this course students will be able to:

- CO1: Know the nature, structure and role of financial system in economic development.
- CO2: Acquaintance with the commercial banking and modern techniques of banking.
- CO3: Know the KYC norms.
- CO4: Understand bank's investment strategy, liquidity security and profitability.
- CO5: Able to study special types of bank customers.
- CO6: Know the rights and responsibilities of banks.
- CO7: Understand modern concepts of banking sector.

Part-II Semester-IV

HCT 4.1 MACRO ECONOMIC ANALYSIS

After completing this course students will be able to:

- CO1: Explain the Post-Keynesian Macro Economics models of New Classical Economics with regard to Supply side economics.
- CO2: Analyse the Mundell-Fleming model and monetary approach to balance of payments.
- CO3: Understand the new classical approach.
- CO4: Able to study theories of Inflation.
- CO5: Evaluate classical, Keynesian and monetarist approaches to inflation.
- CO6: Know the Policies to control inflation.

HCT 4.2 PUBLIC ECONOMICS

After completing this course students will be able to:

- CO1: Know the Centre – state financial relationship in India.
- CO2: Compare the different types of taxes in India.
- CO3: Understand the concept of public debt and its classification.
- CO4: Analyse the burden of public debt.
- CO5: Review the center-state financial relationship in India
- CO6: Understand of major taxes.
- CO7: Able to study public expenditure in India and fiscal crisis.
- CO8: Evaluate the fiscal sector reforms in India.

HCT 4.3 DISSERTATION

After completing this course students will be able to:

- CO1: Select the research problem.
- CO2: Take review of literature
- CO3: Adopt suitable methodology
- CO4: Explain sampling design.
- CO5: Write Dissertation or Thesis.
- CO6: Prepare the project Report / Dissertation.

DSE 4.2 AGRICULTURAL DEVELOPMENT OF INDIA

After completing this course students will be able to:

- CO1: Know the structure of agriculture marketing, problems of agriculture marketing.
- CO2: Take review of agricultural finance in India.
- CO3: Understand the institutional and non-institutional sources of agricultural credit.
- CO4: Analyse the role, progress and problems of agro industries.
- CO5: Describe the importance of Agro Industries.
- CO6: Explain various problems of agricultural labour.

SCT 4.2 ADVANCED BANKING

After completing this course students will be able to:

- CO1: Know the situation of rural banks in India.
- CO2: Evaluate role of Lead bank scheme, Regional Rural Banks (RRBs).
- CO3: Understand the role and functions of CIBIL, Fair Practices Code for Debt Collection.
- CO4: Understand the working of Reserve Bank of India.
- CO5: Know the present scenario of privatization of banks.
- CO6: Review the Banking Sector Reforms.

Name of Department: History

Name of Programme: M.A.History

Program Outcomes (PO's)

After completing M.A.History programme, students will be able to:

- PO1: Understand the fundamental principles Historiography
- PO2: Study and understand the basic concepts in the Historiography
- PO3: Students understand the History of the Ancient India upto 650 AD.
- PO4: Understand the various concepts related to the Modern World during the period of 1900-1970 AD.
- PO5: Students will be able to understand the various concepts in Indian History.
- PO6: Students will be able to understand and analyze the British Period in Modern Indian History.
- PO7: Students can understand the History of Maratha period through the aspects like - Political, Economical, Social & Culture.
- PO8: Study of the Modern Maharashtra (1818-1990 AD.)
- PO9: Students can understand the fundamental Principles in the Research Methodology.
- PO9: Students got knowledge about the contribution of Indian Women in Indian History.
- PO9: To highlight on the Modern British Indian History.

Program Specific Outcomes (PSO's)

After completing this course students will be able to:

PSO1: Learn About the History Writings and its Scientific Writing Process.

PSO2: Gain Knowledge about the History of the Ancient India upto 650 AD.

PSO3: Understand about the basic modern concepts in modern world.

PSO4: Critically analyze the various aspects related to the British India.

PSO5: Understand the ideas in Indian History.

PSO6: Understand the overall developments in Maratha History between 1630-1818 AD.

PSO7: Learn about British administration in Modern Maharashtra in British Period.

PSO8: To gain practical knowledge on how to design the Ph.D. thesis.

Course Outcomes (CO's)

Semester-I

HCT – 1.1 - HISTORIOGRAPHY.

After completing this course students will be able to:

CO1: Know historical development in Historiography.

CO2: Know the Meaning and Definitions of History, Nature and Scope of History.

CO3: Students understand Causation, Theory and Laws of History.

CO4: Students understand about the Primary & Secondary Sources.

Part-I Semester-II

HCT – 1.1 - HISTORIOGRAPHY.

After completing this course students will be able to:

CO1: Students get knowledge about the Chronology and Period in Indian History.

CO2: Understanding the Theories and Themes of History.

CO3: Learn about Eminent Historians like Arnold Toynbee, G. S. Sardesai, Romila Thapar.

CO4: Able to study Rewriting of History.

CO5: Capable of Understanding subaltern approach.

Semester-I

HCT -1.2 - ANCIENT INDIA UP TO 650 A. D.

After completing this course students will be able to:

CO1: Know the Literary Sources and Archaeological Sources of Ancient India.

CO2: Understanding the stone age in India.

CO3: able to understand the Indus Valley Civilization.

CO4: Students understood Polity and Religious Life, Social and Economic Condition during Aryan period.

Semester-II

HCT -1.2 - ANCIENT INDIA UP TO 650 A. D.

After completing this course students will be able to:

CO1: understand the religious movement under the Buddhism and Jainism in Ancient India.

CO2: Understanding the Mauryan administration, Ashoka and his Dhamma.

CO3: able to understand the Ancient Indian Empires like Shungas, Kanvas and Satvahnas, Kushanas.

CO4: Students gain knowledge about the Golden Period of Gupta Empire.

Semester – I

HCT – 1.3 - HISTORY OF WORLD (1900 A.D. - 1970 A.D.)

After completing this course students will be able to:

CO1: learn the Modern Concepts in 20th Century World.

CO2: understood the causes, effects, Versailles treaty as well as League of Nations.

CO3: get knowledge about the causes, effects of rise of dictatorships in Europe as well as Asia in 20th Century.

CO4: understood the causes, course, effects and nature of UNO. They have also got Knowledge about the Nuclear weapons.

Semester-II

HCT – 1.3 - HISTORY OF WORLD (1900 A.D. - 1970 A.D.)

After completing this course students will be able to:

CO1: understood the causes, course, effects of a Russian Revolution and Chinese Revolution and contribution made by Lenin and Mao-Tse-Tung.

CO2: get detailed information about concept, course and effects of a cold war.

CO3: understood the nature and its history of non-aligned movement.

CO4: get detailed Knowledge about the progress in science and Technology as well as civil rights movements in 20th century.

Semester – I

SCT – 1.2 - HISTORY OF IDEAS

After completing this course students will be able to:

CO1: Understand the concepts of Monarchy, Oligarchy and Proto Republicanism .

CO2: know the modern concepts of the 19th century for e.g. Liberalism, Democracy, Utilitarian, Positivism.

CO3: Capable of understanding the concepts like Nationalism & Socialism and Communalism & Secularism .

CO4: Study the Social Ideas.

Semester – II

SCT – 1.2 - HISTORY OF IDEAS

After completing this course students will be able to:

CO1: Understand the Social Reforms Movements during the colonial period.

CO2: To gain knowledge of Formation of Religious Ideas in early India.

CO3: To Forms of Religious thought and Cultural Synthesis.

CO4: Study the Brahmo Samaj, Prarthana Samaj, Arya Samaj, Devband and Aligarh Movement.

Semester – I

SCT – 1.1 - HISTORY OF INDIA (1757 A. D. - 1857 A. D.)

After completing this course students will be able to:

CO1: understood the Introduction. Revolution and contribution Rise of British Power

CO2: Get detailed information about Economy & Society and Culture.

CO3: understood the nature and its history of Role of British Governor in Modern India.

CO4: Get detailed Knowledge about the progress in Educational Development and Press.

Semester – II

SCT – 1.1 - HISTORY OF INDIA (1757 A. D. - 1857 A. D.)

After completing this course students will be able to:

CO1: To know Introduction, Social Policies and Social Change in British Period.

CO2: Enhancement of knowledge about Rural Economic Organization.

CO3: understand Urban Economic Organization in British Period.

CO4: learn more about Revolt of 1857.

SEMESTER – III

HCT-Paper –3.1 – Maratha History (1600 A.D. – 1818 A.D.) (Polity and Economy)

After completing this course students will be able to:

CO1: understood the Important concepts, Sources and different approaches during the Maratha Period.

CO2: understood the causes of transfer power Chhatrapati to Peshwa, Peshwa to Karbhari, its effects and Maratha confederacy.

CO3: get knowledge about the agrarian system, land survey and land revenue.

CO4: understood the industry, trade routes and commercial centres.

SEMESTER – IV

HCT-Paper –3.1 – Maratha History (1600 A.D. – 1818 A.D.) (Polity and Economy)

After completing this course students will be able to:

CO1: Understood the history of Marathas and development of Marathi literary.

CO2: Get detailed information about social institutions, position of women, Balutedari and Watandari system during this Maratha Period.

CO3: Understood the nature and history of bhakti movement and work of Marathi saints.

CO4: Get detailed Knowledge of art and architecture in Maratha period to the students.

SEMESTER – III

HCT-Paper – 3.2. Modern Maharashtra (1818 A.D. – 1990 A.D.)

After completing this course students will be able to:

CO1: understood the Ramoshi, Koli, Bhils, Revolt of Vasudev Balwant Phadke & Deccan Riots of 1875

CO2: get knowledge about the Reforms Movement in Modern British Maharashtra.

CO3: understood the National Movement (1920 – 1947) and Non Brahmin Movement & Leftist Movement.

CO4: understood the Important concept of British Maharashtra.

SEMESTER – IV

HCT-Paper – 3.2. Modern Maharashtra (1818 A.D. – 1990 A.D.)

After completing this course students will be able to:

CO1: understood the overall process of formation of the newly Maharashtra State.

CO2: got detailed information about Economy Development of Maharashtra.

CO3: understood the nature and its history of Agrarian System.

CO4: gain Knowledge about the progress in Maharashtra under 1960 – 1990

SEMESTER – III

HCT 3.3 Research Methodology (Compulsory Paper)

After completing this course students will be able to:

CO1: Know the relationship of history with its allied disciplines.

CO2 : Understand about the Research process in Historical research.

CO3: Learn the Fundamental principles of the Historical research.

CO4: Learn the Nature of Historical Sources, Data Collection and analysis.

CO5: Learn how to write the Report.

SEMESTER – IV

HCT 3.3 Research Methodology (Compulsory Paper)

After completing this course students will be able to:

CO1: Prepare the project Report/Dissertation.

CO2: Write Dissertation Or Thesis.

SEMESTER – III

SCT- Paper – 3.1 – Women in Indian History

After completing this course students will be able to:

CO1: Discuss the Archival, Non-Archival sources related to the Women in Indian History.

CO2: Understand the concept of Feminism.

CO3: Learn about the various religions like- Jainism, Buddhism, Islam, Sikhism and Christianity.

CO4: Discuss the Customary and Legal Status of women in Ancient India, Medieval India, Colonial India, Post-Independence, Tribal Society.

SEMESTER – IV

SCT- Paper – 3.1 –Women in Indian History

After completing this course students will be able to:

CO1: Understand the issues in representing women in history.

CO2 To Discuss the womwens participation in :Household , Agriculture , Industry, Formal and Informal Sectors, Profession.

CO3: Disucss the education in women in the Ancient India , Medieval India Colonial India Post-Independence.

CO4: Learn Women's Participation in Freedom Movement and Politics.

SEMESTER – III

GET - Paper – 3.1 History of India (1858 A. D. – 1964)

After completing this course students will be able to:

CO1: Learn Strategies of British Imperial Control.

CO2 : Discuss the Economic Impact of British Rule.

CO3: Study the Society in Pre Independence Era.

CO4: analyse Rise of Indian Nationalism.

SEMESTER – IV

GET - Paper – 4.1 History of India (1858 A. D. – 1964)

After completing this course students will be able to:

CO1: Learn the Struggle for Freedom.

CO2 :Study the Partition of India and Transfer of Power .

CO3: Discussthe Independent India.

CO4: analyse the India's Foreign Policy after the Indian Independence.