# DEPARTMENT OF BENGALI: AMBEDKAR COLLEGE, FATIKROY COURSE - B.A (MAJOR)

Programme outcome:-	<ul> <li>Students will be familiar with the aspect of the Bengali Language – including sound, words, sentence and meaning.</li> <li>Study of Bengali Literature students will be familiar with Indian culture and social aspects.</li> <li>The text through multiple perspective and various contexts will helpful for students to develop their personal and professional capability.</li> </ul>	
Programme Specific outcome:-	<ul> <li>Knowledge and understanding of basic Bengali Literature.</li> <li>Knowledge and understanding of Bengali Grammar and Linguistics.</li> <li>Knowledge and understanding of essential Bengali vocabulary.</li> <li>Knowledge and understanding on History of Bengali Literature.</li> </ul>	
<u>Course Outcome</u>		
<b>Semester-I</b> Bangla Sahityer Itihas (Adhi o Madhya jug) and Kavya Unit —I,II,III,IV	<ul> <li>The study of Social and Cultural identity of Bengali in ancient and medieval period students will get knowledge about the Brahmin cal culture, food-habits, entertainment and lifestyle of urban and rural society.</li> <li>To create a sense of history and historical analysis about literature among the students.</li> <li>Study of this period to acquire the knowledge of society and literary aspects.</li> <li>To acquire ancient style and Language of the writer, also students will obtain history of socio-economy condition of that period.</li> </ul>	
Semester-II Bangla Sahityer Itihas (Adhunik jog and Chando Alamkar) Unit —I.II.III.IV	<ul> <li>Study and discussion of Bengali literature helps the students to know about the derivation of Bengali and other languages.</li> <li>History of languages and various components of linguistic students can be aware.</li> <li>Beauty of Literature, poem, poetries, Kavya through the knowledge of Chandamanjari.</li> </ul>	
Semester-III Bangla Kavya (Madhyo O Adhunik jug) Unit —I,II,III,IV	<ul> <li>Students will obtain knowledge the base of poetic and creative writings</li> <li>To comprehend literary texts of the writer.</li> <li>Knowledge of the style of Kavya</li> <li>Knowledge of the body of the literature</li> </ul>	
<b>Semester-IV</b> Prabando O Sahityer roop o riti Unit-I,II,III,IV	<ul> <li>To learn the literary, social, political, economic condition and historical background will helpful for students.</li> <li>To acquire good knowledge about modern literary text and writer.</li> <li>Students will obtain knowledge social, economical, political condition, changes of value after world war also helpful to know our historical background and relation of our country with whole world.</li> </ul>	

Semester-V Paper-5th Linguistics and Drama Unit-I,II,III,IV	<ul> <li>Students are able to collect, organize and analyze linguistic data from diverse languages, to form hypotheses about language structure and to test those hypotheses against new data.</li> <li>Students will demonstrate knowledge and analytic skills in core and specialized areas of linguistics.</li> <li>Ability to analyze specific sound and understand systematic properties of sound system of Bengali.</li> <li>Understanding of the social functions of language and the roles they play in culture.</li> <li>Ability and experience to become better teacher of Bengali learners</li> </ul>
Semester-V	toucher of Deligun fouriers.
Paper-6th Fictional Literature	<ul><li>Increasing vocabulary</li><li>Relieving Stress</li></ul>
Unit-I,II,III,IV	Improving memory
	•Knowledge of judgments
Semester-VI Paper-7th Literary Criticism Unit-I,II,III,IV	<ul> <li>Knowledge of thinking ability</li> <li>Concept of beauty, aesthetics, modernism, postmodernism, structuralism, meta-narrative, semiotics, deconstruction that have swept the critical consciousness of the 20<sup>th</sup> century.</li> </ul>
Semester-VI	•This unit helps to develop knowledge the root of
<b>Paper-8th</b> Rabindra Sahitya	our culture and imaginary world also enhanced the thinking power of creative
Unit-I,II,III,IV	writings and lyrics composition. •Knowledge about different perspectives.
Project Paper	<ul> <li>Knowledge about writing skills</li> <li>Knowledge of the body of the Project</li> <li>Develop own ability</li> <li>Building teamwork</li> <li>Group Skills</li> </ul>
	•Future benefits on Research work

# **DEPARTMENT OF BENGALI:** AMBEDKAR COLLEGE, FATIKROY COURSE - B.A (GENERAL)

<u>Course Outcome</u>		
<b>Semester-I</b> Bangla Sahityer Itihas (Adhi o Madhya jug) Unit —I,II,III,IV	<ul> <li>The study of Social and Cultural identity of Bengali in ancient and medieval period students will get knowledge about the Brahmin cal culture, food-habits, entertainment and lifestyle of urban and rural society.</li> <li>To acquire ancient style and Language of the writer, also students will obtain history of socio- economy condition of that period.</li> </ul>	
Semester-II Fictional Literature Unit —I,II,III,IV	<ul> <li>Increasing vocabulary</li> <li>Relieving Stress</li> <li>Improving memory</li> </ul>	
Semester-III Drama, Kavya and Novel Unit —I,II,III,IV	<ul> <li>Make character analysis</li> <li>Understanding of the social functions of language and the roles they play in culture.</li> <li>Students will obtain knowledge the base of poetic and creative writings</li> <li>Knowledge of the style of Kavya</li> <li>Knowledge of the body of the literature</li> </ul>	
Semester-IV Sahityer Roop – Riti and Prose Literature	<ul> <li>To learn the literary, social, political, economic condition and historical background will helpful for students.</li> <li>To acquire good knowledge about modern literary text and writer.</li> </ul>	
Semester-V Chando-Alamkar and Modern Poem Unit-I,II,III,IV	<ul> <li>Beauty of Literature, poem, poetries, Kavya through the knowledge of Chandamanjari.</li> <li>Increase of ability to write own poem</li> </ul>	
F	Foundation Course	
Semester-II Modern Indian Language (MIL) Unit-I,II,III,IV	<ul> <li>Increasing vocabulary</li> <li>Knowledge on Bengali Poem</li> <li>Writing skills on own Poem</li> <li>Understanding of the social functions of language and the roles they play in culture.</li> <li>OMR based Benefits on future Examination</li> </ul>	

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# COURSE OUTCOMES CHEMISTRY

B.Sc. Honours Semester-I Subject: Chemistry Paper H1 Unit-I (General Chemistry) Marks:20	
Chapters	Learning Outcomes
A. AtomicStructure:	
Limitation.s of Bohr's atomic model; idea of the do Broglie matter waves, Heisenhergss uncertainty principle; Schrodinger's wave equation and its importance; quantum numbers; concept of wave function; radial and angular wave functions; shapes of s, p and d-orbitals, Aufbau principle, Pauli's Exclusion Principle, Hund'srule,	<ul> <li>Description of the location of three subatomic particles in an atom ( protons, neutrons, and electrons)</li> <li>4 quantum numbers are (n,l,ml,ms) used to describe atomic &amp; difference between excited and ground states</li> </ul>
<b>B.</b> Periodicproperties: Modern periodic table, periodic variation in properties — atomic and ionic radii, oxidation states, ionization potential, electron affinity, electronegativity (Mulliken scale, Pauline's scale and Allred &Rochow scale); diagonalrelationship.	<ul> <li>It describe the arrangement of elementhaving the atomic number &amp; recognises the periodic trends, position of element in the periodictable.</li> <li>compares the reactivity of elements &amp; explain reasons for the anomalous behaviour</li> </ul>
C. Statistical treatment of data analysis: Accuracy and precision, correction of determinant and indeterminant errors; the normal law of distribution of indetermination errors; the F and T tests, rejection of data, methods of leastsquares, significant figures.	

# Unit-II (Inorganic Chemistry) Marks:20

Chapters	Learning Outcomes
A. Redox Reactions: Ion electron method of balancing equation's, calculation of equivalent weights of oxidants and reductants, standard electrode potential, formal potential, electrochemical series; redox potentials and its applications, choice of indicators in redox titrationa. B. ChemicalBonding:	It helps how to balance a chemical equation by ion- electron method.

Types of ionic solids; radius ratio effect; Bond-Lande equation; Born-Haber cycle; polarizing power; polarizability of ions and Fajan's rule. VBT, Bents Rule, VSEPR theory, Hybridisation, formal charge, dipole moment, LCAO-MO theory and its application to homonuclear, heteronuclear diatomic molecules and polyatomic molecules Band theory in soli.ds; elementary ideas on semiconductors (n and p -types); hydrogen bonding — concept and typesof H-bonding	<ul> <li>It predicts the hybridization, polar nature, geometry &amp; shapes of simplemolecules.</li> <li>It describes the bond order, stability, magnetic behaviour etc. of homonuclear, heteronuclear diatomic and polyatomicmolecules</li> </ul>
Unit-III (Organi	c Chemistry) Marks:20
Chapters	Learning Outcomes
Structure, Reactivity in Organic Molecules:	
Hybridization organic compounds, delocalized chemical bonds, van der Witals interaction, resonance, tautormerisrn, hypercenjugation, inductive effects, H-bonding, dipole moment- bond moment and group moment, Activation energy and TransitionstateEnergyprofile diagrams for reactions. Concepts cf kinetic and thermodynamiccontrol.	<ul> <li>Explains the influence of electronic displacements on structure and reactivity of organiccompounds.</li> <li>Provides the indication of specified type of organic reactions on the basis of reaction mechanism.</li> </ul>
B. Concept of reaction mechanism in aliphaticcompounds: Synthesis of compounds like alkanes, alkadienes, alcohols, aldehydes, carboxylic acids nitriles, amines etc. Study of Electrophilic, free radical, Nucleophilic addition, Nucleophilic substitution, Elimination reactions & mechanisms.	
C. important reactions of aliphatic	
compounds withmechanism: Corey-House synthesis, woodward- prevost hydroxylation. ozonolysis, hydroboration-oxidation, oxymercuration-demercuration reaction, use of Lindlar's catalyst, Birch reduction of alkynes; pinacol-pinacolone rearrangement; Oppenauer oxidation, MPV reduction. Rosenmund reduction, Stephen's reaction, Sommelet reaction, Baeyer-Villiger oxidation, Wo]ff- Kishner reduction; Aldo], Claisen and Darzen-glycidic ester condensation; Cannizzaro and Tischenko reactions.	• Able to describe mechanism of different aliphaticreactions.

UNIT-IV (Physical Chemistry) Marks:20	
Chapters	Learning Outcomes
A. The Gaseousstate: Gas laws; PV=1/3 mnc <sup>2</sup> ; mean free path ; collision diameter, frequency; Realgases; Deviation from ideal behaviour —vander Wads equation; inter-relationships between critical constants and van der waal's constants; Maxwell distribution of molecular velocities (no derivation) — most probable, average and root mean square velocities; Boltzmann equation (withoutderivation). <b>B. Crystallinestate:</b> Three laws of crystallography.: Weiss and Miller indices; unit cell, Bravais lattices; derivation of Bragg's equation ; crystal structure of KCI, NaC1, CsC1, diamond, graphite, boronnitrideand ice, SchottkyandFrankeldefects, colour center, semi-conductors.	Demonstrates gas laws in caseof ideal and real gases. Explains the behaviour of real gases. Describes the conditions required for liquefaction of gases and critical phenomena of gaseous state. It states the overall features of solid state Chemistry
C. Fundamentals of computer: History of development computer systems (mainframe, minis, micros and super computers); computerhardware i.e. CPU & other peripheral devices (Input/Output and auxiliary storage devices); integers in computers (Bit, Byte, Word) and conversions —decimal to binary & hexadecimal; introduction to computer software,computer languages, computer programming; basic knowledge of BASIC.	

B.Sc. Honours Semester-II Subject: Chemistry Paper H2	
Unit-I Inorganic	Chemistry (Marks:24)
Chapters	Learning Outcomes
<ul> <li>A. Acid-Base Concept: Arrehenius and Bronsted-Lowry concept, the solvent-system concept (Franklin) and its limitations; Lewis concept; SHAB principle; pH and pH scale; effect of solvent onrelativestrengthsof acids and bases — leveling effect; Relative strengths of acids and bases (p1(a and pKb concept).</li> <li>B. s-Bloch Elements: Group discussion of the elements with respect to position in the periodic table: electronic configuration, atomic and ionic radii, ionization enthalpy, electron affinity (electron gain enthalpy), electronegativity, oxidation states, variation in properties of oxides and hydroxide, salvation and complexation tendencies of alkali and alkaline earth metals. Chemistry of lithium and beryllium their anomalous behaviour and diagonalrelationship.</li> </ul>	<ul> <li>On completion of this unit, the student should be able to:</li> <li>Explain the concept of characteristics of acids-bases and their relativestrengths.</li> <li>Describe the soft and hard acid-base (SHAB principle)</li> <li>Understand the periodicity in atomic and ionic radii, electronegativity, ionization energy, electron affinity of elements of the periodictable.</li> <li>Understand vital role of sodium, potassium, calcium and magnesium ions in biological systems and the use of caesium in devising photoelectric cells.</li> <li>Explain the diagonal relationship between lithium &amp; magnesium</li> </ul>
<i>C. Noble Gas;</i> Preparation, properties and structure of xenon oxides, fluorides, oxyilmorides.	Chemistry of noble gases and their compounds; application of VSEPR theory in explaining structure andbonding.
<ul> <li>D. p-Block Elements: Group discussion of the elements with respect to position in the periodic table: electronicconfiguration, atomic and ionic radii, ionization enthalpy, electron affinity (electron gain enthalpy), electronegativity, oxidation states, variation of acidic and basic properties of their oxidesand oxy-acids, inertpaireffectand catenation.</li> <li>Preparation, properties and structure in the following compounds: Diborane (with emphasis on bonding), Carbides, Hydrazine, hydroxylamine, hydrazoic acid, oxy acids of nitrogen, sulphurandhalogens;peracids andsaltsofcarbonandsulphurinterhalogen compounds, Pseudo-halogens, polyhalides, basic properties of Iodine.</li> <li>Sodium thiosulphate, Sodiumdithiortite,</li> </ul>	<ul> <li>Understand oxidation states with reference to elements in unusual and rare oxidation states like carbides and nitrides.</li> <li>Describe the inert paireffect</li> <li>Explain the Preparation, properties and structure of Diborane , Carbides, Hydrazine, hydroxylamine, pseudohalogen.</li> </ul>

potassiumiodide ,boric acid, lithium	
aluminium hydride, leadtetraacetate.	
Unit-II OrganiaCh	omistmy (Marks·24)
Chanters	Learning Outcomes
Stereochemistry of organic	On completion of this unit, the student should be able
<b>compounds:</b> Types of stereoisomers configuration and conformational, enaritiomers and diastereomers,	to: Understand the terms like conformation and
their nomenclatures, difference in	configuration, asymmetricmolecules.
diastereomers, optical isomers, chirality,	<ul> <li>Understanding 3-D structure of organic</li> </ul>
notations of optical isomers, raceimic mixture and resolution.	molecules, identifying chiralcenters.
Conformation: Conformational nomenalat	<ul> <li>Identify the stereocenters in a molecule and</li> </ul>
ure; eclipsed, staggered, gaucheandanti	assign the configuration as R or S using CIP
; dihedral angle ,	rule.
stability of conformers on the basis of	<ul> <li>Reactivity, stability of organic molecules,</li> </ul>
stericeffects, conformational a narysisof ethane, n-butane, cyclohexane	structure, stereochemistry.
and monosubstitutedcyclohexanes;	<ul> <li>Assign the application of cram's rule,</li> </ul>
stability of cycloalkanes-strains in rings, angle strain and torsional strain, Baeyer strain theory and its limitations. Asymmetric synthesis: stereospecific and stereasefective synthesis, regioselectivie synthesis, application of cram's rule, prelog's rule and Ahn-Felkenrule,	prelog's rule and Ahn-Felkenrule
A. Aromaticcompounds	
Aromaticity, non-aromatic, antiaromatic, homoaromatic (benzenoid and non- benzenoid). Preparation and properties of benzene, naphthalene, anthracene and phenanthrene.	<ul> <li>Aromatic compounds and aromaticity, mechanism of aromaticreactions.</li> </ul>
<b>B.</b> Organic reaction mechanism in aromatic compounds: Electrophilic substitutionin benzene (general mechanism):a Nitration, acylation halogenations, nitration, sulphonation, Synthesis and reactions of arenes, aromatic alcohols, aromatic halides, phenols, carbonyls, quinones, amines, nitro compounds, carboxylic acids and name reactions of thesecompounds.	Understand the electrophile, nucleophiles, and intermediates along the reaction pathways. Mechanism of organic reactions (effect of nucleophile/ leaving group, solvent),

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Practical : InorganicQualitativeAnalysis Marks:32	
Chapters	Learning Outcomes
Qualitative analysis of mixtures of inorganic salts containing not more than five radicals (at least one interfering radical) from the following fist:	
Basic Radicals: Silver, lead, bismuth, copper, cadmium, arsenic, antimony, tin, iron, aluminium, chromium, manganese, cobalt, zinc, nickel, calcium, barium, strontium, magnesium, potassium, ammonium, Acid Radicals: fluoride, chloride, bromide,	After successful completion of the course, students will be able to analyse inorganic salts qualitatively and identify cations and anions present in a given unknown mixture of salts.
iodide, sulphate, sulphide, sulphite, phosphate, arsenate, arsenate, borate, nitrate, nitrite, ferrocyanide, ferricyanide, chromate, bromate, iodate, thiocyanate, silicate.	

SEMESTER: III (H3)		
Unit-I Inorga	nicChemistry (Marks:24)	
Chapters	Learning Outcomes	
A.Coordination Compounds: Werner's Coordination theory, coordination number, ligands and their classification, chelation, chelate effect and its applications; nomenclature of coordination compounds, isomerism in coordination compounds, stereoisomerism: geometrical and optical isomerism in 4- and 6- coordinate complexes; innermetallic complexes; stabilization of unusual oxidation states; Sidgwick's affective atomic number rule	<ul> <li>On completion of this unit, the student should be able to:</li> <li>Understand the terms, ligand, denticity of ligands, chelate, coordination number and use standard rules to name coordination compounds.</li> <li>Discuss the various types of isomerism possible in such compounds and understand the types of isomerism possible in a metalcomplex.</li> </ul>	
<ul> <li>Bonding in transition metal complexes:</li> <li>Valence bond theory (VBT) and Crystal Field Theory (CFT) for octahedral, tetrahedral and square planer complexes; Explanation of magnetic properties, structures and colour of coordination complexes on the basis of the above theories; Nephelauxetic effect, elementary idea of adjusted crystal field theory (ACFT).</li> </ul>	<ul> <li>Use Valence Bond Theory to predict the structure and magnetic behaviour of metal complexes and understand the terms inner and outer orbitalcomplexes</li> <li>Explain the meaning of the terms Δo., Δt, pairing energy, CFSE, high spin and low spin and how CFSE affects thermodynamic properties like lattice enthalpy and hydrationenthalpy</li> <li>Explain magnetic properties and colourof</li> </ul>	
<ul> <li>B. Magnetochemistry: Concept of diamagnetism, Paramagnetism, ferromagnetism and anti-ferromagnetism, Origin of paramagnetic moment: electron spin moment and orbital angular moment, magnetic susceptibility and magnetic moment; magnetic susceptibility measurement by Gouy methods.</li> <li>Curie law, Curie-Weiss law, explanation of magnetic behaviour of K4[Fe(CN)6], Kg [Fe(CN)6], [Co(NH))6]C13, K3 [COF6] , K2 [Ni(CN)4], Ni(CO)4.</li> </ul>	<ul> <li>complexes on basis of Crystal Field Theory</li> <li>Calculate the magnetic susceptibility by Gouysmethods</li> <li>Explain the Curie law, Curie-Weiss law and magnetic behaviour of differentcomplexes.</li> </ul>	
Unit-II Physical cl	hemistry (Marks:24)	
Chapters	Learning Outcomes	
A. Thermodynamics and Kinetics Thermodynamics: Thermodynamic systems- system,	<ul> <li>On completion of this unit, the student should be able to:</li> <li>✤ Understand the three laws of thermodynamics, concept of State and Path functions, extensive and intensive</li> </ul>	
surroundings and processes isothermal, isobaric, isochoric processes, reversible, irreversible, adiabatic, cyclic etc.processes	<ul> <li>properties.</li> <li>Derive the expressions of ΔU, ΔH, ΔS, ΔG, for ideal gases under different</li> </ul>	

thermodynamic parameters, thermodynamic laws- zeroth law. First law of Thermodynamics:

Statement, mathematical form, concept of enthalpy and heat capacity of gases, Cp and Cv, their interrelationships, Joule's experiment, Joule-Thompson effect, liquefaction of gases.

**Thermochemistry:** exothermic and endothermic reactions, enthalpy (heat) of formation, reaction, combustion, solution, neutralization, atomization, etc.; laws of thermochemistry, bond dissociation energy, Born-Habercycle.

## **Chemical Kinetics:**

Order and molecularity of reaction, rate of reaction, rate laws and rate equations, differential and integral forms of rate equationzero order, first order and second order reactions, half life and average life, experimental methods for the determination of order of reactions, effect of temperature on the rate of reaction, Arrhenius equation, concept of activation energy, collision theory and transition state theory of reaction rates and their comparisons.

# B.TheLiquidStateandSolutionProperties: The LiquidState:

Physical properties of liquids including their experimental methods of determination, internal pressure, vapour pressure, surface tension, viscosity, effect of temperature on these properties, structure of liquid and liquid crystals(elementary idea).

## **Solution Properties:**

Types of solutions, idea! andnon-ideal solutions, modes of expression of composition of solutions - molarity, molality, normality, mole fraction and percentage, solutionsofgasesinliquids,Henry'slaw.

## **Properties of dilute solutions:**

Extensive and intensive properties, colligative properties, Raoult's law of relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmosis- laws of osmosis, determination of molecular weight of substances based on these properties their interrelationships and their thermodynamic conditions.

- predict the energy change in heat capacities at constant volume and pressure and theirrelationship.
- ✤ drive Joule's law and itsapplication.

- Understand the concept of rate of change associated with chemical change on experimentaldata.
- Understand the concept of pseudo-first order kinetics and when theyapply.
- Apply integrated rate equations to solve for the concentration of chemical species during a reaction of differentorders.
- Understand the concept of an activation energy and calculate the activation energy using Arrheniusequation
- Liquid state and its physical properties related to temperature and pressure variation.
- Describe the solubility of gases in liquids(HenrysLaw)
- differentiate colligative properties of solution like elevation of boiling point, depression of freezing point with relatively lowering the vaporpressure.
   Explain the thermodynamic basis of colligative properties and applications in
  - surroundings
- Describe the abnormal properties of nonvolatile solute (van'tHofffactor)

derivation, analogy between, abnormal solution	
properties, van't Hoff factor.	
C. Physical properties:	
Additive and constitutive properties- molar volume at boiling point, parachor, rheochor, molar refraction, optical activity, speCific and molar rotation-optical rotatory dispersion (ORD) and circular dichroism (CD), molar polarization, induced andorientationpolarizations, polar and non- polar molecule dipole moment- ClausiusMosotti equation, Debye equation, experimental methods for the determination of dipole moment,magnetic properties; paramagnetism, diamagnetism andferromagnetism. <b>Practical: Organic Qualitati</b>	<ul> <li>Learn the Molecular structure in relation to opticalrotation</li> <li>Explain the polarisation, ClausiusMosotti equation, Debyeequation</li> </ul>
Chapters	Learning Outcomes
A. Organic qualitative analysis: Identification of a pure solid organic compound through detection of special elements (nitrogen, sulphur, halogens) and functional groups (phenolic-OH, -COON, - CHO, >CO, -NH2, -NO2, -CONH2,>C=C<). (Determination of mp, solubility test, detection of special elements, detection of functional groups, preparation of suitable derivative, determinationof RfvalueonTLC and survey of literature). No need to write detail analytical methods, observations instead total analytical data should be submitted in the given format to be supplied in theexamination.	
List of compounds to be identified: Adipic acid, Cinnamic acid, succinic acid, benzoic acid, salicylic acid, o-chlorobenzoic acid, benzamide, phthalimide, benzil, benzoin, p- nitro benzoic acid, benzophenone, glucose, urea. Sulphanilic acid, p- nitroaniline, fl-napthyl amine, resorcinol, 13- napthol, hydroquinol, anthranilic acid, benzoic acid, p-nitrobenzoic acid, 4- hydroxy benzoic acid.	

B.Sc. Honours Semester-IV Subject: Chemistry Paper- H4		
emistry (Marks:24)		
Learning Outcomes		
On completion of this unit, the student should be able to:		
<ul> <li>Understand various types of reactive intermediates and factors affecting their stability.</li> <li>learn the chemistry active methylene compounds and Grignardreagents.</li> <li>Explain the use of active methylene groups in organic mechanism and preparation of new organic compounds.</li> <li>Describe the uses Organometallic compounds in various organic transformationreactions.</li> <li>Know the fundamental principles of rearrangement reaction &amp;predict the outcome of the products through suitable mechanism.</li> </ul>		
emistry (Marks:24)		
Learning Outcomes		
<ul> <li>On completion of this unit, the student should be able to:</li> <li>Recognize the basic concepts of thermodynamics</li> <li>Derive the Gibb's Helmholtz equation &amp; explain the thermodynamic criteria for spontaneity and equilibrium</li> </ul>		

 understand the physical significance of third law of thermodynamics

 understand the Nernst Heat theorem.

**B. Chemicalequilibrium:** Reversible and irreversible reactions. law

Nernst Heat Theorem — third law of

thermodynamics (statementonly).

of mass action, equilibrium constant, expression for equilibrium constants in various equations, themodvnamic derivation of law of mass action using free energy change and van'tHoff equilibrium box, Le Chatelier principle. Interrelationship between Kp, Kc and KN, Reaction isotherm, reaction isochore, \Van't Hoff equation, equilibrium inphases —Clapeyron equation, ClausiusClapeyronequa tion.

#### **C.Electrochemistry-I:**

Electrical transport: Conductance of electricity through metals. Arrhenius theory of electrolytic dissociation; transportnumber;specificand equivalent conductance; ionic mobility; Kohlrausch law and its application;Deby- Huckel Onsager equation (no derivation), ionic strength, Debye- Huckel limiting law (no derivation); activity and activity coefficient; application of conductance measurements —conductometric titrations, solubility product of sparingly solublesalts

Ionic Equilibrium:Ostwald dilution law; ionization of water; ionic product of water; pH; buffer solution, buffer action and buffer capacity. Henderson equation, hydrolysis of salts, common ion effect, solubility product, - application of solubility product principle in analytical chemistry. Indicators — types, criteria for good indicators, theory of acid base indicators.

**D.Phase:**Phase, component, degree of freedom, phase rule equation: F= C-P 2 and its thermodynamic derivation.One Component Systems —

water, carbon dioxide, sulphursystem.Two Component Systems salt solutions: KI — water; salt hydrate — CuSO4.5H20. Binary alloys: antimony lead; aluminium — magnesium; gold —tin systems.Liquid — liquid mixture:Phenol — water, water — triethyl amine; Thermal analysis, cooling curves, eutectic points, different alloys.  understand the thermodynamic derivation of relations between the various equilibrium constants Kp, KcandKx.

 Explain the Le Chatelier principle & its applications in equilibrium.

Learn the

- ClausiusClapeyronequation.
- understand about electrolyte and their behaviour in different solvents.
- Describe the Kohlrauschlaw and its application; theory of strong electrolytes-Debye .Huckel-Onsager equation
- Recognize the ionic conductance of electrolytes in terms of mobility ofions

 Calculate the pH, concept of Buffer solution and Salt hydrolysis (acid-base hydrolysis) and its application inchemistry.
 recognize the degree of hydrolysis and hydrolysis constant

 Defines the phase, component, degree of freedom and phase rule concepts

 Defines the Phase Diagrams in the field of materials science and engineering (one and two componentsystem)

Practical:	<b>Physical Experiments</b>	Marks: 32
Chapters		Learning Outcomes
I. Determination of surfa tension of a given liquid	ce /	

solution with a stalagmometer by	
drop weight method.	
2 Determination of viscosity coefficient of	
a given liquid / solution by Ostwald's	
a given inquita / solution by Ostward's	
viscometer.	
3. Determination of distribution coefficient	
of iodine between water and an organic	
solvent.	
4.Determination of distribution	
coefficient of an organic acid	
between water and an organic	
solvent.	
5. Determination of pH of a buffer solution	
by colour matching of indicator.	
6. Conductornetrue Titration of Strong	
Acid(HC1) vsStrongBase(NaOH)	
7. Conductometrije Titration of Weak	
Acid(CH3COOH) vsStrongBase(NaOH)	

B.Sc. Honours Semester-V Subject: Chemistry Paper- H5		
Unit-I InorganicChe	emistry (Marks:20)	
Chapters	Learning Outcomes	
ChaptersA. d- and f-Block Elements:Electronic configuration of d-block elements, general properties of transition metals, relative stability of oxidation states, comparison of properties of first, second and third row transition metals. Electronic configurations of lanthanides and 	Learning Outcomes         By the end of this unit students will be able to: <ul> <li>Understand the general characteristics of the d and f blockelements</li> <li>learn the physical and chemical properties of d and f block elements</li> <li>understand preparation of selected transition metal compounds, lanthanides and actinides</li> <li>Compare lanthanide and actinide contraction and their consequence</li> <li>understanding the separation of Lanthanoids and Actinoids, itscolour, spectra and magnetic behaviour.</li> <li>understand the role of metals in biologicalsystems.</li> <li>Understand the nature of Zeise's salt and compare its synergic effect with that of carbonyls.</li> </ul>	
<b>B.</b> Nuclear and Radio-chemistry: Nuclear particles; neutron-proton ratio and its implications, types of radioactive decay; nuclear binding energy; mass defect and packing fraction; natural and artificial radioactivity; first order rate equation of radioactivedisintegration;	<ul> <li>❖ Learn the fundamentals of nucleardecay</li> <li>❖ Distinguish between types of nuclear reactions.</li> <li>❖ Describe measurement of</li> </ul>	

radioactive equilibrium; radioactive	radioactivity.
disintegration series; half-life and average	radioactivity and radioisotopes in
life period, group displacement law, unit	variousfields
of radioactivity; carbon-14 dating, types	
of nuclear reactions, concepts of fusion	
and fission, spontaneous fission, Q value;	
nuclear forces: n-n, n-p,p-p.	

Unit-II Inorganic C	hemistry(Marks:20)
Chapters	Learning Outcomes
.A. <i>Organometallic Compounds:</i> Definition, classification and	<ul> <li>understand the classification, properties and applications of</li> </ul>
nomenclature of organometalllic compounds. Alkyls and aryls of lithium, silicon and mercury (preparation and uses). 18 electron rule and its applications to carbonyls (including carbonyl hydrides and carbonylates), nitrosyls, cyanides, sigma- and pi- bonded organometallic compounds of transition metals. Simple examples of metal-metal bonded compounds and metal clusters. Metal — olefin complexes; Zeise'ssalt(preparation, structure and bonding), ferocene (preparation, structure and reactions). Hapticity (n) of organometallic ligands, examples of mono-, tri- andpentahaptocyclopentadienyl complexes. Coordinative unsaturation: oxidative addition and insertion reactions. Homogeneous catalysis by organometallic compounds (examples	<ul> <li>organometalliccompounds</li> <li>learn the methods of preparation, properties, structure and bonding of metal carbonyls and metalclusters</li> <li>Understand the nature of Zeise's salt and compare its synergic effect with that of carbonyls.</li> <li>Identify important structural features of the metal alkyls tetrameric methyl lithium and dimerictrialkylaluminiumand explain the concept of multicenter bonding in these compounds</li> <li>Apply 18-electron rule to rationalize the stability of metal carbonyls and relatedspecies</li> <li>Get a general idea of catalysis and describe in detail themechanism of Zeigler- Natta catalyst.</li> </ul>
excluding mechanism): hydrogenation, hydroformylation and polymerizationof	

alkenes (Zigler-Natta catalysis).

<ul> <li>B.Bioinorganic Chemistry: Structure of cell membrane, membrane transport (active and passive transport process); essential and trace elements in biological processes, criteria of essential elements, pH of biological</li> <li>fluid, metalloporphyrins, structure, and functions of haemoglobin, myoglobin and chlorophyll; role of Fe and Mg in haemoglobin and chlorophyll, role of Coinvitamin1312,Carbonicanhydrase, its characteristics and functions,. Non- complexingcations in biochemical processes,Na</li> <li>1(±pump;Toxiceffectsofmetalionswithre ferencetomercury,lead, beryllium and aluminum; deficiency of Fe, Ca, Mg and iodine; Platinum complexes as anti- cancerdrugs.</li> </ul>	<ul> <li>Discuss the role of ions in biological systems and biochemistry of haemoglobin, myoglobin and chlorophyll;</li> <li>Discuss various bioinorganic processes like photosynthesis, working of sodium potassium pump, etc</li> <li>Explain the use of chelating agents in medicine and, specifically, the role of cisplatin in cancer therapy</li> <li>explain the applications of iron in biological systems with particular reference to haemoglobin, myoglobin</li> </ul>
cancerdrugs.	
C. Statistical treatment of data	<ul> <li>Perform experiment with</li> </ul>
analysis: Accuracy and precision,	accuracy and precision.
classification of errors, detection and	
correction of determinant and	
indeterminant errors; the normal law	
of distribution of indetermination errors;	
the F and I tests, rejection of data,	
methods of least squares, propagation of	
Unit III OrganiaCha	mistay (Manka:20)
Unit-III OrganicChe	mistry (Wiarks:20)

Unit-III	OrganicChe	mistry	(Marks:20)
Chapters			Learning Outcomes
<b>A. Heterocyclic compo</b> Introduction, five and six heterocycles, aromatic	ounds: membered character,	*	understand condensed fiveand

nomenclature, structure, synthesis and	six members heterocyclic.
chemical reactivity of furan, pyrrole,	<ul> <li>Study the synthesis, reactivity,</li> </ul>
pyrrole and pyridine: Introduction to	aromatic character and
condensed five and six membered	importance of heterocyclic
heterocycles, synthesis and reactivity of	compounds.
indole, quinoline and isoquinoline with	<ul><li>learn the structure and functions</li></ul>
synthesis Skraup synthesis and	of carbohydrates, amino acids,
BischlerNapieralskysynthesis.	proteins and nucleic acids
1 5 5	<ul> <li>Become familiar with their</li> </ul>
<b>B.Carbohydrates:</b> Introduction,	particular properties, chemical
occurrence, classification, nomenclature,	reactions, criterion of aromaticity
inter-relationshipamongst	with reference to polynuclear
monosaccharides, constitution of glucose	hydrocarbons and heterocyclic
and fructose, ribose and arabinose,	compounds, trends in basicity of
reactions of glucose and fructose,	heterocycliccompounds
osazone formation,	• Understand the mechanism of
mutarotation and its mechanism, cyclic	reactions of selected polynuclear
structures, pyranose and furanose	Describe the open shain
forms, determination of ring size.	structures & evelic of
Haworth projectionformula,	carbohydrates (glucose fructose
configurations and conformational	etc.)
analysis of monosaccharides,	<ul> <li>Explain the difference between</li> </ul>
epimerisation, ascending and	anomers&epimers.
descending of sugars, interconversion of	<ul> <li>Discuss the synthesis of amino</li> </ul>
	• • • • •
aldoses andketoses.	acids,peptides
aldoses andketoses. C Amino acids and Proteins:	<ul><li>acids,peptides</li><li>Classify protein and demonstrate</li></ul>
aldoses andketoses. C Amino acids and Proteins: Introduction, alpha-amino acids —	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary</li> </ul>
aldoses andketoses. C Amino acids and Proteins: Introduction, alpha-amino acids — synthesis, physical and chemical	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protection and de- protection strategies involved in peptide synthesis:	acids,peptides ◆ Classify protein and demonstrate the primary and secondary structure ofproteins
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of	acids,peptides Classify protein and demonstrate the primary and secondary structure ofproteins
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of proteins (definationsonly)	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of proteins (definationsonly) and chemical test of proteins.	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> </ul>
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aldoses andketoses. <b>C Amino acids and Proteins:</b> Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis,protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of proteins (definationsonly) and chemical test of proteins. <u>Unit-IV</u> Organic C <u>Chapters</u> A.Pericyclic& Photochemical Reactions:	<ul> <li>acids,peptides</li> <li>Classify protein and demonstrate the primary and secondary structure ofproteins</li> <li>hemistry(Marks:20)</li> <li>Learning Outcomes</li> </ul>
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aldoses andketoses. C Amino acids and Proteins: Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis,protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of proteins (definationsonly) and chemical test of proteins. Unit-IV Organic C Chapters A.Pericyclic& Photochemical Reactions: Definition and classification, electrocyclic reactions: FMO approach, ayampla of alactrographic reactions	<ul> <li>Acids, peptides</li> <li>Classify protein and demonstrate the primary and secondary structure of proteins</li> <li>hemistry(Marks:20)</li> <li>Learning Outcomes</li> <li>Understand the synthesis &amp; applications of various</li> </ul>
aldoses andketoses. C Amino acids and Proteins: Introduction, alpha-amino acids — synthesis, physical and chemical properties, iso-electric points, peptide synthesis, protectionandde- protection strategies involvedin peptide synthesis; determination of C and N terminal amino acid residues; proteins classification, primary, secondary, teriary and quaternary structure of proteins (definationsonly) and chemical test of proteins. Unit-IV Organic C Chapters A.Pericyclic& Photochemical Reactions: Definition and classification, electrocyclic reactions: FMO approach, example of electrocyclic reactions (thermal and photochemical) involving	<ul> <li>Acids, peptides</li> <li>Classify protein and demonstrate the primary and secondary structure of proteins</li> <li>hemistry(Marks:20)</li> <li>Learning Outcomes</li> <li>Understand the synthesis &amp; applications of various photochemical Reactions</li> </ul>
aldoses andketoses.         C Amino acids and Proteins:         Introduction, alpha-amino acids —         synthesis, physical and chemical         properties, iso-electric points, peptide         synthesis, protectionandde- protection         strategies involvedin peptide synthesis;         determination of C and N terminal         amino acid residues; proteins         classification, primary, secondary,         teriary and quaternary structure of         proteins (definationsonly)         and chemical test of proteins.         Unit-IV       Organic C         Chapters         A.Pericyclic& Photochemical Reactions:         Definition       and         classification,       electrocyclic reactions; FMO approach,         example of electrocyclic reactions       (thermal and photochemical) involving         47: and 6t electrons and corresponding       1000000000000000000000000000000000000	<ul> <li>Acids, peptides</li> <li>Classify protein and demonstrate the primary and secondary structure of proteins</li> <li>hemistry(Marks:20)</li> <li>Learning Outcomes</li> <li>Understand the synthesis &amp; applications of various photochemicalReactions</li> <li>acquire knowledge on the basic minimize of the primary and secondary structure of proteins</li> </ul>
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basics of pericyclic reaction through FMOapproach

#### **B:SPECTROSCOPY:**

Ultraviolet and Visible spectroscopy: Introduction, theory, instrumentationand solvent effects, characteristic absorption of organic compounds, application of rules for calculation of km. polyenesanddienones.

Infrared Spectroscopy: Introduction, theory, instrumentation, characteristic group frequencies of organic molecules, factors affecting group frequencies. Proton NMR spectroscopy: Introduction, theory, deuterated solvents, chemical shift and factors influencing it, spin-spin coupling, charactersistic chemical values of different kind of protons, application of UV, IR and NMR in structure elucidation of organicmolecules.

B. Chemistry in applications: Dyes: Relation between colour and constitution, chromophore, auxochrome, valence bond theory ofcolour (ultraviolet visible absorption spectrum), classification of dyes, preparation and uses of phenolphthalein, methyl orange, congo red, malachite green, alizarin and indigo.

Drugs and pesticides: Introduction, classification of drugs, preparation and uses of aspirin, phenacetin, sulphanilamide, sulphaguanidine, diazepam. IntroductionandClas

sification of pesticides, natural and synthetic pesticides, preparation and uses of DDT, endrin, melathion, parathion andbaygon,  Discuss the principle of UV, IR, NMR and Massspectroscopy.

 Interpret spectroscopic data to elucidate the structure of simple organiccompounds.

 explain common terms in NMR spectroscopy such as chemical shift, coupling constant and anisotropy and describe how they are affected by molecular structure.

 Discuss theory of colourand constitution and the method of synthesis ofdyes

Learn the structure of drugs and pesticides have knowledge of their methods of synthesis and applications in everydaylife.

 understand the importance of different classes of drugs and their applications for treatment of variousdiseases

B.Sc. Honours Semester-V Subject: Chemistry Paper- H6			
Practical:	InorganicExperi	iments	Marks:40
Chapters			Learning Outcomes
<ul> <li>(a) Volumetric titri</li> <li>i) Estimation of Fe<sup>2+/</sup>Ca</li> <li>ii) Estimation of Cu<sup>2+</sup>/Fe<sup>+2</sup></li> <li>method</li> <li>iii) Estimation of CO3<sup>-2</sup> +</li> <li>mixture</li> </ul>	rations: <sup>+2</sup> byEDTA by iodometric - HCO3 <sup>-1</sup> in a		

iv) Estimation of total hardness of water samples	
Sumpres	
(b) Quantitative analysis i) Estimation of Nickel(II) usingDMG ii) Estimation of SQ <sup>-2</sup> by usingBaCl <sub>2</sub> method iii) Estimation of percentage of mixed oxide	
in an ore Hematite, dolomite, limestone.	
(c)Inorganic preparation &Crystallization: i) Tris (thiourea) copper (I)Sulphate ii) Hexamine cobalt (III)Chloride iii) Chloropentaaminecobalt(III)Chlorid e iv)Potassiumtris(oxalato)chromate (III) vi)Potassiumtris(oxalato)ferrate(III) vii) Sodiumperoxohorate	
ix) Sodiumeobaltinitrite	
ix) Sodiumeobaltinitrite Practical: Organic Expen	riments Marks:40
ix) Sodiumeobaltinitrite Practical: Organic Exper Chapters	iments Marks:40 Learning Outcomes
<ul> <li>initial (acetylacetalloto))(on(111))</li> <li>ix) Sodiumeobaltinitrite</li> <li>Practical: Organic Experimental (Chapters)</li> <li>i) Organic quantitative analysis:         <ul> <li>a) Estimation of glycine (Sorenson's method)</li> <li>b) Estimation of aniline (bromatebromidemethod)</li> <li>c) Estimation of oxalic acid (titrimetric method)</li> <li>i) Organic Preparation                 <ul></ul></li></ul></li></ul>	iments Marks:40 Learning Outcomes

B.Sc. Honours Semester-VI			
Subject: Chemistry			
Paper- H /			
Chapters	Learning Outcomes		
A.Electrochemistry-II:	On completion of this unit the student		
Electromotiveforce: Measurement ofe.m.f.,			
Weston-Cadmium cell, types of reversible electrodes. e.m.f of reversible cells, Nernst	should be ableto:		
equation, single electrode potentials, sign convention of e.m.f. a cell, reference electrode	<ul> <li>Understand different types of</li> </ul>		
— Hydrogen electrode.calomel electrode.	galvanic cells, their Nernst		
quinhydrone electrodes, standard electrode	equations, calculations of		
measurements elementary ideas of polarization	emf&thermodynamicproperties		
and over voltage- Tafel equation (no			
derivation), successive anodic and cathodic	<ul> <li>apply the Tatel equation to different</li> </ul>		
processes, Lead and alkaliaccumulators.	electrochemicalsystems		
transference liquid junction potential	$\blacklozenge  \text{define the term overpotential,}$		
corrosion-	explain its origin and the		
types of corrosion, theory of corrosion and	relationship between current and		
methods for combating corrosion.	potential for some types of		
D SUDEACE BDODEDTIES.	electrochemicalcells		
<b>Adsorption:</b> Absorption theories of	• describe different trans of comparing		
adsorption: Freundlich, Langmuir and	• describe different types of corrosion		
Gibb's adsorption isotherms — their	as well as explain the origin and		
derivations; BET equation: determination of	describe some common methods		
surface area of adsorbates	used to prevent or control corrosion		
ureandindustry. <b>Catalysis:</b> Classification:	processes		
criteria for a good catalyst; catalyst	✤ able to explain Freundlich.		
promoters and catalyst poisons;	Langmuir and Gibb's		
theories of catalysis; application of catalyst in the manufacture of ammonia initial acid and	adsorptionisotherms		
sulphuric acid: acid base catalysis			
and enzymecatalysis.	• Recall the basic physical concepts		
Colloids: Definition, classification, preparation	in adsorption, BETequation		
and purification of colloids, properties of	<ul> <li>getanelementaryideaofcatalysisi</li> </ul>		
motion) ontical (Tyndal effect) electrical	ncludingenzymecatalysisforthe		
(Zeta potential) properties, stability and	manufacture of ammonia;		
protective action of colloids — Gold number;	nitric acid and sulphuricacid		
Hurdy — Schulze rule, coagulation,	• apply the concents of colloids and		
functioning of soap and detergents micelle			
formation; critical micelles concentration	gels		
(CMC), emulsions. Introduction of Nano	<ul> <li>learndepthknowledgeaboutZetap</li> </ul>		
Particles & Applications.	otential, Hurdy-Schulze rule,		
C. MACROMOLECULES:	CMC,		
Definition, types of macromolecules, degree of polymerization molar mass number-average			
porymenzation, motar mass, number-average			

and weight-average molar mass, distribution of molar mass, Types of polymerization reactions — mechanism —kinetics of polymerization reactions; initiators-types functions. Conformation and configurationofmacromolecules in solution. Properties of macromolecules, their uses.

#### **D PHOTOCHEMISTRY:**

Interaction of radiation with matter, difference between dark (thermal) and photochemical reactions: elementary ideas of phosphorescence, fluorescence, luminescence; laws of photochemistry — Draper law, Stark — Einstein law, Lambert'slaw, Beer's law, Lambert — Beer's law, quantum yield and quantum efficiency; photochemical equilibrium; photosensitized reactions ; photosynthesis and photochemistry of air andair pollution: Understand the concept of nanomaterials, their properties and

applications.

 Learn about macromolecules, degree of polymerisation and calculation of the number average molecular weight and weight average molecular weight.
 Explain Lambert-Beer's law,

quantum efficiency and photochemicalprocesses.

 Will be able to interpret fluorescence spectroscopy, Explain basic principles of fluorescence spectroscopy

Unit-II PhysicalCher	mistry (Marks:20)
Chapters	Learning Outcomes
A. ATOMIC & MOLECULAR SPECTRA: Electromagnetic radiation Interaction of matter with electromagnetic radiation, different forms of energy viz, translational, electronic, vibrational, rotational energy in molecules, Born-Oppenheimer Approximation, types of spectra— absorption and emission	After the end of this unit, the students areable to; Understand the basics of
<ul> <li>spectra, atomic or line spectra and molecular or bandspectra.</li> <li>Rotational Spectra - diatomic molecules, energy levels of a rigid rotor, selection rules.</li> </ul>	spectroscopic techniques Born- Oppenheimer Approximation, Rotational, Vibrational and RamanSpectroscopy
Vibrational Spectra: Hook's law, expression for vibrational energy in terms of quantum number, anharmonicity, fundamental modes of vibration, overtones, Morse curves force constant. selection rules, bond energy, bond distance, isotope effect, <b>RamanSpectra:</b> Origin,Stokeslinesandanti- stokes lines, explanation of Raman spectra based on Einstein theory, Raman frequency, selectionrules,applicationofRamanspectra.	<ul> <li>Will be able to interpret atomic absorptionspectroscopy,</li> <li>Understand the basics of Hooks law, Frank-Condon Principle, selectionrules.</li> </ul>
Molecular Electronic Spectra: Potential energy (PE) curves, bonding and anti- bonding molecular orbitals, Frank-Condon Principle, selectionrules.	

#### **B.QNANTUM MECHANICS:**

i) ElementaryQuantum Mechanics: Black body radiation, Photo-electriceffect. Bohr model of hydrogen atom (no derivation) and its defects, Compton effect, de Broglie hypothesis, Heisenberg Uncertainity Principle, operators and observable, Hamiltonian operator; Schrodinger wave equation and itsimportance;

 ii) Molecular Orbital Theory(MOT): Criteria for forming molecular orbitals (MO) from atomic orbitals (AO), construction of MOs using LCAO hybrid orbitals — sp, sp2. spa, sp3d, d2sp3hybridization, comparison (in brief) of MOT and VBT (valence bond theory); Geometry of simple molecules like H20, NH3, CH4, H2O2, BF3 in terms of molecularorbitals.

#### D.STATISTICAL THERMODYNAMIC:

Limitation of classical thermodynamics, thermodynamic probability and entropy; Boltzmann distribution law (with derivation), partition function and its significance, translational partition function of ideal monoatomic gas (withderivation). Preliminaries of Maxwell-Boltzmann statistics, Bose-Einstein Statistics and Fermi-Dirac statistics, Thermodynamic functions in terms of partition functions; SackurTetrode equation (with derivation).heat capacity of solids.

- account for the basic principles and concepts of quantummechanics
- differentiate between classical and quantummechanics
- account the quantum mechanical model of the hydrogenatom
- solve the Schrödinger equation for model systems of relevance within chemistry
- articulate the basic postulates of statistical thermodynamics and basic concepts such as Boltzmann equation.
  - apply Fermi-Dirac and Bose-Einstein distributions to quantum idealgases

Unit-III IndustrialChem	uistry (Marks:20)
Chapters	Learning Outcomes
INDUSTRIAL CHEMISTRY INORGANIC BASED: Water : Modern methods of water treatment and purification	After the end of this unit, the students are able to;
<ul> <li>Fertilisers: Different types of N and P fertilizers, manufacture of ammonia, ammonium nitrate, urea phosphates and superphosphates. Nitrogen fixation by plants. Glass :Various types of glass fibres, optical glass, glazing and vitrification, glass ceramics.</li> <li>Cement :Various types of cement, their composition and manufacture. Portland cement, setting of cement.</li> <li>Paints : Constituents of different paints, Role of binder and solvent, Lead andZinc</li> </ul>	<ul> <li>understand different sources ofwater, water quality parameters, watertreatment</li> <li>account different types of fertilizers and theirapplications.</li> <li>Learn the composition and applications of the different kindsofglass.</li> <li>Understand glazing of ceramics and the factors affecting theirporosity.</li> </ul>

containing paints. Paints of common use.	<ul><li>Understand the role of binder</li></ul>
Metals and Alloys: General procedure of extractionofmetals.Manufacture. properties, composition and uses of important alloys. Manufacture of steel and stainless steel. Galvanization, rusting andcorrosion. Chemical Toxicology: Metal poisoning due to Pb, Cd and Hg, hazard from radioactive. Definition and principles of green chemistry.	<ul> <li>&amp;solvent in paints along with their commonuses.</li> <li>Get a general idea of synthetic gasoline manufacture byFischer-Tropschprocess.</li> <li>Give the composition of cement and discuss the mechanism of setting ofcement.</li> </ul>
ODCANIC DASED	<ul> <li>Hazardous effects of the radioactive</li> </ul>
Coal :Fisher-Tropsch process. Chemicals from coal. Petroleum : Manufacture and industrial reactions of ethane, propane, butadiene, acetylene. Synthesis of methanol from natural gas. Cracking of petroleum, knocking and octane number. Synthetic petrol, LPG and CNG. Biodiesel. Oils, Fats and Detergents :Catalytic hydrogenation of vegetable oil and fat for production of soap, synthesis of detergents. Principles of cleansing action. Polymers: a. Synthetic rubber (including principle of cross- linking and vulcanization), b. Plastics c. Resins, d. Silicones Enzymes in industries :Productionof alcohol by fermentation of starch and sugar (reaction conditions. nature of enzymes used, structural	<ul> <li>on human beings andvegetation.</li> <li>Generation of nuclear waste and its disposal.</li> <li>Learn about the composition, synthesis and mechanism of cleaning action ofdetergents</li> <li>Learn about the chemistry of synthetic polymers including rubbers, plastics andsilicones.</li> </ul>

Unit-IV GreenChem	uistry (Marks:20)
Chapters	Learning Outcomes
Definition. Principles of green chemistry, atom	After the end of this unit, the students are
economy, environmental factor; Green	able to;
synthesis (acetylation of primary amines,	<ul> <li>Understand the twelve principles of</li> </ul>
cycloaddition, benzyl-benzillic acid	green chemistry and will build the basic understanding of toxicity,
rearrangement reaction. thiamine catalyzed	hazard and risk of chemical
benzoin condensation, bromination of	substances.
	• account atom economy and how it
acetanilide ), reaction conditions, solvent free	is different from percentageyield.
reaction (three components synthesis of	<ul> <li>Learn to synthesisedifferent products that are lesstoxic.</li> </ul>
dihydropyrimidinone, ammoniumformate	<ul> <li>Understand benefits of use of</li> </ul>
	renewable feed stock which helpsin

meditedKnoevanagel reaction), sonochemical	energy efficiency and protection of
reaction (Ulman coupling), Use of green	the environment, renewable energy sources.
reagents (tetrabutyl ammonium tribromide,	<ul> <li>Appreciate the use of green</li> </ul>
green oxidizing agents), green catalysts, and	chemistry in problem solving skills, critical thinking to innovate and
greensolvents.	find out solution to environmental
	problems.

<b>B.Sc. Honours Semester-VI</b>		
Subject: Chemistry		
Paper- H8		
alExperiments Marks: 40		
Learning Outcomes		
Practical: Unit-II Industrial and GreenchemistryExperiments Marks:40		
Learning Outcomes		

using water as solvent)	
2. Basecatalyzedaldolcondensation(Synthesis	
ofdibenzalpropanone).	
3. Separation of reactions products by Column	
chromatography.	
Green Chemistry Practicals:	
1.Preparation of Manganese(III)	
acetylacetonate by using KMNO4 and	
acetylacetone.	
2. Preparation of Iron(III) acetylacetonate	
by using FeCl3, KOH and acetylacetone.	
3. Acetylation of primary amine by using	
Aniline. Glacial acetic acid and Zinc dust	
catalyst.	

# **Department of Economics**

Programme & Course	Programme Specific Outcomes	Course Outcome
B.A. Major		Paper-1 (Introduction to Economics)
Semester-1	PO1: Economics student in	On completion of the course students will able to :-
Unit-1: Basic Concept of	general will be able to pinpoint	CO1: develop ideas of the basic concept of economics demand, supply and market equilibrium
Economics	and understand the past, present	CO2: understand the basic utility analysis, consumer equilibrium.
Unit-11: Theory of Consumer	economic conditions of the	PCC, ICC, revealed preference etc.
Behaviour	country. The behavioural	CO3: understand the concept of total, average and marginal product,
Unit-III: Theory of Production,	patterns of different economic	cost & revenue, law of variable proportion, short-run and long-run cost curves
Cost & Revenue	agents, advance theoretical issues	CO4: develop ideas of basic concept of national income, GNP, NNP,
Unit-IV: National Income	and their application.	methods of measuring national income
Accounting	PO2: As the course contains the	Paper-11 (Microeconomic Theory)
Semester-II	fields like statistics, mathematics	CO1: Profit maximisation under perfect competition in short run &
Unit-1: Profit maximisation and	and economic principles, it	long run, Constant, Increasing and Decreasing cost industry, the effects
perfect competition & analysis of	enhance them to compute and	of tax
competitive markets	assess the real situation of the	CO2: Price discrimination-first, second and third degree, sources of monopoly power, Monopoly and monopony comparison, monopolist
Unit-11: Market with power-	economy including the size and	equilibrium, social cost of monopsony
monopoly, monopsony,	changes of population, income	CO3: Equilibrium of monopolistic competition under short-run and
monopolistic competition and	pattern, nature of an extend of	CO4: Price and employment of factor market, pareto optimality and
oligopoly	employment, rate of	social welfare function

Unit-III: Factor Market Analysis	development with pattern of	Paper-1II (Macroeconomics Theory)
Unit-IV: Welfare Economics	investments and savings, policies	CO1: Classical theory of employment, Keynesian equilibrium, the IS-
Semester-III	and social security measures	LM framework and complete Keynesian model
Unit-1: Theory of Employment	adopted in the country.	CO2: Keynesian s psychological law of consumption, MEC & MEI CO3: Fisher's cash transaction approach, cash balance approach,
Unit-11: Consumption Function	PO3: Basically, economic	quantity theory of money, modern theories of Money-Friedman
and Investment Function	graduates are familiar with the	CO4: Demand pull & cost push theories, effects of inflation in
Unit-III: Quantity Theory of Money	knowledge and application of	production & distribution, Haw trey's theory of trade cycle
Unit-IV: Inflation and Business	microeconomics and	Paper-1V (Public Finance & Basic Statistics)
Cycle	macroeconomics for the	CO1: Nature & scope of public finance, public & private goods, market
Semester-IV	formulation of policies and	failure, public revenue, tax & non-tax revenue
Unit-1: Public Revenue and	planning. They are equipped with	CO2: Internal & external debt, burden & redemption of debt, Canons & principles of taxation, benefit & ability to pay & fiscal policy
Expenditure	all the relevant tools/knowledge	CO3: Discrete & continuous variable, primary & secondary data,
Unit-11: Public Debt and Fiscal Policies	based on economic principles	frequency distribution, measures of central tendency, median & mode CO4: Measures of dispersion, correlation & regression and moments
Unit-III: Basic Mathematical Tools	including market functions and	controlation de regression and moments
for Economics	structures, efficiency in	Paper-V (Development Economics)
Unit-IV: Mathematical	manpower and resources	CO1: Economic growth & development, the evolution of measures of
Applications in Economics	n management need of	development, Human development Index
		CO2: Rostow & Marx stages of growth, Big push theory
Semester-V	credit/finance for initiating and	CO3: Structural approach of development, Lewis model & its
Unit-1: Measuring Development	accelerating projects.	extension by Kanis & Fei, Harris and Todaro model
Unit-11: Theories of Growth and	PO4: Graduates from the	environment: common property rights
Development	department are taught and	

explained the course with the	Paper-VI (International Trade & Mathematical Applications in
help of visuals aids like white	Economics)
board. They will be able to	CO1: Relations & functions, differential & integral calculus, Matrix
visualise the real world situation	CO2: Utility function, production & cost functions, demand & supply
and enhance them to initiate the	CO3: Theory of international trade- absolute & comparative
programmes for pursuing studies	advantage, Heckscher-Ohlin theory of trade, gains from trade
and he alert with the importance	CO4: Trade policy- types & quotas, balance of trade & balance of
of optroproposition alcilla for their	payments, foreign exchange market
	Paper-VII (Issues in Indian Economy)
self-employment, to improve the	CO1: Nature & broad characteristics if Indian economy
general attitudes and living	CO2: Agriculture- production & productivity, land reforms, green
conditions of the masses.	revolution, large, small & cottage industries, WTO & agriculture
PO5: To improve students a well	CO3: Money market- structure, RBI, SEBI, OTECI, NBFC, IRDA
founded education in economics.	CO4: Objectives & strategy of economic planning, economic reforms
PO6: To provide and adapt	Paper-VIII (History of Economic Thought & Basic Econometric
curricula that prepares our	Methods)
entreula that prepares our	CO1: Condition of Indian economy during the Mughal & pre-1857
graduates for employment and	period, transition to colonisation, trend in agricultural production
further study as economists.	CO2: Small & large scale industries- types, changes in production,
PO7: To provide structured	capital used, employment pattern, development of infrastructure
curricula which support the	CO3: Sampling distribution- meaning, objectives & types, statistical
academic development of	CO4. Two variable classical linear regression OLS linear regression
students	Contrative encoded integression, OES, integression
Students	
	explained the course with the help of visuals aids like white board. They will be able to visualise the real world situation and enhance them to initiate the programmes for pursuing studies and be alert with the importance of entrepreneurial skills for their self-employment, to improve the general attitudes and living conditions of the masses. PO5: To improve students a well founded education in economics. PO6: To provide and adapt curricula that prepares our graduates for employment and further study as economists. PO7: To provide structured curricula which support the academic development of students

Unit-III: Sampling & Statistical	PO8: To provide students with	Paper-1 (Economic Theory I)
Inference	the opportunity to pursue courses	CO1: Basic concepts, law of demand, elasticity of demand
Unit-IV: Bivariate Correlation &	that emphasise qualitative and	CO2: Utility, indifference curve analysis, PCC & ICC
Regression	theoretical aspects of economics	cO3: National income-real & nominal, circular flow, measurement &
Droioot Work (Compulsory)	POQ: To provide students with	CO4. Say's law of market Quantity theory of money Inflation-
Toject work (Compulsory)	109. To provide students with	causes, impacts and control of inflation
B.A. General	the opportunity to focus on	
Semester-1	applied and policy issues in	Paper-1I (Economic Theory II)
Unit-1: Basic Concept	economics.	CO1: Production function, cost of production- fixed & variable, short
Unit-11: Consumer Behaviour	PO10: To acquaint with some	& long run, Revenue- total, average and marginal revenue
Unit-III: National Income	basic concepts of	CO2: Theories of market, theories of factor pricing
Unit-IV: Determination of national	microeconomics statistical and	LOS: Keynes law of consumption- APC & MPC, APS & MPS, Investment, MEC & MEL Investment multiplier
income monoy and price	motoreal mothods to he	CO4: Functions of central & commercial banks, high power money.
meonie, money and price	mathematical methods to be	money multiplier
Semester-11	applied in economics, theoretical	Paper-III (Indian Economy)
Unit-1: Production, cost and	concept of public finance.	CO1: Features of under development, problems of poverty &
revenue	PO11: To acquaint with the	unemployment, government policies to combat the problems.
Unit-11: Theories of market	measurement of development	CO2: Role & importance of agriculture in Indian economy,
Unit-III: Consumption and	with the help of theories along	CO3: Role & problems of cottage, small & large industries in Indian
investment	with the conceptual issues of	economic development, Industrial policy of 1956 & 1991
Unit-IV: Money supply and	poverty and inequalities with	CO4: Role & monetary policy of RBI, central-state finance in India,
taxation	Indian perspectives.	FCI & FII, achievement & failures of India's five year plan.

Semester-III	PO12: To facilitate the historical	Paper-1V(Development Economics)
Unit-1: Basic features of Indian	developments in the economic	CO1: Indicators of development, growth vs development, human
Economy	thoughts propounded by different	development approach, stages of growth-Rostow & Marx
Unit-11: Indian agriculture	schools, learns the basic concept	unbalanced growth
Unit-III: Indian industry	of monetary analysis and	CO3: Trade as an engine of growth, Foreign investment- role of FDI
Unit-IV: Money market and capital	financial marketing in Indian	& foreign aid in economic development
market, Planning	financial markets and also lean	intervention, sustainable developem,nt-concept & indicators
Semester-IV	the development issues if Indian	
Unit-1: Meaning of development	economy.	Paper- V(Public Finance and International Trade)
Unit-11: Development models	PO13: Though the syllabi do not	instruments, principles of taxation- ability to pay & benefit approaches,
Unit-III: Trade and development	contain research methodology,	horizontal & vertical equity, direct & indirect tax, incidence & impact
Unit-IV: Planning and development	students are taught the techniques	of indirect tax, value added tax
Semester-V	to collect and disseminate	loan finance
Unit-1: Economic role of the state	information like primary and	CO3: Difference between internal & external trade, theory of absolute
and taxation	secondary data, preparation of	& comparative advantages, gains of trade, termof trade
Unit-11: Public debt	questionnaire, students are	CO4: Prohibitive & non-prohibitive rariffs, comparison of tariff & quota, exchange rate determination, protection & free trade.
Unit-III: Basis of Trade	deployed to do survey in the last	1, Sittinge the attention, protonon of the later
Unit-IV: Tariff and exchange rate	semester and on the spot	
Project Work (Optional)	interaction with personnel of the	
	case under study.	

# Department of Education, Ambedkar College Fatikroy, Unakoti, Tripura

The Three Years Under Graduate Programme of Tripura University has been designed to produced Young Graduates- both Male and Female with knowledge, experience, skills and abilities who can perform well either in their Higher studies or in a chosen Carrier. They're also supposed to play constructive roles as responsible citizens in the Society.

PROGRAMME SPECIFIC OUTCOME (PSO) & COURSE OUTCOME (CO)		
PROGRAMME (S)	PROGRAMME SUMMARY	
B.A. With Education Honors	The students are awarded the BA with Education honors degree after successful completion of three years/six semesters of studying mainly eight papers on the subject 'Education'. The papers are Philosophical & sociological foundations of education, Educational psychology, Development of education in India, Contemporary trends & issues in education, Educational technology & management, Basics of educational research & statistics and Educational theories & ideas of great educators. Besides those eight papers they have to prepare a research project on any one of the topics studied in the theory papers.	
B.A With Education as one of the Elective subjects	The students who take education as one of their electives have to go through five papers related to education. The papers are Education & Society, Educational Psychology, History of Education in India, Measurement, evaluation & statistics in education, Thoughts & ideas of great educators. Besides those five papers, if a student chooses Education for his project, he/she has to prepare a research project on any one of the topics studied in the theory papers.	
PROGRAMME IN SPECIFIC	PROGRAMME SPECIFIC OUTCOME	
B.A .With Education Honors	<ul> <li>The students after getting this degree are eligible for higher studies in Education as well as for getting jobs in various fields. A student after completing the Programme is able to <ul> <li>a) know the basics of Education as a subject and its relevance to other subjects.</li> <li>b) understand the importance of Education in day-to-day life and also comprehends the meaning of life, the aim of life and the ways of achieving it.</li> <li>c) apply the acquired experiences, knowledge and understanding in the changing life situations.</li> <li>d) acquire various life skills which are essential in day to day living.</li> <li>e) develop the moral, ethical and aesthetic value of life as well as the sense of personal, social and national responsibilities.</li> <li>f) enhance the professional and vocational competencies, especially if he/she is willing to join the teaching profession.</li> <li>g) Inculcate proper attitude towards life and jobs, adaptability and accountability for various jobs and professions.</li> </ul> </li> </ul>	
B.A with Education as one of the Elective subjects	Studying Education as a subject at the under graduate level helps to acquire the knowledge and understanding of Education and its importance in life. It also develops proper attitude, habits, skills and abilities to deal with various critical situations in day to day living. It further makes the individual fit for doing various jobs.	

COURSE OUTLINE	COURSE OUTCOME
BA Education Honors Paper – I (1 <sup>st</sup> Semester) (Philosophical & Sociological Foundations of Education)	This paper intends to give the students the basic knowledge of philosophy & sociology and their relevance to education. The Students after going through this paper are able to:
Unit – I (Concept of Education)	1.acquire the knowledge of Education and its nature, scope, factors, aims and functions.
Unit – II (Introduction to Philosophy of Education)	2. understand the concept of philosophy and its relationship with Education. They can further explain the different areas of Philosophy and their educational implications.
Unit – III (Basics of Sociology of Education)	3.explain the relationship between sociology and Education. They also can describe the society, its structure and function as well as the role of Education therein. It also acquaints the students with the understanding of culture and community in Indian perspective and their relationship with Education.
Unit – IV (Education and Social system)	4.enhance the knowledge of social change, social stratification and social mobility and the role of Education therein. They also understand social equity and equality of educational opportunities in India.
BA Education Honors Paper – II (2 <sup>nd</sup> Semester) (Educational Psychology)	This paper intends to give the students the basic knowledge of Psychology and its related aspects like personality, intelligence, learning and various theories related to them. So, after going through the paper the students are able to:
Unit – I (Concept and methods of educational Psychology)	1.know the meaning, nature and scope of Psychology and its relationship with Education. They also know the different methods of Psychology and their usage in the field of Education.
Unit – II (Learning Process)	2. acquaint with the meaning of learning, its various factors and theories. They're also able to use those theories in actual learning situations.
Unit – III (Intelligence & Creativity)	3.understand the meaning of intelligence and creativity. They also acquaint themselves with the various types and techniques of measuring intelligence and creativity.
Unit – IV (Developmental Psychology)	4.explain the concept of personality, its characteristics and different theories related to it. They also comprehend the development process of learning ability in the children as suggested by Piaget, Bruner, Kohlberg and Vygotsky.
BA Education Honors Paper – III (3 <sup>rd</sup> Semester) (Development of Education system in India)	This paper intends to give the students the basic ideas about the evolution and development of education system in India since the Vedic period up to the 21 <sup>st</sup> century. So, after going through the paper the students are able to:
Unit – I (Education in ancient and medieval India)	1.understand the system of Education developed during Vedic, Brahminic, Buddhistic as well as Islamic period in India.

Unit – II (Education during pre- independence period)	2.know the development of Education during British period. They also can understand the contributions of different commissions and committees in the evolution of education system during that period.
Unit – III (Education during post- independence period)	3.make them acquainted with the contributions of four major educational commissions made for the development of various stages of education in India. The commissions are Higher education commission of 1948-49, Secondary education commission of 1952-53, Kothari commission of 1964-66, National policy of Education 1986 and Programme of action 1992.
Unit – IV (Recent issues in Education)	4.enhance the knowledge of right to education Act. Knowledge commission report, SSA, RMSA, RUSA etc. They also can identify various problems of Secondary and Higher education in Tripura and suggest the remedial measures.
BA Education Honors Paper – IV (4 <sup>th</sup> Semester) (Contemporary Trends and Issues in Education)	This paper intends to give the students the basic knowledge about the different agencies/ organizations and their functions in the field of Education. It further makes the student aware of the recently developed issues like vocationalization of Education, Value Education, inclusive education, population Education, teacher education, education for women empowerment etc. So, this paper helps the students to:
Unit – I (Education and Child welfare)	1.know the different agencies like Anganwadi, Balwadi, Creches, Day Care Centre, ICDS, ICCW etc. and their role in child welfare and education.
Unit – II (Educational organizations and their role)	2.understand the role of NCERT, SCERT, DIET, & TBSE etc. in the field of school education and the role of UGC, NAAC, AICTE, ICSSR, NUEPA, CSIR etc. in higher education.
Unit – III (Contemporary trends in Education)	3.make them aware of the contemporary trends like Vocationalization of Education, Value Oriented Education, Inclusive Education etc. and understand some current problems like student unrest, language problem in India, unemployment problem in India etc. along with solutions to tackle those problems.
Unit – IV (Emerging issues in Education)	4.comprehend the emerging concepts in Education like population education, environmental education, teacher education, education and women empowerment etc.
BA Education Honors Paper – V (5 <sup>th</sup>	This paper enables the students to understand the concept,
(Measurement & Evaluation in	different tools and techniques adopted in measurement and
Education)	evaluation etc. it also makes the students understand the
	characteristics of various types of tests used in evaluation. This namer also highlights about the modern trends like CCF. Grading
	System, Credit System, Question Bank, Semester System etc. and
	their usage in evaluation of educational achievements. So, after going through this paper the students are able to:
Unit – I (Measurement Assessment &	1. differentiate among measurement, assessment and evaluation and
Evaluation in Education)	also their relationship and similarities
Unit – II (Tools and Techniques of	2.know the different tools and techniques used in evaluation like Tests,
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Assessment)	Observation, Assignment, Project etc. And it further helps the students
	to understand how to construct and standardize a Test.
Unit – III (Concept and characteristics	3.explain a good test and its characteristics like Reliability, Validity,
of a good test)	Norms, Objectivity etc. along with the factors affecting those
	characteristics.
Unit – IV (Modern trends in	4.realize the modern techniques of evaluation like CCE, Grading &
Evaluation)	Credit System, Semester System etc. and their advantages and
	limitations.
<b>BA Education Honors Paper – VI</b>	This paper enables the students to recognize the meaning, nature,
(5 <sup>th</sup> Semester)	purpose & types of educational technology and educational
(Educational Technology &	management. It further helps the students to understand the
Management)	various modern techniques of teaching learning and use of ICT in
	educational organization and management. So, after going
	through this paper the students are capable of:
Unit – I	1.understanding the meaning, nature, scope, needs and importance of
	educational technology. It also enhances the knowledge of
	communication, use of various approaches and techniques of
	communication in teaching learning.
Unit – II	2.explaining the concept of system approach, programmed learning,
	computer aided learning etc.
Unit – III	3.realizing the needs & importance of scientific organization and
	management of education system.
Unit – IV	4.explaining the concept and importance of planning and organization
	of education. It further enhances their knowledge about educational
	planning and man power planning along with their various steps and
	strategies.

BA Education Honors Paper – VII (6 <sup>th</sup> Semester) (Basics of Educational Research and Statistics)	This paper enables the students to understand the meaning, nature, purpose & types of educational Research and use of various educational data graphically and statistically in educational management and evaluation. So, after going through this paper the students are able to:
Unit – I (Concept and types of Research)	1.acquire the basic knowledge of research in education, its nature and scope, its types and techniques etc. it also enhances their knowledge of identifying research problem, formulating research objectives and hypothesis.
Unit – II (Major approaches of research)	2.understand the different approaches of research like Historical, Descriptive, Experimental and Survey.
Unit – III (Basic Statistics and their uses)	3.realized importance of statistics, measure of central tendency and dispersion, graphical representation of data, co-relation and their uses.
Unit – IV (Inferential data analysis)	4.analyse the inferential data by using NPC, Standard Scores, CR-Test (t-test), Chi-square Test etc.
BA Education Honors Paper – VIII (6 <sup>th</sup> Semester) (Educational theories and Ideas of great educators)	This paper enables the students to understand the life, philosophy of life, and contribution of six Indian great educators and six Western great educators in the field of Education. So, this paper helps the student to:

Unit – I	1.know the life, philosophy and educational contribution of three grea Indian Scholars - Raja Ram Mohan Roy, Ishwar Chandra Vidyasaga and Swami Vivekananda.	
Unit – II	<ul> <li>2.understand the life, philosophy and educational contribution of three great Indian Scholars – Rabindranath Tagore, Mahatma Gandhi, Shri Aurobindo.</li> </ul>	
Unit – III	3.comprehend the life, philosophy and educational contribution of three great Western Scholars – J J Rousseau, J H Pestalozzi, F W A Froebel.	
Unit - IV	4.analyse the life, philosophy and educational contribution of three great Western Scholars Herbert Spencer, John Dewey, Madam Maria Montessori.	
100 Marks Project Work	Through this paper, all the students of Education honors are made acquainted with the practical knowledge of carrying out a research- based project choosing a topic from any one of the earlier studied eight theory papers. They have to follow a prescribed format provided by Tripura University, by which they develop necessary knowledge and aptitude of preparing and presenting research work.	
BA with Education as one of the Elective papers Paper – I (1 <sup>st</sup> Semester) (Educational and society)	This paper makes the students acquainted with the meaning, nature, scope, functions, factors and aims of Education. It also enhances the knowledge of students about curriculum, its types, its principles as well as the concept, needs and organization of co-curricular activities in Education. This paper further helps the students to understand the functions of the different formal and non-formal agencies of Education, role of Education in social change, relationship between culture and Education, constitutional provisions related to Education etc. So, after going through this paper the students able to:	
Unit – I (Introduction to Education)	1.understand the meaning, nature, scope, functions, factors and aims of Education.	
Unit – II (Curriculum & Child centered Education)	2.explain the meaning, types, and principles of curriculum as well as organizing co-curricular activities in Education. It further helps them to understand the concept of child centered Education.	
Unit – III (Educational Social Sub- system)	3.know the relationship between Education & Society, Culture & Education, Education as a process of socialization and as a means of social cohesion.	
Unit – IV (Current issues relating to Education)	4.realize some current issues like equalization of educational opportunities, liberalization, globalization and privatization in education. This unit also enhances their knowledge about various problems of SC, ST, Deprived classes, women, Rural poor people in Education.	
BA with Education as one of the elective papers Paper – II (2 <sup>nd</sup> Semester) (Educational Psychology)	This paper intends to give the students the basic knowledge of Psychology and its related aspects like personality, intelligence, learning and various theories related to them with educational implications. So, after going through this paper the students are able to:	

Unit – I (Introduction educational	1.understand the meaning, nature and scope of Psychology and its
psychology)	relationship with Education.
Unit – II (Intelligence of creativity)	2.know the meaning of intelligence and creativity and differentiate
	between them. They also can apply the various techniques of measuring
	intelligence and creativity.
Unit – III (Personality & Individual	3.explain the concept of personality and individual differences in
Differences)	Education along with their educational significance.
Unit – IV (Learning)	4.elaborate the meaning of learning, its various factors and theories.
	They also can apply those theories in actual learning situations.

BA with Education as one of the Elective Paper Paper – III (3 <sup>rd</sup> Semester) (History of Education)	This paper intends to give the students the basic ideas about the evolution and development of education system in India since the Vedic period up to the 21 <sup>st</sup> century. So, after going through this paper the students are able to:
Unit – I (Education in ancient and medieval India)	1.realize the system of Education developed during Vedic, Brahminic, Buddhistic as well as Islamic period in India.
Unit – II (Education in early British period)	2.know the development of Education during early British period and understand the contributions of Sri Rampur Mission, Fort William College, Lord William Bentinck, Raja Ram Mohan Roy, Vidyasagar in the evolution of education system during that period.
Unit – III (Education during pre- independence period)	3.explain the development of Education during British period and analyze the contributions of different commissions and committees in the evolution of education system during that period.
Unit – IV (Education during post- independence period)	4.know the different educational provisions made in Indian constitution and acquaint themselves with the contributions of four major educational commissions made for the development of various stages of education in India. The commissions are Higher education commission of 1948- 49, Secondary education commission of 1952-53, Kothari commission of 1964-66, National policy of Education 1986 and Programme of action 1992.
BA with Education as one of the Elective Papers Paper – IV (4 <sup>th</sup> Semester) (Measurement, evaluation & statistics in Education)	This paper enables the students to understand the concept, purpose & types of measurement and evaluation in Education, different tools and techniques adopted in measurement and evaluation etc. it also makes the students understand the basic concept of statistics and its usage in Education. So, after going through this paper the students
Unit – I (Introduction to	are able to: 1.differentiate between measurement and evaluation along with their
Measurement & Evaluation)	similarities and dissimilarities.

Unit – II (Tools and Techniques of	2.know the different tools and techniques used in evaluation and
Evaluation)	understand the concept of a good test and its characteristics like
	Reliability, Validity, Norms, Objectivity etc. along with the factors
	affecting those characteristics.
Unit – III (Concept of educational	3.realize the use of statistics, measure of central tendency and dispersion,
statistics)	graphical representation of data, co-relation etc.
Unit – IV Co-relation & Normal	4.acquaint themselves with the knowledge of inferential data analysis by
Probability Curve)	using NPC, Spearman's Rank Difference method, Product moment
	method of co-relation etc.

BA with Education as one of the Elective papers Paper – V (5 <sup>th</sup> Semester) (Thoughts and ideas of great educators)	This paper enables the students to understand the life, philosophy and contribution of four Indian great educators and four Western great educators in the field of Education. So, after going through this paper the students are able to:
Unit – I	1.know and understand the life, philosophy and educational contributions of two Great Indian Scholars – Sri, Aurobindo and Swami Vivekananda.
Unit – II	2.know and understand the life, philosophy and educational contributions of two Great Indian Scholars – Rabindranath Tagore and Mahatma Gandhi.
Unit – III	3.make them acquainted the life, philosophy and educational contributions of two Great Western Scholars – J.J. Rousseau and F.W. A. Froebel.
Unit - IV	4.make them aware of the life, philosophy and educational contributions of two Great Western Scholar John Dewey and Madam Maria Montessori.
100 Marks Project Work	Through this paper, the students who have taken Education as their subject of project work are made acquainted with the practical

100 Marks 110ject Work	Through this paper, the students who have taken Education as then
	subject of project work are made acquainted with the practical
	knowledge of carrying out a research-based project choosing a topic
	from any one of the earlier studied five theory papers. They have to
	follow a prescribed format provided by Tripura University, by
	which they develop necessary knowledge, ability and aptitude of
	preparing and presenting research work.

#### **DEPARTMENT OF ENGLISH**

PROGRAMME(S)	<b>B.A. ENGLISH MAJOR &amp; ENGLISH GENERAL</b>
PROGRAMME OUTCOME	Students will be awarded the B.A. English Honours Degree after successful completion of the three years/six semester course studying English language and literature as a major or general subject. Developing their linguistic competence and communicative skills, Students are thus equipped with the artistry and utility of the English language making them eligible for higher studies and a successful career.
PROGRAMME SPECIFIC OUTCOME	Literature courses in the Department of English offer students the opportunity to study influential writings from Britain, American and Global Anglophone traditions while keeping focus on student's skills in reading, writing and speaking the language as well as enhancing their understanding of the English language and literature. They will be familiar with the conventions of diverse textual genres including fiction, non- fiction, poetry, autobiography, biography, Journals, films, plays, theatre, editorials etc.
COURSE OUTCOME	B.A. ENGLISH MAJOR
COURSE OUTCOME	B.A. ENGLISH MAJOR TER - I
COURSE OUTCOME SEMES Paper -I (Unit- I-II) HISTORY OF ENGLISH LITERATURE (Old English to Alexander Pope)	<b>B.A. ENGLISH MAJOR</b> <b>TER - I</b> The course will enable the students to perceive a chronological survey of the major writers and their writings that have contributed to the development of English literature till the 18 <sup>th</sup> century. It will also develop a view of how English literature has evolved through the centuries, establishing a perception of its Literary History and comprehend the outline of English literature based on the three important aspects of England namely political, religious and social.

Paper- I (Unit – iv)	The course will enable students to comprehend
16 <sup>th</sup> and 17 <sup>th</sup> century Poetry	the development of English poetry from 16 <sup>th</sup> and
	17 <sup>th</sup> Century and gain a natural appeal in terms of
	universal significance as poetry cuts across all
	barriers while enjoying poetic beauty through
	literary devices like similes, metaphors, images,
	alliteration and other rhetorical devices
CENTE	
JEIVIE	
	This course will further enhance student's
HISTORY OF ENGLISH LITERATURE (19" and 20"	understanding of the history of English Literature
Century)	and help to analyze cogently the changing
	perspectives of writings through the times and
	place them in the contemporary socio-political
	and cultural perspective and also explore the
	living literary merit whether medieval or modern.
	And finally possess an awareness of alternatively
	defined traditions and genres, such as women's
	literature, postcolonial literatures, world
	literatures
Paper – II Unit II and III	Students are exposed to the origin and growth of
Drama (16 <sup>th</sup> & 17 <sup>th</sup> Century)	drama in England and the drama specifically
	written during Elizabethan times and they will
	have learnt about the historical, socio-political
	and literary features of the Elizabethan era in
	which the production of drama gained
	momentum in English literature. They would
	further analyze and appreciate the representative
	works of Elizabethan and Jacobean drama with
	respect to its plot character dialogue theme
	characters structure motifs and dramatic
	techniques
Paper – II Unit IV	Students will comprehend the general features of
Shakespearean Sennets	Statents will complete the general reactives of Shakespeare's writing, especially the salient
Shakespearean Summers	fostures of his art as a post through this source
	and approxiate as well as develop an interest in
	the themes and the postic form and devices of
	Chakespeare's connets
	Shakespeare's sonnets.
SEMES	
Paper – III Unit I	Students will be encouraged to think creatively
16 <sup>th</sup> and 17 <sup>th</sup> Century Poetry	with handpicked poems from the two centuries
	of British literature and help to focus on
	analytical rather than emotional or
	impressionistic aspects and will observe the
	details of action and language, make connections
	and inferences and draw conclusions to a certain
	extent when reading poetic texts. They will also
	imbibe the poetic language and the prosody of

	the great poets such as John Milton and	
	Alexander Pope.	
Paper – III Unit II	The course is designed to help students gain	
16 <sup>th</sup> and 17 <sup>th</sup> Century Prose	understanding of the various aspects of the Essay	
	<ul> <li>its elements, kinds, structure and the nuances</li> </ul>	
	of language and demonstrate through	
	discussion, writing tasks and end exams the	
	ability to interpret and appreciate the literary	
<b>5</b>	nuances of prose writings.	
Paper – III Unit III	Critically analyze the poetic texts and appreciate	
18 <sup>th</sup> Century Poetry	and evaluate texts better and analyze the various	
	elements of poetry such as diction, tone, form,	
	theme and various other postical devices	
Paner – III Unit IV	This course helps the students to understand	
18 <sup>th</sup> Century Drama & Prose	how society and culture played a significant role	
	in the lives and career of the writers of the age to	
	enable them to analyze and appreciate the	
	narrative styles of the writers and the innovative	
	novelistic techniques employed by them.	
	It would also help the students to write cogent	
	and well-constructed essays to enhance their	
	vocabulary and become an active readers who	
	will appreciate ambiguity and complexity in prose	
	and can articulate their own interpretations.	
SEMESTER IV		
Paper – IV Unit I	The course in this unit helps the students to	
18 <sup>th</sup> & 19 <sup>th</sup> Century Poetry	correlate the life and the significance of the poet	
	to poem to be analyzed and also demonstrate an	
	awareness of the analysis in forming appreciation	
	and understanding of poetry relating the poems	
Baner – IV I Init II	This portion of the syllabus being the students to	
19 <sup>th</sup> Century Prose	gain knowledge of the major traditions of prose	
15 century mose	written in English. And also shows how to write	
	effectively for a variety of professional and social	
	setting which will develop an awareness of and	
	confidence in their own voice as a writer.	
Paper – IV Unit III & IV	The students are further exposed to the realistic	
19 <sup>th</sup> Century Fiction	portraits of common English people through the	
	fiction genres and it demonstrate the noticeable	
	socio-political transition and its impact on	
	Literature.	
SEMESTE	R V (H-5)	
Paper – V Unit I	The course disseminate the knowledge of the	
History Of English Language	diachronic history of English language from	
	earliest times to the modern and helps the pupils	

	to understand the ortioulation of Funlish would	
	to understand the articulation of English words;	
	the use of sounds and intonation. This further	
	helps in comprehending the impact of political	
	and social changes on the English language	
	throughout the centuries.	
Paper – V Unit II	After completing this course, the students will be	
Rhetoric & Prosody	able to understand the structure of modern	
	English which gives them a command over the	
	syntactic formation and the semantic complexity	
	of words.	
Paper – V Unit III & IV	Further the students after completion of the	
Phonetics & Linguistics	course will understand the origin of language and	
	the development of writing and comprehend	
	basic grammatical and semantic categories of	
	English. They will also understand the regional	
	and social variations of English and able to grasp	
	the complexity of language as a communication	
	system shaped by cognitive, cultural and social	
	factors	
CENTECTE		
SEIVIESTE	<b>κ ν (Π-ο)</b>	
Paper—VI Unit I & II	Students at this juncture are able to appreciate	
19" & 20" Century Poetry	the poems aesthetically and instinctively as their	
	knowledge broadens and learn about the use of	
	poetic devices and common techniques involved	
	in writing poetry. Students are also acquainted	
	with the ways to locate the particular poem in its	
	historical and social context.	
Paper—VI Unit III & IV	Exposed to different cultures, myths, and	
20 <sup>th</sup> Century Fictions (Short stories)	histories of various nations through fiction,	
	students receive creative acumen and will be	
	nourished by the scintillating stories and a sense	
	of inclination towards literary sensibility through	
	this course.	
SEMESTER VI ( H-7)		
Paper –VII Unit I	Through this course Students get acquainted to	
History of Indian English Literature	the evolution of Indian Writing in English from	
	the colonial phase till the present and made	
	familiar with the major Indian writers and their	
	monumental works as an independent field of	
	literature in English which helps them to get a	
	deeper understanding of the major traditions and	
	values of the ancient India.	
Paper –VII Unit II & III	Further the students gain knowledge of	
IEL Poetry & Fictions ( Novel, Drama & Short	'Indianness' through the works of Indian writing	
story)	in English: as they become more acquainted with	
	the Indian way of perceiving the world and	
	nresenting their findings in their writings in an	
	presenting their multips in their writings in di	

	appreciable way. They are also able to Identify
	the significance and relevance of the works of
	Indian writers and thereby relate to the ideas
	embedded in their works.
Paper –VII Unit IV	Through this course students are made
NorthEast Literature (Poetry, Short stories &	aware of this body of English writings from the
Novel)	eight states of India's Northeast. Often
	overshadowed by the growing dominance of a
	'mainstream India-centred' Indian writing in
	English. Political violence and recovery in a turn
	to nature and traditional culture, myths and land.
	local performance traditions and a long tradition
	of Western popular music – many of these are
	captured by writers which are discominated
	through their works
CENAFCEE	
SEMIESTE	κνι(π-δ)
Paper—VIII Unit I & II	Through this course students gets an insight and
Literary Criticism and Theory	an initiation to the fundamentals of literary
	criticism and become aware of the fundamentals,
	definition, nature, scope and function of literary
	criticism and it also enables them to conduct a
	close reading of a poem, prose or other genres
	and develop the skills of critical thinking.
Paper—VIII Unit III	The study of this course enables the students to
New Literatures in English	perceive through reading representative texts
Č	from varied new literatures the respective
	customs, habits, culture, language,
	socioeconomic and political background of
	different countries
	Students are also made to realize the nlight and
	exploitation of the natives /indigenous people as
	they receive practical knowledge of the identity
	crisis through the proceeded toxic
	Unseen Dress (Verse Diese to spekle the students
Paper—VIII Unit IV	Unseen Prose/Verse Piece to enable the students
Substance & Critical Appreciation	analyse & evaluate passages/prose/poetry.
Project(Compulsory)	This allows the students to practice the art of
	writing coherently, originally and analytically and
	would have further learnt the technique of
	documenting various sources and also present
	their findings hypothetically, descriptively and
	evaluatively as a research work.
COURSE OUTCOME	<b>B.A. ENGLISH GENERAL</b>
SEME	STER I
Paper-     Init   & II	The course in this unit helps the students to
19 <sup>th</sup> Century Poetry	correlate the life and the significance of the noet
15 Century Foetry	to noem to be analyzed and also demonstrate an
	awaronoss of the analysis in forming appreciation
	awareness of the analysis in forming appreciation

	and understanding of poetry relating the poems
	to the real life experiences.
Paper- I Unit III	This portion of the syllabus helps the students to
19 <sup>th</sup> Century Prose	gain knowledge of the major traditions of prose
	written in English. And also shows how to write
	effectively for a variety of professional and social
	setting which will develop an awareness of and
	confidence in their own voice as a writer.
Paper- I Unit IV	The students are further exposed to the realistic
19 <sup>th</sup> Century Novel	portraits of common English people through the
	fiction genres and it demonstrate the noticeable
	socio-political transition and its impact on
	Literature.
SEMES	STER II
Paper – II Unit I	Students are exposed to the realistic portraits of
20thn Century Short Fictions	common English people through the fiction
	genres in which it demonstrate the noticeable
	socio-political transition and its impact on
<b>.</b>	Literature.
Paper – II Unit II	The course is designed to help students gain
20 <sup>th</sup> Century Prose	its almost hinds structure and the suggest
	– Its elements, kinds, structure and the huances
	discussion, writing tasks and and avams the
	discussion, writing tasks and end exams the
	ability to interpret and appreciate the interary
Paner – II   Init III & IV	Through fiction students receive creative
Novel	acumen and will be nourished by the scintillating
	stories and a sense of inclination towards literary
	sensibility through this course.
SEMES	TER III
Paper – III Unit I & II	Study of this course will make the pupil
Phonetics	comprehend the features of speech sounds in
	English and their respective RP phonetic symbols
	and also know how speech organs work and
	attain a practical knowledge of the articulation of
	the English speech sounds.
Paper – III Unit III	Students will have an insight of the origin and
Literary Types	development of the different genres of literature
	and Identify the unique features of each literary
	form by way of comprehending its characteristics
	and conventions which will thus help in applying
	knowledge of the various forms of literature to
	the study of individual works.
Paper – III Unit IV	After completing this course, the students will be
Rhetoric & Prosody	able to understand the structure of modern
	English which gives them a command over the

	, , , , , , , , , , , , , , , , , , , ,		
	of words.		
SEMESTER IV			
Paper IV Unit I, II & III	This course intends to make the students gain		
Indian English Literature (Novel, Poetry & Short	knowledge of Indian English Literature and the		
Stories)	concept of 'Indianness' through the works of		
	Indian writing in English; as they become more		
	acquainted with the Indian way of perceiving the		
	world and presenting their findings in their		
	writings in an appreciable way. They are also		
	the works of Indian writers and thereby relate to		
	the ideas embedded in their works		
Paper IV   Init IV	Through this course students are made		
North Fastern Poetry in English	aware of this body of English writings from the		
	eight states of India's Northeast. Often		
	overshadowed by the growing dominance of a		
	'mainstream India-centred' Indian writing in		
	English. Political violence and recovery in a turn		
	to nature and traditional culture, myths and land,		
	local performance traditions and a long tradition		
	of Western popular music – many of these are		
	captured by writers which are disseminated		
	through their works.		
SEMESTER V			
Paper –V Unit I	This course helps the students to understand		
British Drama	how society and culture played a significant role		
	in the lives and career of the British writers of the		
	age and enables them to analyze and appreciate		
	the harrative styles of the writers		
Paper –V Unit II & III	The course in this unit helps the students to		
British Poetry	correlate the life and the significance of the poet		
	to poem to be analyzed and also demonstrate an		
	awareness of the analysis in forming appreciation		
	and understanding of poetry relating the poems		
	to the real life experiences.		
Paper –V Unit IV	Unseen Prose/Verse Piece to enable the students		
Substance & Critical appreciation	analyse & evaluate passages/prose/poetry.		
Project(Optional)	This allows the students to practice the art of		
	writing coherently, originally and analytically and		
	would have further learnt the technique of		
	documenting various sources and also present		
	their findings hypothetically, descriptively and		

FNDC- I Unit- I	Students are introduced to the development of
Poetry	English poetry and gain an insight to a natural
	appeal in terms of universal significance as poetry
	cuts across all barriers while enjoying poetic
	beauty through literary devices like similes,
	metaphors, images, alliteration, and other
	rhetorical devices.
FNDC- I Unit- II	The course expose the students to the realistic
Short Fiction	portraits of common people through the fiction
	genres and demonstrate the noticeable socio-
	political transition and its impact of daily life on
	Literature.
FNDC- I Unit- III & IV	This course is intended to strengthen the basics
Grammar & Composition	of English language through the elementary
	knowledge of grammar, vocabulary and
	composition writing to identify the nuances of
	writing a formal & informal letter/reports etc.
ALTERNATIVE ENGL	ISH FOR SEMESTER II
FNDE- MIL- II Unit I	Students will be encouraged to think creatively
Prose & Poetry	with handpicked poems & short stories from the
	British as well as global Anglophone literature
	prescribed text and help to focus on analytical
	rather than emotional or impressionistic aspects.
FNDE- MIL- II Unit II	This course is intended to further strengthen the
Grammar & Composition	basics of English language through the
	elementary knowledge of grammar, vocabulary
	and composition writing to identify the nuances
	of writing a formal & informal letter/reports etc.

# DEPARTMENT OF HISTORY, AMBEDKAR COLLEGE, FATIKROY COURSE OUTCOME AND PROGRAMME OUTCOME.

Pogramme outcome	Study of Indian History Northeast History
History	and the World History will enriched the
Thistory	knowledge of the Under Graduate Student
	Especially it will reflect back the life and
	culture of the Indian Post life and bring the
	culture of the indian rast file and offing the
	different entrue and their Second life of the
	Weild encourt the Stellant
	world among the Student
Programme Specific Outcome	On the successful completion of the
	Programmed the student will learn and know
	in detail the history of North Rast, History of
	India and world. The traditional Culture, land
	and language. They will be able to make final
	decision on the migration of different tribes
	to different parts of the Country.
Course Out Come	
BA HONOUR	S OUTCOME COURSE
Sem-1	Study about the Pre-History and Proto
	History, The Student will developed their
Unit-1 & Unit 11	knowledge on the Sources of ancient History
	and also on the greatest Civilization called
	The Harappa Civilization Further they will be
	enriched on the Vedic Age and the Protest
	movement on the Jainism and Buddhism
Sem 1	The student will be enlightened on the
Unit 111 & 1V	Mauryan Empire and Magadha.It will bring
	knowledge on the Asokas Dhamma and the
	importance of the History of Kushan and
	Harshavardhana.
Sem 11	It enhance the Student to learn more on the
Unit 1 & 11	History of Arab in India. The important of
	Tripartite Struggle and the Economic land
	grant during the Medieval Indian History
Sem 11	The Student will learn on the great ruler of
Unit 111 & 1V	Delhi Sultanate. Their strength, power and
	expansion.
	It will also brings more knowledge on the
	Provincial kingdom like Vijavanagar and
	Bhamani and Bhakti and Sufi movement
Sem 111	It enhance the Student to learn more on the
Unit 1 & 11	Sources of Mediavel Indian history. The
	history of the Mughel rule. Althor and
	Sharshah
Sam 111	Shershall.
	It enriched the Knowledge of Student on the
	Art and Architecture of the Mughal, How did
	they decline and The introductory part of the
	British Indian relation in India.

SEM 1V Unit 1 & 11	The Student will be developing their knowledge on the Expansion and consolidation of the British in India, how did Education started in India, The social Religious reform movement of India and how did the Wealth of the Country is Drained.
SEM 1V Unit 111 & 1V	It will enlightened the student on the ground of National movement in India, The important role played by Gandhi, Subash Chandra Bose and different Indian Freedom Fighter.
SEM V Paper V Unit 1 & 11	This paper focus on the European history, it bring knowledge to the student regarding Feudalism, rise of Monarchy and the Thirty years war. It also let the student learn on the Renaissance and Reformation in the western Europe
SEM V Paper V Unit 111 & 1V	It gives knowledge to the Student on the important of Price Revolution and Industrial Revolution and French Revolution
SEM V Paper VI Unit 1 & 11	The student learn about Napolean Bonaparte, The importants of July Revolution and February Revolution, Nationalism in Europe and American civil war
SEM V PAPER VI Unit 111 & 1V	Student developed their knowledged on First World war and Second World war, Economic depression and League of Nation and the Utopian and Marxian Socialism
SEM VI PAPER V11 Unit 1 & Unit 11	This course intended the Student to learn on the First Anglo Burmese War, the anexxation of Cachar, Jantia, Khasi, Naga and Lushai Hills. Revolt of 1857 and Assma.
SEM VI PAPER V11 Unit 111 & 1V	Student were enriched on particularly about their own State, History of Tripura, Detail in focuss on the History of Birchandra Manikya to Bir Bikram Kishore maniky and the contribution of Rabidranath Tagore in the development of Bengali language and literature.
SEM VI PAPER V111 UNIT 1 & 11	Student learn the History of China, The Taiping Rebellion, Boxer Rebellion and the Resolution of 1911 in China and the Chinese Revolution of 1949
SEM VI PAPER V111 Unit 111 & IV	Here the Student were enriched about the knowledge of the History of Japan, Tokugawa Shogunate, The perry Mission and Meiji Restoration, Sino Japanese wae and the

	Manchurian crisis.	
BA GENERAL OUTCOME COURSE		
SEM 1	Student learn about the Sources of Ancient	
Unit 1 & 11	Indian History, the greatest Civilization	
	called Harappa civilization, The Mauryan	
	Period and the important of Kushanas and	
	Gupta Age in ancient Indian history.	
SEM 1	It enlightened the student about the History	
Unit 111 & 1V	of Bengal, Harshavardhaan, The Contribution	
	of Pallava Art and the history of Pala, Cholas	
	and Chalukyas.	
SEM 11	It brings to the Student about the Knowledge	
Unit 1 & 11	of the Sources of Medieval Indian history,	
	The important of Delhi Sultante, The Bhakti	
	and Sufi Movement and the Decline of Delhi	
	Sultanate.	
SEM II	Student learn about the Great Mughal ruler	
Unit III & IV	such as Akbar, Aurangzeb, Ali vardi khan	
	and Siraj-ud-daulah.	
SEW 111	It gives and enriched the knowledge to the	
	Student about the British- Indian relation,	
	Battle of plassey, De-industrialization, Socio-	
	in 10 <sup>th</sup> Contury	
SEM 111	III 19 Century. Student loam about the Devolt of 1857 and	
SEWITTI Unit 111 & IV	the Partition of Bengal and Swadeshi	
	movement Few National freedom fighter	
	such as Mahatma Gandhi Subach Chandra	
	Bose and Bal Gangadhar tilak	
SEM 1V	It enlightened the student on the History of	
Unit 1 & 11	Tripura. Before Birchandra manikya till Bir	
	Bikram Kishore Manikya . World War 1 and	
	11, its integration of Tripura to Indian union.	
SEM 1V	Student learn the important of History of	
Unit 111 & 1V	Assam, The Ahom kingdom and its decline,	
	Anglo Burmese war, The life and	
	contribution of David scott and the	
	relationship of Assam with the Central India	
	during independence.	
SEM V	It enriched the knowledge of the Student on	
Unit 1 & 11	the History of Europe, They learn about the	
	French Revolution, Industrial revolution	
	,Napoleon Bonaparte, and American war of	
	Independence.	
SEM V	Student learn about the July Revolution,	
Unit 111 & 1V	February Revolution and Unification of Italy	
	and Germany and background of Japan Meiji	
	Restoration.	

DEPARTMENT OF HUMAN PHYSOLOGY			
Programme Specific outcome			
B. S gener hum physio	<ul> <li>B. Sc general, human</li> <li>PSO 1. The main objectives of the programme are to provide depth anatomical and functional knowledge about human body system.</li> <li>PSO 2. This programme promotes innovative thinking and analytical skills to comprehend multidisciplinary interactions in Life sciences.</li> <li>PSO 3. Demonstration an understanding of elementary human physiology and bio-chemistry.</li> <li>PSO 4. Acquire knowledge on the various aspects of life sciences ; cell biology, genetics, developmental biology , histology , bioinformatics, genetic engineering , biotechnology , biochemistry , endocrinology,biostatistics ,nutrition and sport physiology etc.</li> <li>PSO 5. The students gain theoretical knowledge about the using method of modern equipment and tools.</li> <li>PSO 6. This programme will create a curiosity among the learner to gather knowledge about human body system and pathophysiology.</li> <li>PSO 7.Particularly human physiology helps them to move towards clinical works, physician assistant and research study which provide better employment for learner.</li> <li>PSO 8. Practical based on theory help themto become skilled in laboratory work</li> </ul>		
			COURSE OUTCOME Semester I
Course code PHYG1	Unit – unit of Unit – and bio	I : Structural human system II : Biophysical ochemical	It provides thorough understanding about structure and function of cell organelles of eukaryotic cell. It provides knowledge about biophysics.
	Unit – body f	III :Blood,other luids and l hematology	It provides thorough knowledge about haematology.
	Unit – bioche enzym	IV : mistry and ology	It provides thorough knowledge about biochemistry and enzymology.
Semester II			
Course code PHYG2	Unit – Cardio respira	I : vascular and tory system	It provides thorough knowledge about Cardiovascular and respiratory system.
	Unit – Digest metabo	II : ion and blism	It provides knowledge about digestion and metabolism.

	Practical based on haematology and biochemistry, human skeleton	It provides practical knowledge about haematology and biochemistry, human skeleton .
		Semester III
Course		It provides knowledge about neurochemical and
code	Unit –I : neurophysiology.	
PHYG3	Neurochemical and neurophysiology	
	Unit –II : Renal physiology and environmental stress biochemistry	It provides knowledge about renal physiology and environmental stress biochemistry.
	Practical based on excretory system ,reflex and biochemistry	It provides practical knowledge about excretory system, reflex and biochemistry.

Semester IV			
Course	It provides knowledge about sensory physiology.		
code	Unit –I		
PHYG4	Brain and sensory		
	physiology		
	Unit –II :	It provides knowledge about endocrinology and reproductive	
	Endocrinology and	physiology.	
	reproductive		
	physiology		
	Practical based on	It provides knowledge about histological study of	
	model study and	reproductive system and anatomy.	
	histology of		
	reproductive system		
	1	Semester V	
		It provides knowledge about nutrition and dietetics.	
	Unit –I Nutrition and		
Course	dietetics		
code			
PHYG5	Unit –II : Molecular	It provides knowledge about molecular biology and	
	biology and	immunology.	
	immunology		
	D (* 11 1		
	Practical based on	It provides practical knowledge about biochemistry &	
	biochemistry &		
	Assessment of	It provides knowledge aboutnutritional status and	
	nutritional status by	aninropomeiry.	
	anuropometric & diet		
Semecter VI			

Course code PHYG6	Unit –I Sensory physiology	It provides knowledge about Sensory physiology.	
	Unit –II : Microbiology, biotechnology &immunology	It provides knowledge about microbiology, biotechnology &immunology.	
	Unit –III Molecular biology &genetics	It provides knowledge about molecular biology &genetics.	
	Unit – IV Research methodology & Epidemiology	It provides brief knowledge about research methodology & epidemiology.	
	Practical based on total theory	It provides practical knowledge about all over the theory course of this semester.	

## Programme Outcome (Po) & course outcome (Co)

Programme (S)	Programe Summery
B.A with Kokborok as one of the elective subjects	The students who take Kokborok as one of their electives have to go through five papers related to Kokborok the papers are Educations & Society Educational pshychology, History of Kokborok Language in International. Language Knowledge, thoughts . meaning of Literature, Ideas besides those five papers. If a students choces Kokborok Project. He/she has to prepare a recharch project on any one of the topics studied in theory papers.

Department of KOKBOROK

COURSE INDEX	COURSE OUTCOME
B.A Kokborok elective	The paper intends to give the students basic
Paper-1 (1 <sup>st</sup> sem.)	knowledge of Historical Development of Kokborok History of Kokborok Poetry, Prose and
History of Kokborok Language and Literature	Drama, Many Ideas Kokborok related to Literature and Historical Background.
Unit-I (Historycal Development of Kokborok)	Through this unit the students acquire History of Kokborok Language, Knowledge and concept,Vactors and aims of Kokborok. They also understand Language is Very important.
Unit-ii (Developmentpart of Kokborok	This unit its very important part of Kokborok
Gramer)	language. Students aquire meaning of Grammer Kokborok Phonilogy, Morphology, indic loan, recent neologism varius concept and thoughts.
Unit -iii (History of Kokborok Poetry)	This unit provides Kokborok oral Literature. Social oral folk song, lulla bies knowledge for created by written literature.
Unit-iv (History of prose Kokborok Drama)	This unit provides history of Novel Drama, Short stories, Growing of the Kokborok Literature as

well	as	the	name	of	the	first	writer	of
Dram	as,N	lovels	etc.					

COURSE INDEX	COURSE OUTCOME
B.A Kokborok elective Paper-ii (2 <sup>nd</sup> semester) Kokborok poetry	This unit provides poetry, thousand meaning of one word. Concept of poetry, knowledge, thoughts of poetry for social development.
Unit-I (Kokborok Poetry)	Throug this unit students are acquitend through the changing acquired with the self development through individual thoughts.
Unit -ii (Kokborok poetry)	In this chapter, students will learn how to survive in thes society by facing the problem of competives.
Unir -iii, Romantic Poetry.	In this lesons, students will learn how the stay peachfully by loving each other in the beautiful world. Wo've to take case each other to stay happily.
Unit -iv, Poetry	Will show then loves towads motherland.

B.A Paper 3. Kokborok Grammer	In this chapter, students will aquaic the knowledge about the Kokborok language & basic information about the phonology & morphology.
unit-I Grammer Basic- Kokborok Vowel & consonant	In this chapter, students with aquaire the knowledge about the Kokborok indic loans and recent neologism.
Unit-ii syntax & Semantics	This units Kokborok syntax and semantics varius ideas, concept etc.
Unit -iii , Grammer	In this chapter students aquire the knowledge about Kokborok speling mehod and IPA.
unit -iv Grammer	In this chapter students aquire the knowledge about Kokborok toother language translation ideas thouth.

B.A Kokborok elective paper-iv Novel, Dramas, Short stories & literary essay	The paper intends to give to students basic knowledge of Novels, Dramas, short stories literary essay.
Unit -I Kokborok Novels	This unit is very important part of Tripura socio culture, past, preset basic information.
Unit-ii Short stories	this units is provides Kokborok short stories. The students aquire to how to save motherland.
Unit-iii Dramas	This units is provides for students aquire to Darkness to right come moon light.
Unit iv literary essay	This unit is provdes to students present reality situation handle.

B.A 5 <sup>TH</sup> Semester Paper- v (Kokborok poetry)	This paper intends to give koborok poetry. Varius thougths.
Unit -I Poetry	In this units provides student aquire to love , nature, feel the heart.
Unit-ii Poetry	This unit provides students aquire to self defendable in life and strong minded.
Unit-iv poetry	This units provides student aquire to happiness. Alowess to feeling good any time.
Unit -v Poetry	This unit provides students aquire present times conditions and how to manage any placeS.

Course outline	Course outcome
6 <sup>th</sup> semester . 100 marks project work	Through this paper, the students who thave taken
	Kokborok as their subject of project work are
	made acquarited with the practical knowledge of
	carrying out a research based project chosing a
	topic from any one of the earlier studied fiv
	theory papers. They have to follow a prescribed
	format provided by Tripura university, by which
	they develop necessary knowledge and apitudeof
	preparing ad presenting research work.

**Future paln** – For better learning in Kokborok there are different seminer and other and otherimportant projects are beings set up for the students. Because only books are not enough for understanding or establishing their knowledge. To expend Kokborok, need to teach Kokborok Language so that they can studyKokborok as a subject.



#### Ambedkar College

### **DEPARTMENT OF MATHEMATICS**

**Programme Specific Outcomes(PSO):** 

**PO1.** Bachelor's degree in mathematics is the culmination of in-depth knowledge of algebra, calculus, geometry, differential equations and several other branches of mathematics. This also leads to study of related areas like computer science and statistics. Thus, this program helps learners in building a solid foundation for higher studies in mathematics.

**PO2.** The skills and knowledge gained has intrinsic beauty, which also leads to proficiency in analytical reasoning. This can be utilized in modeling and solving real life problems.

**PO3.** Students undergoing this program learn to logically question assertions, to recognize patterns and to distinguish between essential and irrelevant aspects of problems. They also share ideas and insights while seeking and benefitting from knowledge and insight of others. This helps them to learn behave responsibly in a rapidly changing interdependent society.

**PO4.** Students completing this program will be able to present mathematics clearly and precisely, make vague ideas precise by formulating them in the language of mathematics, describe mathematical ideas from multiple perspectives and explain fundamental concepts of mathematics to non-mathematicians.

**PO5.** Completion of this program will also enable the learners to join teaching profession in primary and secondary schools.

**PO6.** This program will also help students to enhance their employability for government jobs, jobs in banking, insurance and investment sectors, data analyst jobs and jobs in various other public and private enterprises.

#### **Course Outcomes: Major**

SEMESTER-I			
	<b>Outcome1:</b> Students will understand inequalities and their generalization in the form of theorems mainly weighted mean and m power theorem, Cauchy-Schwartz inequality. Weierstrass inequality		
(Classical Algebra &	Outcome2: Students will be able to apply trigonometry concepts on		
Number Theory)			

	1	
		DeMoivre's theorem and trigonometry functions.
		Outcome3: Students will understand numbers. way of representing
		numbers, relationships among numbers, and number systems.
		Outcome1: Demonstrate a working knowledge of set notation and
		elementary set theory, recognize the connection between set operations
		and logic, prove elementary results involving sets. Apply the different
		functions
	UNIT-II	
	(Abstract	Outcome2: Students will be able to understand group theory, subgroup,
	Algebra-I)	abelian group, their properties and applications in the real phenomena.
		Outcome3: Students will be able to demonstrate a working knowledge of
мтмн		Cyclic group and its properties, order of the group, permutations,
Paper-I		symmetric and alternating group.
		Outcome1:After successful completion of this topic, students will
		understand group homomorphism, endomorphism and isomorphism and
		be acquainted with applications.
		Outcome2: Students will be able to understand rings and fields, their
	UNIT-III	properties and applications.
	(Abstract Algebra-II)	<b>Outcome3</b> : Students will be able to demonstrate a working knowledge of
		sub-ring, sub-field, characteristic of ring and integral domain along with
		ring and field homomorphism, isomorphism.
		<b>Outcome1:</b> After successful completion of this topic, students will be
		able to understand vector algebra, its properties and product of two or
		more vectors like scalar product, vector product, scalar triple product,
	UNIT-IV	vector triple product.
	(Vector Algebra)	Outcome2: Students will understand direct application of vector algebra
		in geometrical and trigonometrical problems and also work done, moment
		of force.
		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of
		vector equation of lines and planes, volume of a tetrahedron.
	<u> </u>	SEMESTER-II
		Outcome1: After successful completion of this topic, students will be
		able to understand matrices of real and complex numbers, algebra of
		matrices, solution of mical equations, fairs of the matrix.
	UNIT-I	<b>Outcome2:</b> Students will be able to demonstrate a working knowledge of
	(Linear	characteristics polynomial, characteristics equations, eigen values, eigen
	Algebra-I)	vectors and Cayley Hamilton theorem.

		<b>Outcome3:</b> Students will understand linear space, subspace, their properties and linear sum of two subspaces.
МТМН	UNIT-II (Linear Algebra-II)	<ul> <li>Outcome1: Students will be able to demonstrate a working knowledge of linear combination, independence and dependence, basis of vector space, finite dimensional vector space and replacement theorem.</li> <li>Outcome2: Students will understand row space and column space of matrix, row rank and column rank of matrix, consistency of a linear nonhomogeneous system of equations.</li> <li>Outcome3: After successful completion of this topic, students will be able to understand linear transformations and their representation as matrices and algebra of linear transformations, rank and nullity.</li> </ul>
Paper-II UNIT-III (Geometry dimension	UNIT-III (Geometry-2 dimension)	<ul> <li>Outcome1: After successful completion of this topic, students will be able to understand transformation of rectangular axes, translation, rotation and their combinations, reduction of general equation of second degree in two variables into canonical form.</li> <li>Outcome2: Students will be able to demonstrate a working knowledge of pair of straight lines, condition that the general equation of second degree in two variables represents a pair of straight lines.</li> <li>Outcome3: Students will understand polar coordinates, polar equation of straight lines, circles and conic.</li> </ul>
	UNIT-IV (Geometry-3 Dimension)	<ul> <li>Outcome1: Students will understand rectangular Cartesian coordinates in space, equation of a plane, their properties and parallel and perpendicularity of two planes.</li> <li>Outcome2: After successful completion of this topic, students will be able to understand straight lines in space, canonical equation of line of intersection of two intersecting lines, shortest distance between two skew lines.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge general equation of sphere, cone, right circular cone, cylinder and right circular cylinder.</li> </ul>
	[	SEMESTER-III
		Outcome1: Demonstrate a working knowledge of limit and continuity of a real valued function, neighbourhood properties of continuous function, intermediate value theorem. Outcome2: After successful completion of this topic, students will be

	(Calculus-I)	uniform continuity, Lipschitz condition.
		<b>Outcome3:</b> Students will understand infinite series of real numbers, tests of convergence, absolute and conditional convergent series and rearrangement of series.
	UNIT-II (Calculus)	<ul> <li>Outcome1: Students will be able to demonstrate a working knowledge of chain rule, successive differentiation, Darboux theorem, mean value theorems of Lagrange's and Cauchy and Rolle's theorem.</li> <li>Outcome2: Students will be able to apply Taylor's theorem on closed and bounded interval with Lagrange's and Cauchy's form of remainder, Maclaurin's infinite series.</li> <li>Outcome3: After successful completion of this topic, students will be able to understand functions of several variables, partial derivatives, Euler's theorem of homogenous functions of two variables</li> </ul>
MIMH Paper-III UNIT-III (Calculus)		<ul> <li>Outcome1: After successful completion of this topic, students will be able to understand extremum of a function, application of the principle of maximum/ minimum in geometrical problems.</li> <li>Outcome2: Students will be able to understand tangent, normal, pedal equation of a curve, curvature, asymptotes.</li> </ul>
		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of reduction formulae and their applications.
	UNIT-IV (Vector Calculus)	<ul> <li>Outcome1: After successful completion of this topic, students will be able to understand limit, continuity, derivative of vector function and conditions for constant length and parallelism of vector function.</li> <li>Outcome2: Students will be able to understand vector integration, gradient, divergence and curl.</li> </ul>
		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of line, surface and volume integral which are applied in physics.
		SEMESTER-IV
	UNIT-I (Differential	<b>Outcome1:</b> Students will be able to demonstrate a working knowledge of geometrical and physical application of ordinary differential equation, existence theorem, equations reducible to first order linear equations. <b>Outcome2:</b> Students will be able to understand equations of first order
	<b>Equations-I</b> )	but not first degree, Clairaut's equation, orthogonal trajectories, particular

		integral.		
		<b>Outcome3:</b> After successful completion of this topic, students will be able to understand method of variation of parameters, Euler's homogeneous equation.		
	UNIT-II (Differential	<b>Outcome1:</b> After successful completion of this topic, students will be able to understand exact differential equations of higher order, non-linear exact equations and linear equations of some special forms.		
	Èquations-II)	<b>Outcome2:</b> Students will be able to understand second order linear equations with variable co-efficient, complete solution.		
мтмн		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of reduction to normal form, simple eigenvalue problems and simultaneous linear differential equations.		
Paper-IV	UNIT-III	<b>Outcome1:</b> Students will be able to demonstrate a working knowledge of mathematical form of LPP, graphical representation and solution of LPP, basic solution.		
Р	(Linear Programming	<b>Outcome2:</b> Students will be able to understand Euclidean space, hyperplane, convex set, extreme points of convex set.		
	Problem-1)	<b>Outcome3:</b> After successful completion of this topic, students will be able to understand slack, surplus, artificial variables, application of simplex method of solution of LPP, Charne's M-technique.		
		<b>Outcome1:</b> Students will be able to understand degeneracy, two phase method.		
	UNIT-IV (Linear	<b>Outcome2:</b> After successful completion of this topic, students will be able to understand duality theorem, dual simplex method.		
Programming Problem-II)		<b>Outcome 3:</b> Students will be able to demonstrate a working knowledge of transportation problem, assignment problem, travelling salesman problem and their practical applications.		
	SEMESTER-V			
	1	<b>Dutcome1:</b> Students will be able to demonstrate a working knowledge of bounded subset of R, supremum, infimum of a set, Bolzano-Weierstrass heorem, complement of open set and closed set.		
	UNIT-I (Analysis-I)	<b>Outcome2:</b> Students will be able to understand Heine Borel theorem, sequence of real numbers, convergence and divergence.		

		<b>Outcome3:</b> After successful completion of this topic, students will be able to understand sandwich rule, nested interval theorem, Cauchy's first and second limit theorems, Cauchy's general principle of convergence.
MTMH Paper-V	UNIT-II (Analysis-II)	<ul> <li>Outcome1: Students will be able to understand Riemann integral, darboux's theorem, condition of Riemann integrability, equality of Riemann and Darboux's approach.</li> <li>Outcome2: After successful completion of this topic, students will be able to understand Riemann integrability of sum, product, quotient, piecewise continuous functions.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of primitives or indefinite integrals, first mean value theorem of integral calculus.</li> </ul>
	UNIT-III (Analysis-III)	<ul> <li>Outcome1: Students will be able to demonstrate a working knowledge of improper integrals and their convergence, tests of convergence.</li> <li>Outcome2: Students will be able to understand beta and gamma functions and their convergence, their properties and interrelation.</li> <li>Outcome3: After successful completion of this topic, students will be able to understand geometric interpretation of definite integral, fundamental theorem of integral.</li> </ul>
	UNIT-IV (Analysis-IV)	<ul> <li>Outcome1: Students will be able to understand sequence of functions, uniform convergence, power series, Weierstrass M-test.</li> <li>Outcome2: After successful completion of this topic, students will be able to understand Fourier series, calculation of Fourier coefficients, Parseval's identity.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of evaluation of double and triple integrals, Dirichlet's integrals, change of order of integration in double integrals.</li> </ul>
	UNIT-I (Probability)	<ul> <li>Outcome1: Students will be able to demonstrate a working knowledge of definition and properties of probability, Binomial, Poisson, Beta, Gamma, Uniform and normal distribution.</li> <li>Outcome2: Students will be able to understand two dimensional probability distributions, conditional distribution and transformation of random variables in two dimensions.</li> </ul>

		<b>Outcome3:</b> After successful completion of this topic, students will be able to understand mathematical expectation and their properties, measures of central tendency, measures of dispersion, skewness and curtosis.	
MTMH Paper-VI	UNIT-II (Statistics)	<ul> <li>Outcome1: After successful completion of this topic, students will be able to understand concept of sampling and various types of sampling, sample characteristic and their computation, sampling distribution of statistic.</li> <li>Outcome2: Students will be able to understand estimates of population, characteristic or parameter, maximum likelihood estimate, estimation of population proportion, normal population parameters.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of testing of hypothesis, type one and type two errors, Chi-square test of goodness of fit.</li> </ul>	
	UNIT-III (Tensor Analysis)	<ul> <li>Outcome1: Students will be able to understand summation convention, Kronekar symbol, n-dimensional space, Chritoffel symbols and their properties, law of transformation law of Chritoffel symbols.</li> <li>Outcome2: After successful completion of this topic, students will be able to understand covariant differentiation of tensors, gradient, divergence, curl and Laplacian, spherical and cylindrical coordinate system.</li> </ul>	
		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of curves in E <sub>3</sub> , Riemannian space, Serret-Frenet formulas.	
		<b>Outcome1:</b> After successful completion of this topic, students will be able to understand Simple Harmonic Motion, Tangent and normal acceleration, velocity and acceleration along radial and transverse directions.	
	UNIT-IV (Dynamics of Particle)	<b>Outcome2:</b> Students will be able to understand central orbit, central forces and differential equation in polar and pedal coordinates.	
		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of Kepler's laws of planetary motion, artificial satellites, geo-stationary satellite, and disturbed orbits.	
SEMESTER-VI			
		<b>Outcome1:</b> Students will be able to understand error in numerical analysis, different operators- their properties and interrelations, equispaced arguments and entries.	
	UNIT-I (Numerical Analysis-I)	<b>Outcome2:</b> After successful completion of this topic, students will be able to understand interpolations, different interpolation formulae and their applications in different branches of science.	

		<b>Outcome3:</b> Students will be able to demonstrate a working knowledge of Numerical differentiation, numerical integration, their formulae and applications, Euler Maclaurin' sum formula.
MTMH Paper-VII	UNIT-II (Numerical Analysis-II)	<ul> <li>Outcome 1: After successful completion of this topic, students will be able to understand numerical solution of non-linear equations, different methods, their geometrical significance and convergency.</li> <li>Outcome 2: Students will be able to understand numerical solution of a system of linear equations, different methods and their convergency.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of numerical solution of ordinary differential equation of first order, different methods like Euler's method, Picard's method, Runge-Kutta method, Milne's method and their applications.</li> </ul>
	UNIT-III (C- Programming- I)	<ul> <li>Outcome1: Students will be able to understand algorithm and flow charts, bracing and looping.</li> <li>Outcome2: After successful completion of this topic, students will be able to understand ANSI-C, different kinds of integer constant.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of different operators, relation operators, logical operators.</li> </ul>
	UNIT-IV (C-Programming- II)	<ul> <li>Outcome1: After successful completion of this topic, students will be able to understand control flow, conditional and unconditional bracing, looping.</li> <li>Outcome2: Students will be able to understand switch, break, continue, goto statements.</li> <li>Outcome3: Students will be able to demonstrate a working knowledge of infinite loops, functions, arrays and pointers.</li> </ul>
МТМН	UNIT-I Practical (Numerical Analysis)	<ul> <li>Outcome: After successful completion of this topic, students will be able to understand practically</li> <li>1. Problems of interpolation.</li> <li>2. Numerical differentiation and integration.</li> <li>3. Roots of an equation by different methods.</li> <li>4. Inverse of a third order matrix without finding its determinant.</li> </ul>

Paper-			
VIII	UNIT-II Practical (C- Programming)	<ul> <li>Outcome: After successful completion of this topic, students will be able to understand practically</li> <li>1. Ascending/ descending order, finding largest/ smallest.</li> <li>2. Sum of finite series.</li> <li>3. Solution of quadratic equation.</li> <li>4. Interpolation.</li> <li>5. Solution of linear equation.</li> <li>6. Numerical integration</li> </ul>	
MTMH Paper-IX	Project Work	<b>Outcome:</b> Each student will select an advanced topic in Mathematics and undergo critical study and will develop his or her research aptitude.	

#### **Course Outcomes: General**

SEMESTER-I		
	UNIT-I (Classical	<b>Outcome:</b> Students will understand inequalities and their generalization in the form of theorems mainly weighted mean and m power theorem, Cauchy- Schwartz inequality, Weierstrass inequality, able to apply

	Algebra & Vector Algebra)	trigonometry concepts on DeMoivre's theorem and trigonometry functions, vector algebra, its properties and product of two or more vectors like scalar product, vector product, scalar triple product, vector triple product. Students will understand direct application of vector algebra in geometrical and trigonometrical problems and also work done, moment of force.		
MTMG Paper-I	UNIT-II (Abstract Algebra & Linear Algebra)	<b>Outcome:</b> Demonstrate a working knowledge of set notation and elementary set theory, recognize the connection between set operations and logic, prove elementary results involving sets. Apply the different properties of injections, surjections, bijections, compositions, and inverse functions. Students will be able to understand group theory, subgroup, abelian group, their properties and applications in the real phenomena. Students will be able to understand rings and fields, their properties and applications, students will be able to understand matrices of real and		
		complex numbers, algebra of matrices, solution of linear equations, rank of the matrix, characteristics polynomial, characteristics equations, eigen values, eigen vectors and Cayley Hamilton theorem. Students will understand linear space, subspace, their properties and linear sum of two subspaces, linear transformations and their representation as matrices		
		SEMESTER-II		
MTMG	UNIT-I (Differential Calculus)	<b>Outcome:</b> Demonstrate a working knowledge of limit and continuity of a real valued function, successive differentiation, Darboux theorem, mean value theorems of Lagrange's and Cauchy and Rolle's theorem, functions of several variables, partial derivatives, Euler's theorem of homogenous functions of two variables.		
Paper-II	UNIT-II (Integral Calculus)	<b>Outcome:</b> Students will be able to demonstrate a working knowledge of improper integrals, reduction formulae, beta and gamma functions, evaluation of double and triple integrals, rectification of planes, volume and surface area of solid.		
	SEMESTER-III			
	UNIT-I (Geometry-2 dimension & 3-	<b>Outcome:</b> After successful completion of this topic, students will be able to understand transformation of rectangular axes, translation, rotation and their combinations, reduction of general equation of second degree in two variables into canonical form, pair of straight lines, polar coordinates. Students will understand rectangular Cartesian coordinates in space		

MTMG Paper-III	dimension) UNIT-II (Differential Equations)	<ul> <li>equation of a plane, their properties and parallel and perpendicularity of two planes, straight lines in space, canonical equation of line of intersection of two intersecting lines, shortest distance between two skew lines, general equation of sphere.</li> <li>Outcome: Students will be able to demonstrate a working knowledge of geometrical and physical application of ordinary differential equation, existence theorem, equations reducible to first order linear equations.</li> <li>Students will be able to understand equations of first order but not first degree, Clairaut's equation, orthogonal trajectories, particular integral.</li> <li>After successful completion of this topic, students will be able to understand method of variation of parameters, Euler's homogeneous equation.</li> </ul>		
	SEMESTER-IV			
MTMG Paper-IV	UNIT-I (Linear Programming Problem) UNIT-II (Probability & Vector Calculus)	<ul> <li>Outcome: Students will be able to demonstrate a working knowledge of mathematical form of LPP, graphical representation and solution of LPP, basic solution, Euclidean space, hyperplane, convex set, extreme points of convex set, slack, surplus, artificial variables, application of simplex method of solution of LPP, Charne's M-technique.</li> <li>Students will be able to understand two phase method, duality theorem, transportation problem, assignment problem.</li> <li>Outcome: Students will be able to demonstrate a working knowledge of definition and properties of probability, Binomial, Poisson, Beta, Gamma, Uniform and normal distribution.</li> <li>After successful completion of this topic, students will be able to understand limit, continuity, derivative of vector function and conditions for constant length and parallelism of vector function.</li> <li>Students will be able to understand volume integral which are applied in physics.</li> </ul>		
		SENTESTER-V		
	UNIT-I	<b>Outcome:</b> Students will be able to understand error in numerical analysis, different operators- their properties and interrelations, equispaced arguments and entries, interpolations, different interpolation formulae.		
	(Numerical	Numerical differentiation, numerical integration, their formulae and		

	Analysis)	applications.	
		Students will be able to understand numerical solution of a system of linear equations, different methods and their convergency.	
		<b>Outcome:</b> Students will be able to understand algorithm and flow charts, bracing and looping.	
Paper-V	UNIT-II	After successful completion of this topic, students will be able to understand ANSI-C, different kinds of integer constant.	
	(Computer Science)	Students will be able to demonstrate a working knowledge of different operators, relation operators, logical operators.	
		Outcome: After successful completion of this topic, students will be able to	
		understand practically	
		1. Ascending/ descending order, finding largest/ smallest.	
	UNII-III Prostical	<ol> <li>Sum of finite series.</li> <li>Solution of guadratic equation</li> </ol>	
	(C-programming	4 Internolation	
	& Numerical	5. Solution of linear equation.	
	Analysis)	6. Numerical integration.	
SEMESTER-VI			
MTMG Paper-VI	Project Work	<b>Outcome:</b> Each student will select an advanced topic in Mathematics and undergo critical study and will develop his or her research aptitude.	

### **DEPARMENT OF PHILOSOPHY**

PROGRAMME (S)	B.A PHILOSOPHY MAJOR & GENERAL	
Programme outcome	After successful completion of the three years B.A I.e. 6 (Six) semesters course of studying philosophy the students will be awarded B.A degree certificate (both for Major& General subjects) This will create opportunity for the students to seeks for higher studies as well as helpful in seeking job.	
Programme Specific Outcome	<ol> <li>Academic Proficiency : The study of Philosophy will enriched the students in excellent preparation for lifelong learning and enhanced intellectual, political and social existence. It will also give a solid foundation for entering the workforce and are beneficial in careers that require problem solving and assessing information from various angels.</li> <li>Social Competency: The study of philosophy as a subject will embedded ethical values among the students. It will also help them enjoy additional social benefit such as better self-esteem and the demonstration of empathy for other. It will also produce critical, caring. Creative and collaborative thinkers.</li> <li>Employability: The study of philosophy will make the students employable specifically for the jobs relating to the subject in different occupational fields such as: Business professional, counselor, teacher, lawyer, public relation directer etc.</li> </ol>	
COURSE OUTCOME	B.A PHILOSOPHY MAJOR	
	SEMESTER - I	
Paper – I (Unit-I to Unit-IV ) INDIAN PHILOSOPHY	This course will help the students learn the 9 (Nine) different school of Indian Philosophy. It will enhance the idea about the basic different between the two Branches of Hindu philosophy. The students will learn about 6 orthodox schools (āstika) and3 heterodox (nāstika) schools.	
	SEMESTER – II	
Paper – II (Unit – I to IV) HISTORY OF WESTERN PHILOSOPHY	This course will enable the students to learn about the three historical period of western philosophy such as (1) Pre-Socratic ( $7^{th} - 5^{th}$ century B.C) (2) Socratic ( $5^{th} - 4^{th}$ Century B.C) (3) Hellenistic ( $3^{rd}$ century B.C – 3th Century A.D) (4) Roman ( $1^{st}$ century B.C - $5^{th}$ century A.D)	
	SEMESTER III	
Paper – III (Unit – I – II) PHILOSOPHY OF MIND	This course will help the students study the ontology and nature of Mind and its relationship with the body. The course covers all philosophical topics pertaining to the mind and mental states. This course is an introductions to social and political philosophy, the	
SOCIO-POLITICAL PHILOSOPHY	uses on principle for regulating the living together of members in society.	
SEMESTER-IV		
Paper – IV (Unit-I to IV) INTRODUCTION TO LOGIC	This course will teach the students the importance of studying Logic. It will teach them about relation. This course has far reaching effects beyond Mathematics, where it is often studied. It teaches deductive reasoning, such as the difference between reason and fallacy.	
	SEMESTER- V	
Paper- V (Unit –l to IV) TARKASAMGRAHA WITH DIPIKĀ: ANNAMBHAŢŢA	Inis course will enhanced the students about Tarka-Sangraha a treatise in Sanskrit giving a foundational exposition of the ancient Indian system of Logic and reasoning. The text presents the ontology, logic and epistemology of the Nyaya-Vaiseshika system.	

SEMESTER- V			
Paper VI (Unit – I to IV)	This course will teach the students about John Hospers: An		
CONTEMPORARY WESTERN	Introduction to Philosophical Analysis. They will learn about the		
PHILOSOPHY	theory of positivism and Existentialism.		
	SEMESTER- VI		
	This course will teach the students about ethical theories into three		
Paper- VII (Unit- I to II)	general subject areas: Meta ethics normative ethics and applied		
WESTERN 8 APPLIED ETHICS	ethics. It will help them understand to resolve question of human		
	morality.		
	This course will teach the students about rational thought on religious		
(Unit –III to IV)	issues and concern. It will help them examine the nature of religion		
PHILOSOPHY OF RELIGION	and religious belief. It will help them explore the conceptual analyses		
	of the varying conception of God.		
	The student will understand the primary purpose of Bhagavat-Gita i.e.		
Paper VII (Unit I to II)	to illuminate for all of humanity the realization of the true nature of		
THE BHAGAVAT GITA	divinity for the highest.		
(Unit – III to IV)	This course will teach the students about the concept and ideas of		
BERTRAND RUSSELL: THE PROBLEMS	Bertrand Russell on such topic as the existence of matter, Idealism,		
OF PHILOSOPHY	on Induction, the world of Universals and so on.		
### **Department of Physics Programe outcome and Course outcome**

# The Department has formulated three broad educational goals for the undergraduate degree programs:

**Physics knowledge:** To provide students with the basic foundation in physics theory and experiment, and to motivate scientific enthusiasm and curiosity and the joy of learning.

**Problem solving skills:** To provide students with the tools needed to analyse problems, apply mathematical formalism and experimentation, and synthesize ideas.

**Employment and technical skills:** To provide the students with technical skills necessary for successful careers in physics and related or alternative careers for which a physics foundation can be very useful. These include mathematics, computers, electronics and devices, and communication skills (oral and written).

### **Program Outcomes**

The student graduating with the Degree B.Sc (Honours) Physics should be able to

**PO1:** A fundamental/systematic or coherent understanding of the academic field of Physics, its different learning areas and applications in basic Physics like Nuclear and Particle Physics, Condensed matter Physics, Atomic and Molecular Physics, Mathematical Physics, Analytical dynamics, and its linkages with related disciplinary areas/subjects like Chemistry, Mathematics, Life sciences, Environmental sciences, Atmospheric Physics, Computer science, Information Technology;

**PO2:** Demonstrate the ability to translate a physical description to a mathematical equation, and conversely, explain the physical meaning of the mathematics, represent key aspects of physics through graphs and diagrams, and use geometric arguments in problem-solving.

**PO3:** Apply and demonstrate knowledge of concepts of physics, to analyze a variety of physical phenomena

**PO4:** Demonstrate the learned laboratory skills, enabling them to take measurements in a physics laboratory and analyse the measurements to draw valid conclusions

**PO5:** Capable of oral and written scientific communication, and will prove that they can think critically and work independently.

**PO6:** Communicate effectively using graphical techniques, reports and presentations within a scientific environment.

**PO7:** Use and apply professional software for scientific data analysis and presentation

**PO8:** skills in areas related to one's specialization area within the disciplinary/subject area of Physics and current and emerging developments in the field of Physics.

**PO9:** Recognize the importance of mathematical modeling simulation and computing, and the role of approximation and mathematical approaches to describing the physical world.

### Course Outcomes of B. Sc. Major Course

	Semester-I			
	Unit-I:	<b>CO1:</b> The students will gain knowledge about vector algebra and will		
	Mathematic	also know the physical concept of gradient, divergence and curl and		
	al methods	their corresponding relations and some important theorem using these		
Paper-	in Physics-I	operator. These basic mathematical structures are essential in solving		
PHSH-1		problems in various branches of Physics as well as in engineering.		
		Understand vector calculus in three dimensions and derive Gauss theorem,		
		Stoke"s theorem and Green"s theorem.		
		CO2: Learn the curvilinear coordinates which have applications in		
		problems with spherical and cylindrical symmetries.		
		<b>CO3:</b> Learn the beta, gamma and the error functions and their		
		applications in doing integrations.		
		CO4: Learn the Fourier analysis of periodic functions and their		
		applications in physical problems such as vibrating strings etc.		
		CO5: Learn the basic properties of matrices, different types of		
		matrices viz., Hermitian, skew Hermitian, orthogonal and unitary		
		matrices and their correspondence to physical quantities, e.g, operators		
		in quantum mechanics. They should also learn how to find the		
		eigenvalues and eigenvectors of matrices.		
		CO6: Learn about inertial and non-inertial systems and essentials of		
		special theory of relativity.		
	Unit-II:	CO1: Understand the role of vectors and coordinate systems in		
	Mechanic	Physics.		

s – I Unit-III: General properties of matter (Gravitation , Elasticity, Surface Tension and Viscosity)	<ul> <li>CO2: Write the expression for the moment of inertia about the given axis of symmetry for different uniform mass distributions.</li> <li>CO3: Explain the conservation of energy, momentum, angular momentum and apply them to basic problems.</li> <li>CO4: Understand the analogy between translational and rotational dynamics, and application of both motions simultaneously in analyzing rolling with slipping.</li> <li>CO5: Apply Kepler's law to describe the motion of planets and satellite in circular orbit.</li> <li>CO1: After successfully completing this course, the student will be able to find the Gravitational potential and intensity in different cases, determination of g by Kater's Pendulum,</li> <li>CO2: Apply the concepts of elasticity to real world problems.</li> <li>List fundamental forces in nature, applications and factors affecting surface tension.</li> <li>CO3: Demonstrate different applications of Bernoulli's theorem, laws of elasticity, surface tension.</li> <li>CO4: Define and conceptualize different laws of fluid mechanics and related quantities like steady, turbulent flow and concept of Reynolds number</li> </ul>
Unit-IV: Vibration and Waves	<ul> <li>CO1: Recognize and use a mathematical oscillator equation and wave equation, and derive these equations for certain systems.</li> <li>CO2: The motion of coupled oscillators, study of Lissajous figures and behaviour of transverse, longitudinal waves can be learnt in this laboratory course.</li> <li>CO3: Understand the principle of superposition of waves, so thus describe the formation of standing waves.</li> <li>CO4: Explain several phenomena we can observe in everyday life that can be explained as wave phenomena.</li> <li>CO5: Use the principles of wave motion and superposition to explain the Physics of polarisation, interference and diffraction.</li> <li>CO6: Will gain knowledge about propagation of different types of waves together with their characteristic and also learn about the acoustics of a hall.</li> </ul>

Semester-II			
PHSH-2A	-2A Unit-I: After going through the course, the student should be able to		
(Theory)	Electrostatics	<b>CO1:</b> Demonstrate Gauss law, Coulomb's law for the electric field,	
	&	and apply it to systems of point charges as well as line, surface, and	
	Magnetostati	volume distributions of charges.	
	cs	<b>CO2:</b> Explain and differentiate the vector (electric fields, Coulomb's	
		law) and scalar (electric	
		potential, electric potential energy) formalisms of electrostatics.	
		<b>CO3:</b> Apply Gauss's law of electrostatics to solve a variety of	
		problems.	
		<b>CO4:</b> Articulate knowledge of electric current, resistance and	
		capacitance in terms of electric	
		field and electric potential.	
		<b>CO5:</b> Demonstrate a working understanding of capacitors.	
	Unit-II:	After successful completion of the course the student will be able to:	
	Optics	<b>CO1:</b> Describe the geometrical formation of images by thin lenses.	
		lens equation and lens makers formula using fundamental laws of	
		geometrical optics.	
		<b>CO2:</b> Use mathematical analysis to calculate properties of image.	
		formed by combination of lenses and applies theory of optics to	
		calculate the cardinal points of an ontical system and design ontical	
		devices	
		<b>CO3:</b> Describe optical aberrations produced in image by lenses and	
		methods of their removal.	
		<b>CO4:</b> Describe the construction and operation of optical devices.	
		including, evepieces, compound microscope, grating, polarisers etc.	
		<b>CO5:</b> Use mathematical analysis to find bright and dark fringes in an	
		interference pattern of thin and wedge shaped film and find a	
		wavelength of light using newton's rings	
	<b>CO6:</b> Interpret a diffraction pattern to determine re		
	optical system		
	<b>CO7:</b> Geometrical determination of polarization of		
and determine a polarisation state of light by inte		and determine a polarisation state of light by interpreting polarizer.	
		<b>CO8:</b> Understand the working of selected optical instruments like	
		biprism, interferometer, diffraction grating, and holograms.	
PHSH-2B		In the laboratory course, the students will get opportunity to learn the	
(Practical)		following Experiments	
		CO1: In thermal Physics, Student will learn to determine thermal	
		conductivity of a bad conductor	
		CO2: In general properties, Student will learn to determine Coefficient	
		of viscosity	
		CO3: In optics Student will learn to determine Dispersive power of	
		material of a Prism, Unknown wavelength by prism, Unknown	
		concentration of an optically active substance by a Polarimeter and	
		specific rotation of the substance, Double Slit Experiment to find slit	
		width	

	Semester-III		
PHSH-3A Theory	Unit-I: Current Electricity :	<ul> <li>After going through the course, the student should be able to <i>C01</i>: Apply various network theorems such as Superposition, Thevenin, Norton, Reciprocity, Maximum Power Transfer, etc. and their applications in electronics, electrical circuit analysis, and electrical machines.</li> <li><i>C02</i>: Apply Kirchhoff's rules to analyze AC circuits consisting of parallel and/or series combinations of voltage sources and resistors and to describe the graphical relationship of resistance, capacitor and inductor.</li> <li><i>C03</i>: Explain Faraday-Lenz and Maxwell laws to articulate the relationship between electric and magnetic fields.</li> <li><i>C04</i>: Understand the phenomena of Seeback effect, Peltier effect and</li> </ul>	
	Unit-ll: Thermal Physics (Thermodyna mics, Radiation, Kinetic Theory of Gases, Transport Phenomena and Refrigeration ):	<ul> <li><i>Co1:</i> Onderstand the phenomena of second effect, refired effect and apply the concept of thermo-emf wherever suitable</li> <li><i>Co1:</i> Comprehend the basic concepts of thermodynamics, the first and the second law of thermodynamics, the concept of entropy and the associated theorems, the thermodynamic potentials and their physical interpretations.</li> <li><i>Co2:</i> Learn about Maxwell's thermodynamic relations.</li> <li><i>Co3:</i> Learn the basic aspects of kinetic theory of gases, Maxwell-Boltzman distribution law, equitation of energies, mean free path of molecular collisions, viscosity, thermal conductivity, diffusion and Brownian motion.</li> <li><i>Co4:</i> Learn about the real gas equations, Van der Waal equation of state, the Joule-Thompson effect.</li> <li><i>Co5:</i> Learn to derive classical radiation laws of black body radiation.</li> <li>Wiens law, Rayleigh Jeans law, ultraviolet catastrophe. Learn to derive classical radiation laws of black body radiation. Wiens law, ultraviolet catastrophe, basic assumptions and statement of Planck's law</li> </ul>	
PHSH-3B Practical		In the laboratory course, the students will get opportunity to learn the following Electrical/ Electronics Experimentsi)Construction of One Ohmii)Study thermoelectric curveiii)Measurement of boiling pointiv)Determination of high resistance by the method of Leakagev)Determination of Mutual Inductance between two coilsvi)Construction of rectifier circuit and study of output Using CRO with filter and without filter	

	Semester-IV			
PH-401 A	Unit-l:	After the successful completion of the course, the students shall be able		
(Theory)	Mechanics II	to learn about		
	and	<b>CO1</b> : Generalized coordinates, degree of freedom, constraints, forces		
	Relativity:	of constraints, degrees of freedom, application of generalized		
	-	coordinate and concept of constraints in different cases, Revise the		
		knowledge of the Newtonian, the Lagrangian and the Hamiltonian		
	formulations of classical mechanics and their applications			
appropriate physical problems.		appropriate physical problems.		
		<i>CO2</i> : Recapitulate and learn the special theory of relativity- postulates		
		of the special theory of relativity, Lorentz transformations on space-		
		time and other four vectors, four-vector notations, space-time invariant		
		length, length contraction, time dilation, mass-energy relation		
		Michelson-Morley experiment & its outcomes and difficulties		
	Unit-II: COI: Demonstrate the effect of magnetic field on current carry			
	<b>Electromagne</b>   conductors, Distinguish between magnetic effect of electric current a tism and electromagnetic induction and to apply the related laws in approximately the rel			
	<b>tism</b> and electromagnetic induction and to apply the related laws in appropriate <b>Flectromagne</b> circumstances. Demonstrate magnetic field of electric currents			
	tic Theory: electromagnetic induction through proper understanding			
	<i>CO2:</i> Compare the principles and working of different type			
	galvanometer			
		<b>CO3</b> : Apply and analyze the behaviour of ac/ dc circuits based on L,C		
		and R		
		CO4: Understand about displacement current, Understand the		
		unification of electric and magnetic fields and Maxwell"s equations		
		governing EM waves		
PH-401B		on successful completion of this subject the students have the programming ability in BASIC/FORTRAN Language to deal with physics problems		
Practical		ability in DASIC/ TORTIANA Language to deal with physics problems.		
	I			

Semester-V		
PHSH-5	Unit-1 Mathematical Methods in Physics – II:	<ul> <li>CO1: Learn about the complex numbers and their properties, functions of complex numbers and their properties such as analyticity, poles and residues. The students are expected to learn the residue theorem and its applications in evaluating definite integrals.</li> <li>CO2: Learn about the Laplace transform, the inverse Laplace transforms, their properties and their applications in solving physical problems.</li> </ul>
	UNIT-II Atomic and Molecular Physics, Laser and Fiber Optics:	<ul><li>CO1: Analyze the prerequisite in a molecule towards its Rotational and vibrational activity</li><li>CO2: Understand the laser action phenomena, properties of laser</li></ul>
	UNIT-II Electronics (Analog)	At the end of the course the student is expected to assimilate the following and possesses basic knowledge of the following. <b>CO1:</b> N- and P- type semiconductors, mobility, drift velocity, fabrication of P-N junctions; forward and reverse biased junctions. <b>CO2:</b> Application of PN junction for different type of rectifiers and voltage regulators. <b>CO3:</b> NPN and PNP transistors and basic configurations namely common base, common emitter and common collector, and also about current and voltage gain. <b>CO4:</b> Biasing and equivalent circuits, coupled amplifiers and feedback in amplifiers and oscillators. <b>CO5:</b> Operational amplifiers and knowledge about different configurations namely inverting and non-inverting and applications of operational amplifiers in D to A and A to D conversions. <b>CO6:</b> To characterize various devices namely PN junction diodes, LEDs, Zener diode, solar cells, PNP and NPN transistors. Also construct amplifiers and oscillators using discrete components. Demonstrate inverting and non-inverting amplifiers using op-amps.
	UNIT-IV Statistical Mechanics	<b>CO1:</b> Understand the concepts of microstate, macrostate, ensemble, phase space, thermodynamic probability and partition function. <b>CO2:</b> Understand the combinatoric studies of particles with their distinguishably or indistinguishably nature and conditions which lead to the three different distribution laws e.g. Maxwell-Boltzmann distribution, Bose-Einstein distribution and Fermi-Dirac distribution laws of particles and their derivation. Comprehend and articulate the connection as well as dichotomy between classical
PHSH-6 Practical		In the laboratory course, the students will get opportunity to learn the following Experiments i)Determination of wavelength by Fresnel's Biprism. ii) Determination of wavelength of spectral line by plane transmission

		<ul> <li>grating.</li> <li>iii) Determination of J by Callender and Barnes method</li> <li>iv) Drawing of B-H loop and determination of hysteresis loss.</li> <li>v) Measurement of self-inductance by Anderson's bridge.</li> <li>vi) Determination of the Q-factor for LCR resonant circuit for different frequencies</li> <li>vii) Determination of susceptibility of a magnetic material.</li> </ul>
		Semester-VI
PHSH-7	Unit-1 Nuclear Physics	<ul> <li>CO1: Understanding the properties of nuclei like density, size, binding energy, nuclear forces and structure of atomic nucleus, liquid drop model and nuclear shell model and mass formula.</li> <li>CO2: Ability to calculate the decay rates and lifetime of radioactive decays like alpha, beta, gamma decay. Neutrinos and its properties and role in theory of beta decay.</li> <li>CO3: Understand fission and fusion well as nuclear processes to produce nuclear energy in nuclear reactor and stellar energy in stars.</li> <li>CO4: Understand various interactions of electromagnetic radiation with matter. Electron positron pair creation.</li> </ul>
	Unit-2 QuantumMec hanics	<ul> <li>This course will enable the student to get familiar with quantum mechanics formulation.</li> <li>CO1: After an exposition of inadequacies of classical mechanics in explaining microscopic phenomena, quantum theory formulation is introduced through Schrodinger equation.</li> <li>CO2: The interpretation of wave function of quantum particle and probabilistic nature of its location and subtler points of quantum phenomena are exposed to the student.</li> <li>CO3: Through understanding the behavior of quantum particle encountering a i) barrier, ii) potential, the student gets exposed to solving non-relativistic hydrogen atom, for its spectrum and eigenfunctions.</li> <li>CO4: This course shall develop an understanding of how to model a given problem such as particle in a box, hydrogen atom, hydrogen atom in electric fields.</li> <li>CO5: These course will help in understanding the different Quantum Systems in atomic and nuclear physics.</li> </ul>
	Unit-3 Condensed Matter Physics	<ul> <li>At the end of the course the student is expected to learn and assimilate the following.</li> <li>CO1: A brief idea about crystalline and amorphous substances, about lattice, unit cell, miller indices, reciprocal lattice, concept of Brillouin zones and diffraction of X-rays by crystalline materials.</li> <li>CO2: Knowledge of lattice vibrations, phonons and in depth of</li> </ul>

	Unit-4 Digital Electronics and Computers	<ul> <li>knowledge of Einstein and Debye theory of specific heat of solids.</li> <li>CO3: At knowledge of different types of magnetism from diamagnetism to ferromagnetism and hysteresis loops and energy loss.</li> <li>CO4: Secured an understanding about the dielectric and ferroelectric properties of materials.</li> <li>CO5: Understanding above the band theory of solids and must be able to differentiate insulators, conductors and semiconductors.</li> <li>CO6: Understand the basic idea about superconductors and their classifications.</li> <li>At the successful completion of the course the student is expected to master the following</li> <li>CO1: About analog systems and digital systems and their differences, fundamental logic gates, combinational as well as sequential and number systems. Sequential systems by choosing Flip Flop as a building bockconstruct</li> <li>CO2: Operating System</li> <li>CO3: Algorithm and Flow chart for solving simple problems</li> <li>CO4: Elementary idea about Machine, Assembly and High-Level Language such as BASIC, FORTRAN, C</li> </ul>
PHSH-8		<ul> <li>In the laboratory course, the students will get opportunity to learn the following Experiments <ul> <li>i) Experiment related to Triode, Zener Diode, Transistor, Field Effect Transistor (FET)</li> <li>ii) Experiment related to Half wave and full wave rectifier using CRO</li> <li>iii) Construction and study of OR, AND and NOT circuit</li> <li>iv) Boolean expressions and relalization of relevant truth table using IC74**</li> </ul> </li> </ul>
PHSH-9 Project	After successful completion of the course the student will be able to CO1: design and test hypothesis CO2: Describe the underlying theory of experiments in the course. CO3: Perform derivations of theoretical models of relevance for the experiments in the course. CO4: Document their results, using correct procedures and protocols. CO5: Perform a quantitative analysis of experimental data including the use of computational and statistical methods where relevant. CO6: Interpret relationships in graphed data and develop an intuition for alternative plotting methods and communicate results from laboratory experiments, orally or in a written laboratory report. CO7: write a project report with literature review. CO8: defend the outcome of project work in scientific manner.	

## Course Outcomes of B. Sc. General Course

		Semester-I
	Unit-I: Vectors,	CO1: The students will gain knowledge about vector
	Mechanics	algebra and will also know the physical concept of
		gradient, divergence and curl and their corresponding
		relations.
		CO2: Students will also acquire basic knowledge of
		Rotational mechanics, Lagrange's and Hamilton's
		equations and their applications and will understand how
		to apply the conservation of rotational motion in different
		parts of physics in everyday life.
	Unit-II:	CO1: After successfully completing this course, the
	Gravitation,	student will be able to find the Gravitational potential and
	Elasticity and	intensity in different cases, determination of g by Kater's
	Fluid	Pendulum,
		CO2: Laws of elasticity, Apply the concepts of elasticity
		to real world problems.
D		<b>CO3:</b> List fundamental forces in nature, applications and
Paper-		factors affecting surface tension.
PHSGPI		CO4: Demonstrate different applications of Bernoulli's
		CO6: Define and concentualize different laws of fluid
		mechanics and related quantities like steady turbulent
		flow and concept of Reynolds number
	Unit-III <sup>.</sup>	<b>CO1:</b> To understand the basic principle and laws of
	Thermodynamics	thermodynamics and also the concents of Entrony
	and Radiation	Different Engine. Porus plug experiment. Joule
		Thomson effect.
		CO2: different aspects of Radiation including
		Kirchhoff's law
	Unit-IV: Optics	After successful completion of the course the student will
		be able to:
		<b>CO1:</b> Describe the geometrical formation of images by
		thin lenses, lens equation and lens makers formula using
		fundamental laws of geometrical optics. Use
		mathematical analysis to calculate properties of image,
		formed by combination of lenses and applies theory of
		optics to calculate the cardinal points of an optical system
		and design optical devices
		<b>CO2:</b> Describe optical aberrations produced in image by

		lenses and methods of their removal. Describe the construction and operation of optical devices, including, eyepieces, compound microscope, grating, polarisers etc. <b>CO3</b> : Use mathematical analysis to find bright and dark fringes in an interference pattern of thin and wedge shaped film and find a wavelength of light using newton's rings Interpret a diffraction pattern to determine resolution of an optical system <b>CO1</b> : Geometrical determination of polarization of light and concept and determine a polarisation state of light by interpreting polarizer.
		Semester-II
	Unit-I: Acoustic	<ul> <li>CO1: Students will gain a thorough knowledge about Composition of SHMs, Lissajou's figure, Damped and Forced vibrations.</li> <li>CO2: Will gain knowledge about propagation of different types of waves together with their characteristic and also learn about the acoustics of a hall.</li> </ul>
	Unit-II:	<b>CO1:</b> Will gain knowledge about the electric field,
PHSGP2	Electrostatics,	electrostatic energy, dielectrics, Capacitor
	Magneto statics,	<b>CO2:</b> Acquire basic knowledge of magnetic properties.
	Magnetic effect	<b>CO3:</b> Able to calculate Magnetic field produced due to current carrying conductor indifferent cases
	Practical Part	After doing this practical experiments, students will be
		able to learn the determination of different elastic modulus, acceleration due to gravity, Unknown frequency of a tuning fork, refractive index of a liquid, determination of coefficient of viscosity of any liquid,
		focal length of a unknown lens.
		Semester-III
	Electricity I	Thermoelectricity.
PHSGP3		<b>CO2:</b> Direct current and varying and its application in electrical circuits, self induction and mutual induction
	Current	<b>CO1:</b> Will gain knowledge about the Transformer,
	Electricity II and	alternating current and different circuit related to alternating current
	Atomic Theory	<b>CO2:</b> To provide a detailed study of atom and also to learn the impact of magnetic fields in spectra
		<b>CO3:</b> Students will also get the knowledge about X-Rav
		diffraction, about crystal structure, Compton effect and
		calculation of Compton shift.
	Practical Part	Will learn to determine different electrical related

		quantities using Meter Bridge, determination of magnetic
		field and magnetic moment, Potentiometer and its uses,
		Suspended coil Galvanometer, Spectrometer basics
		Semester-IV
	Unit-l: Electronics	<b>CO1:</b> To motivate the students to apply the principles of electronics in their day-to-day life. It deals with both analog and digital electronics. After learning this unit, they will gain knowledge about Diode and it's use as rectifier, Zener diode and its use as voltage regulator, <b>CO2:</b> Transistor, FET and their uses
PHSGP4		<b>CO4:</b> Different network theorem
	Unit-II: Relativity and Nuclear Physics	CO1: Will gain negation of ether concept and also about the geometry of space-time and space-time interval. CO2: To acquire knowledge and apply it to study the structure of nucleus. Know the formation of nucleus and their binding energy. To motivate the students and analyze the energy released by the nucleus during the fission and fusion process.
	Practical Part	Will acquired practical knowledge about Diode, Zener
		diode, Transistor, FET and Gate
		Semester-V
	Unit-I Electromagnetic	<b>CO1:</b> Thorough knowledge of electromagnetic nature of wave will be gained together with the proof of basic laws
	Theory and Laser & computer science, programming and digital electronics	of reflection and refraction. <b>CO2:</b> Explain the interaction of radiation with matter, Quantum behaviour of light, thermal equilibrium and population inversion. Illustrate the absorption, spontaneous and stimulated emission with appropriate diagrams. Derive the Einstein's relation, conditions for large stimulated emission and light amplification. Distinguish between ordinary light and laser light. Define the characteristics of laser light. <b>CO3:</b> After learning computer science part student will be able to know the some basic terms of computer
PHSGP5	Unit-II Quantum mechanics-1 & Qunatum mechanics-II	After successful completion of the course the student will be able to: <b>CO1:</b> outline the historical aspects of development of quantum mechanics; <b>CO2:</b> explain the differences between classical and quantum mechanics; <b>CO3:</b> describe metter ways, ways function and
		uncertainty principle;

		<b>CO4:</b> describe Schrodinger's equation and its steady state		
		form; solve Schrodinger's steady state equation for		
		simple potentials to obtain eigen functions and eigen		
		values apply Schrodinger's steady state equation for		
		spherically symmetric potentials obtain eigen functions		
		and eigen values:		
		<b>CO5:</b> interpret quantum numbers in atomic system:		
		discuss operator algebra in quantum mechanics.		
	Practical Part	On successful completion of this subject the students		
		have the programming ability in BASIC Language to deal		
	Computer	with physics problems.		
	program	······································		
	Semester-VI			
PH-601	After successful comp	letion of the course the student will be able to		
Project	<b>CO1:</b> design and test hypothesis			
5	<b>CO2:</b> Describe the underlying theory of experiments in the course.			
	<b>CO3:</b> Perform derivations of theoretical models of relevance for the experiments			
	in the course.			
	<b>CO4:</b> Document their results, using correct procedures and protocols			
	<b>CO5:</b> Perform a quantitative analysis of experimental data including the use of			
	computational and statistical methods where relevant.			
	<b>CO6:</b> Interpret relationships in graphed data and develop an intuition for			
	alternative plotting methods and communicate results from laboratory			
	experiments, orally or in a written laboratory report.			
	<b>CO7:</b> write a project r	eport with literature review.		
	CO8: defend the outco	ome of project work in scientific manner.		

### DEPARTMENT OF POLITICAL SCIENCE

PROGRAMME(S)	B.A. Political Science Major & B.A. Political Science General
Programme Outcome	The department of political science and its syllabus equipped in such a way that all the students who will be aspirant for higher studies and for job; they will be able to compete with all the competitive exams. State and National level along with able to get chance to admit into higher educational institutions.
Programme Specific Outcome	<ol> <li>Thought provoking: The programme will enrich and develop the thought process of the students. They can be realized and understood how the society is built and made its successful journey since long ago to till date.</li> <li>Responsibility oriented: The subject matter of the programme will make the students responsible to its family, society and finally to its nation.</li> <li>Leadership building: The programme teaches the lesson of building the nation.</li> <li>Job seeking: The programme will be a big source of employment especially for those who are keenly job seeker as it can give ample scope of jobs in different fields in different dimensions.</li> </ol>
COURSE OUTCOME	B.A Political Science Major
	SEMESTER – I
Paper – I (Unit-I – IV) POLITICAL THEORY	<ul> <li>This course is projected to aware the students about basic and theoretical part of political science.</li> <li>It also focuses on concept of many political philosophers who dealt with various theories from different visions.</li> <li>Students will able to know about various perspectives of state sovereignty, Liberty, Equality, Rights, Laws and Justice.</li> <li>The last unit deals with theories of social change and theories of change after Lenin, Mao and Gandhi.</li> </ul>
	SEMESTER –
Paper – II(Unit – I- IV) Western Political Thought	<ul> <li>This syllabus enriches and enlarges knowledge of students regarding western political thought. They will get to know the history of evolution of western political thought especially about movements, revolutions etc.</li> <li>They will learn about the thought of Jean Bodin, Hobbes, Locke and Rousseau on many issues.</li> <li>Students will learn about Bentham, Green and Hegel.</li> <li>They will capable to know about various types of concept like democratic socialism, Anarchist theory, Utopian Socialist and Scientific socialism.</li> </ul>

	<ul> <li>Legislature and also about Provisions for official language.</li> <li>Students will get to know about Indian Judiciary, Provisions for SCs and STs, Election process and Public Service Commission.</li> <li>Unit IV specially deals with issues of Indian politics, political parties, Interest groups, Local self governments in Tripra and TTAADC</li> <li>SEMESTER - IV</li> </ul>
Paper – IV (Unit – I-IV) Public Administration	<ul> <li>The contents intend to elaborate the knowledge of students about administrative legacy and its related theories.</li> <li>It also enhances the knowledge about Indian administration from various aspects.</li> <li>Students will learn about Bureaucracy, Riggsian Model, Capitalist and Socialist Management.</li> <li>They will able to understand about the evolution of public administration, District administration in India, Various committees, Lokpal and Lokayukta.</li> </ul>

SEMESTER - V		
Paper – V (Unit- I- IV) Indian Political Thought	<ul> <li>Students can develop their Knowledge on ancient political thought of India.</li> <li>They will also have ideas about Rammohan Roy, Bankim Chandra, Aurobinda, Rabindranath Tagore and Syed Ahmed Khan and their concepts.</li> <li>They will understand Vivekananda, S.C. Bose, J. Nehru, Gandhi, M.N. Roy and Gokhle by their concepts.</li> <li>Students will also learn about Narendra Deva, Jay Prakash Narayan and B.R. Ambedkar through their analytical concepts.</li> </ul>	
Paper VI (Unit – I-IV) Comparative Government and Politics	<ul> <li>Students can develop their understanding of analysis of comparative government and comparative politics.</li> <li>They can enrich their understanding regarding federal and unitary, parliamentary and presidential systems.</li> <li>They will enlarge their knowledge on political parties and interest groups of various states also able to know the rights and duties and judiciary of these states.</li> <li>They will also learn about the composition and functions of Executive and Legislature and comparison between heads of the states.</li> </ul>	
	SEMESTER VI	
Paper – VII (Unit – I - IV) International Relations	<ul> <li>The course intends to throw light upon the relationship between various states of the world and students will capable to understand various dimensions of National power.</li> <li>They will enrich their knowledge of foreign policy, Propaganda and Diplomacy.</li> <li>The students can learn the erstwhile and existing world order and politics through Globalization, Non alignment movement, post cold war politics, imperialism, Neocolonialism etc.</li> <li>They also get to know about many world political organizations and its functions.</li> </ul>	
Paper – VIII (Unit – I - IV) Political Sociology	<ul> <li>The students will understand the inter-relation of society, state and politics and about social stratification.</li> <li>They will get to know about power and Authority.</li> <li>They will develop their level of understanding regarding political participation, electoral behavior, political communication etc.</li> <li>They will also know about types of states, military and politics.</li> </ul>	

COURSE OUTCOME	B.A Political Science General	
	SEMESTER – I	
Paper – I (Unit-I – IV) POLITICAL THEORY	<ul> <li>This course is intended to aware the students about basic and theoretical part of political science.</li> <li>Students will able to know about various perspectives of state sovereignty, meaning and features of Democracy, Nationalism and Internationalism.</li> <li>Students will able to know about various perspectives of state sovereignty, Liberty, Equality, Rights, Laws. They also will learn about political parties and pressure groups.</li> <li>They will also understand theories regarding state functions. Marxism and concept of Imperialism after Lenin.</li> </ul>	
	SEMESTER – II	
Paper – II(Unit – I- IV) Political Thought	<ul> <li>This syllabus enriches and enlarges knowledge of students regarding western and Indian political thought.</li> <li>Students will learn about Bentham, J.S. Mill and Lenin.</li> <li>They will also have ideas about Rammohan Roy, Bankim Chandra and Vivekananda.</li> <li>They will capable to understand Gandhi, M.N. Roy, Ambedkar and Nebru from their thoughts</li> </ul>	
	SEMESTER -	
Paper – III(Unit –I- IV) Indian Government and Politics	<ul> <li>The students can enhance their knowledge about Indian constitution and it's Preamble. They will get to know the rights and duties of the citizens.</li> <li>They will develop their knowledge on Indian Federal system, relation between union and states and also amendment to the constitution.</li> <li>They will learn about (Union and State) Executive, Legislature. They can understand and know about law making process and Parliamentary privileges.</li> <li>They will able to know about Indian Judiciary, Election Commission, PSC(Union and State), Provisions for SCs and STs and lastly about local self government.</li> </ul>	
IV		
Comparative Government and Politics	<ul> <li>Students will enhance their knowledge about constitution, Rule of Law, Crown, PM and Parliament of United Kingdom.</li> <li>They will get to know about Constitution, President, Congress, Supremecourt of USA.</li> <li>From III unit they will understand Constitution, President, PM and Parliament of France Republic (5<sup>th</sup>).</li> <li>In last unit students will involve and know about China's Constitution, Fundamental rights and Duties, NPC,State Council, role of Communist party etc.</li> </ul>	

SEMESTER - V		
Paper – V (Unit- I- IV) International Relations and Organisations	<ul> <li>The course intends to throw light upon the relationship between various states of the world and students will capable to understand various dimensions of National power.</li> <li>They will enrich their knowledge of foreign policy of UK, USA and China, National Interest, Propaganda and Diplomacy.</li> <li>The students can learn the erstwhile and existing world order and politics through Non alignment movement, post cold war politics, imperialism, Neo-colonialism etc.</li> <li>They also get to know about many world political providence.</li> </ul>	
	The contents intend	
FNDC-5 Public Administration	to elaborate the knowledge of students about administrative legacy and its related theories. It also enhances the knowledge about Indian administration from various aspects. SEMESTER-VI The course intends to throw light upon the various aspects of Indian constitution. The main aim is to make students capable to compete with all kinds of competitive examinations.	
Soft Study (Unit – I - II) Human Rights and Gender Studies	This paper helps the students to understand the rights of all the sections of the society. Prevention, protection and preservation of rights are also taken into account in this paper.	
Project Work	To develop an ability of research and inculcate research oriented enthusiasm into the students and learn the basics of research for future preparation.	

### DEPARTMENT OF SANSKRIT

PROGRAMME(S)	B.A. SANSKRIT MAJOR & B.A. SANSKRIT GENERAL
Programme outcome	Students will be awarded the B.A. Sanskrit Honours degree after successful completion of the three years/six semesters of studying Sanskrit language and literature as a major or general subject. Thus it will make the students eligible for higher study and jobs.
Programme specific Outcome	<ol> <li>Academic Proficiency: this programme will make students skilled in reading, writing and speaking the Sanskrit language, and enhance their understanding of the Sanskrit language and literature. Also inspiring for the students to undertake higher study on Sanskrit language and literature.</li> <li>Social Competency: It will inculcate ethical values, sense of social responsibility and enhance the capacity of the art of living in the society in harmony with all stakeholders.</li> <li>Employability: It will make the students employable specifically for the jobs related to the subject Sanskrit.</li> </ol>
COURSE OUTCOME	SEMESTED I
Paper – I (Unit-I – II) Grammar Paper – I (Unit III – IV) Ethics	This course is intended to strengthen the basics of Sanskrit language though the knowledge of elementary knowledge of grammar like Alphabets, Mahesvara sutra, Subanta, Tinanta, Sandhi, Pratyaya etc. It will enhance the knowledge of ethics and importance of
	ethical behaviour in human live through reading of ancient Indian ethical texts like Hitopadesa and Manusamhita.
	SEMESTER – II
Paper – II(Unit - I) Grammar	This will enhance the knowledge on Sanskrit grammar, make the student better in understanding the Sanskrit language and skilled in reading, writing, speaking the language.
Paper – II(Unit - II) Metrics	It will develop the understanding of Sanskrit prosody by the study of different Meters from the text Chandomanjari of Gangadasa, and make the students capable in composition of poetry in Sanskrit language.
Paper – II(Unit – III - IV) Drama	It will enhance the understanding of Sanskrit drama and through study of the famous Abhijnanasakuntalam of Kalidasa.
	SEMESTER - III
Paper – III(Unit –I) Prose	It will make the students acquainted with the prose literature in Sanskrit language and inculcate morals values through study of the text Kadambari (sukanasopadesa) of Vana.
Paper – III(Unit –II & III) Poetry	This gives better understanding of poetry (Kavya) in Sanskrit literature through Bharavi's Kiratarjuniyam and Bhatti's Ravanavadha.
Paper – III(Unit –IV) Polity	Students get knowledge on various aspects of ancient Indian administration and their relevance in modern time by reading the Vinayadhikarana of the famous Arthashastra of Kautilya. SEMESTER - IV
Paper – IV (Unit – I) Drama	Though this student can identify, understand and analyse different distinct characteristics of Sanskrit Drama in general and Svapnavasavadattam of Bhasa in special.

Paper – IV (Unit – II)	Students get knowledge on various texts, viz. Ramayana,
History of Classical Sanskrit Literature	Mahabharata and Purana: origin and growth of different style of
	literary compositions, viz. drama, prose, poetry, fable etc.; and
	life and works of various famous authors and their works of
	classical Sanskrit literature
Paper – IV (Unit – III)	It will make the students aware about famous scientific
History of Ancient Indian Science and	literatures pertaining to the field of medicine astronomy
Medicine	methamatics and their authors viz Caraka Susruta Liveka
Wiedicilie	Varahamihira Argabhatta Dhaja ata
Depen IV (Unit IV)	Students will be convergent with the summent and contemporary
Paper = IV (Unit = IV)	Students will be conversant with the current and contemporary
History of Modern Sanskrit Literature	tradition of Sanskrit literature, i.e. modern Sanskrit literature,
	and will have brief idea about some selected authors and their
	contributions to modern Sanskrit literature. As a result they may
	also make an attempt to create their own literary creation in
	Sanskrit language.
	SEMESTER - V
Paper – V (Unit-I)	Knowledge on various Gods and Goddess of Rig Vedic age is
Vedic Selection	intended to obtain through selected hymns of Rig Veda.
Paper – V (Unit- II)	Students will be conversant with various rules of grammar of
Vedic Grammar & Padapatha	Sanskrit language pertaining to Vedic age and their
	distinctiveness from classical Sanskrit grammar.
Paper – V (Unit- III)	Students will come to know about Vedas, Vedangas, Brahmana,
History of Vedic Literature	Aranyaka, Upanisads etc. And acquire knowledge on Vedic
	society, Vedic culture and traditions.
Paper – V (Unit- IV)	It would quench the thirst of students regarding Indian
Upanisad	philosophical knowledge on Nature of Soul, transmigration of
	soul, way to emancipation through true knowledge etc. by
	reading the Brihadaranyakopanisad.
Paper VI (Unit – I)	It gives deeper understanding of Sanskrit language through its
Linguistics	history and developments, and analysis in comparison with
	other languages, phonetic laws etc.
Paper VI (Unit – II, III & IV)	By the study of History of Paniniyan System students will have
Grammar	an insight about the famous grammarians of Sanskrit language
	of classical period starting from Panini, and have knowledge on
	some relevant rules for understanding the methodology of
	Panini in presenting different Sutras in his text Astadhyayi.
	Also students' knowledge on Sanskrit grammar,
	especially on Karaka and Samasa, will be strengthened through
	study of the different rules of relevant sections form the text
	Vaivakaranasiddhantakaumudi of Bhattoji Dikshit.
	By this students' overall understanding of Sanskrit
	grammar will be strengthened and application of Sanskrit
	language by them will be refined.
	SEMESTER VI
Paper – VII (Unit – I & II)	The outcome of this course is to introduce different aspects of
Poetics (Kayyasastra)	notics viz style of composition types of poets essentials for
	composition of poetry etc. through study of the text
	Kavyalankarasutravritti of Vamana And students will be well
	versed with of selected Alankaras through study of the chapter
	X of Sahityadarnana of Vishwanathkavirai
Paper – VII (Unit – III & IV)	It will make students aware about different social and
Dharmasastra	administrative practices of ancient India and their relevance
Dharmasastia	through study of the Vyayahara-adhyaya of
	Vainavalkvasamhita
	r ujnu vuin yusunninu.

Paper – VIII (Unit – I, II, III & IV)	This course will enhance students' understanding on various
Introduction to Indian Philosophy	schools of Indian philosophy, specially make students aware
	about different concepts of ancient Indian physics through study
	of the philosophical text Tarkasangraha of Annambhatta, and
	intends personality development and self management through
	study of Samkhyayoga of Bhagavadgeeta and Isopanisad.
Project Work (compulsory)	Students will develop their research aptitude and learn basics of
	preparing and presenting an research work.
COURSE OUTCOME	B.A SANSKRIT GENERAL
	SEMESTER - I
Paper – I (Unit- I, II & IV)	Students will be well versed with the basics of Sanskrit
Grammar	grammar and that will enable them to read, write, speak and
	interpret Sanskrit language properly.
Paper – I (Unit – III)	Inculcate human values through study of stories from the text
Ethics	Hitopadesa, and have knowledge on fable literature in Sanskrit
	language.
	SEMESTER - II
Paper – II (Unit – I)	Strengthen students' knowledge on Sanskrit grammar to
Grammar	improve the skill of reading, writing and speaking in Sanskrit
	language.
Paper – II (Unit – II)	Gives a basic understanding of selected meters from the text
Metrics	Chandomanjari of Gangadasa, and aims at developing the skill
	of students in the composition of poetry in Sanskrit language.
Paper – II (Unit – III & IV)	It will make the students aware about the dramatic tradition of
Drama	Sanskrit literature through study of the text
	Abhijnanasakuntalam of Kalidasa.
	SEMESTER - III
Paper – III (Unit – I)	Give an insight into the tradition of prose writings through the
Prose	study of Rajavahanacharitam of Dasakumaracharitam of
	Dandin, that will develop students' skill of prose writing.
Paper – III (Unit – II) Poetry	Through study of the Kiratarjuniyam of Bharavi students will
	come to know the beauty of Sanskrit poetry and enhance their
	skill of writing and interpreting Sanskrit poetry.
Paper – III (Unit – III & IV)	Inculcate moral values and increase students' knowledge on
Dharmasastra	their duties and responsibility in the society by studying the way
	and means of ancient Indian administration and polity as
	narrated in the Manusamhita.
	SEMESTER - IV
Paper – IV (Unit – I)	It will make the students aware about the early history of ancient
History of Vedic literature	India by studying contents and importance of different Vedas
	and Vedangas etc.
Paper – IV (Unit – II & III)	Students will gain knowledge about classical Sanskrit literature
History of Classical Sanskrit literature	that includes - Ramayana, Mahabharata, Purana, origin and
	growth of different types of compositions, viz. Lyrics, Fable,
	Drama etc., and life and works of various famous authors
	pertaining to the above mentioned different types compositions
	III Sanskrit language.
Paper - IV (Unit - IV)	I hrough study of famous authors and their texts pertaining to
History of Modern Sanskrit Literature	the ancient Indian science and medicine, and modern Sanskrit
	in Songkrit language
	in Sanskrit language.
SEMECTED V	

Paper – V (Unit – I)	Students will have basic knowledge of Gods and Goddess of
Veda	Vedic age and Vedic hymns.
Paper – V (Unit- II)	Students will get moral and philosophical lesions through study
Upanisad & Bhagavadgeeta	of Srimad Bhagavad Geeta and Isopanisad that will enhance the
	life management skill.
Paper – V (Unit – III)	Knowledge on Alankara through study of the text
Poetics	Sahityadarpana of Viswanathkaviraj will enhance students'
	skill of poetry composition in Sanskrit language.
Paper – V (Unit – IV)	Study of the history and development of languages, different
Philology	groups of languages, and various basic rules of linguistics will
	make students skilled in understanding and interpreting
	languages, especially the Sanskrit language.
SEMESTER – VI	
Project Work (optional)	To develop research aptitude and learn basics of preparing and
	presenting an research work.

Course code	Paper & Unit	Semester I
	Paper I 100MARKS Unit –I : Invertebrata -1 ( Protochordate to Annelida)	<ul> <li>CO1: Understand the locomotion of Protozoa</li> <li>CO2 : Attain knowledge about the morphology and reproduction of paramecium.</li> <li>CO3 : Know about the histology of body wall, spicule and its formation.</li> <li>CO4 : Understand the polymorphism in siphonophora a character of Cnidaria and function of nematocyst</li> <li>CO5 : Attain knowledge about the pseudocoelom , coelom formation , metamerism and structural modification along the phylogenetic advancement .</li> <li>CO5 : Know about the morphology , digestive system , excretory system and the medicinal use of Hirudinaria</li> </ul>
ZOOH1	Unit –II : Invertebrata – 2 (Arthropoda to Protochordata)	CO1 : Know about the salient features of Arthropoda and the study of the morphological character , digestive system .respiratory system of periplanetaenables them to familiarize with class insecta and their system . CO2 :Know about the properties of Phylum Mollusca and the morphology, digestive system ,nervous system and torsion in Pila confirms the properties of Mollusca to the students . CO3: Study of notochord helps the student to differentiate between invertebrate , chordate as well as aware about the diversity of animal . CO4: Know about Hemichodata , which helps them to know the evolutionary development towards chordate . CO5: Study of the life history and evolutionary significance of ascidia develop the insight of taxonomical knowledge . CO6 : Know about pharynx ,ciliary mode of feeding of Branchiostoma that implys proper understanding of chordate characters .
	Unit – III : Vertebrata (Cyclostomata to Mammalia)	CO1 : Know about cyclostomes and its Amocoetes the evolutionary aspect . CO2 : Understand the variety of fishes, lung fishes and thei r distribution , anatomical features , physiological functions and diversifying status . CO3: Neoteny ,Paedomorphosis, Heterochrony and Progenesis help to familiarize Amphibia and diversifying nature of development . CO4: Learner knows about the fang structure as well as mechanism of snake bite. CO5: Understand how mammals are advanced than aves and also know specificity of respiratory system and blood vascular system of them .
	Unit – IV : Taxonomy and Classification	<ul> <li>CO1: Understand the terms which are used in the classification of animals .</li> <li>CO2: Know about the code and conduct of scientific naming of animals.</li> <li>CO3: Understand the classification of Porifera , Cnidaria, Annelida, and Vertebrate classes Amphibia, Reptilia and Mammalia .</li> <li>CO4: Familiarize species .</li> </ul>

Course code	Paper & Unit	Semester II
ZOOH2	Paper IIA 60 MARKS Unit –I : Cell Biology ,Histology and Development biology Unit –II : Applied Zoology	<ul> <li>CO1:Understand overview of cell and cell organelles.</li> <li>CO2: Know about chromosome, chromatin, meiosis, mitosis, synaptonemal complex in details.</li> <li>CO3: Know about cancer, its causes and types</li> <li>CO4:Gather knowledge of animal tissues, skeletal muscle, structure and function of skin, liver, kidney and spleen</li> <li>CO5: Understand Gametogenesis, Fertilization, Gastrulation in Chick Embryo, Extra-embryonic membrane formation in Chick to Placenta formation in Rabbit and the types of placenta</li> <li>CO1: Familiarize all about pisciculture, sericulture, prawn culture, poultry, apiculture, vermiculture theoretically.</li> <li>CO2: Know about Pollination, pollinator types and conservation of pollinator.</li> </ul>
	Practical Paper IIB 40MARKS	<ul> <li>CO3:Understand IPM, paddy pest pest of brinjal and their control measure .</li> <li>CO1: Perfection of theoretical knowledge through specimen visualization representing Invertebrate, Protochordate, and Chordates CO2: Perfection of histology and development biology are attained.</li> <li>CO2: Known the technique of wetching shown a series and with the college of the series of the ser</li></ul>
		CO3: Know the technique of watching chromosome and mitotic cell division stages under microscope by onion root preparation CO4: Farm visit inspire the student in applied zoology .

Course	Paper & Unit	Semester III
code		
	IIIA	CO1: Learn about the genetic material properties , linkage,
	60MARKS	crossing over , recombination , sex determining system in man
	Unit –I : Genetics	and drosophila .
		CO2: Knowledge of syndromes and inheritance of genes .
		CO3: Gather information about mutation , mutant , mutagen
		and genetic disorder due to metabolic blockage.
		CO4: Know about gene expression following one gene one
		polypeptide hypothesis.
	Unit –II : Ecology	CO1: Gather knowledge about environment, community,
		population and community succession , energy flow in
		ecosystem and all about of the generalised aspect of ecology.
ZOOH3		CO2:Know about the migration of bird
		CO3: Realise and acquire generalised illustration about different
		types of pollution and their effects on the environment .
		CO4: Know about various acts and agencies related with
		conservation of wild life and its funding .
	III B	CO1: Know about practical skill on community analysis of soil
	40MARKS	and water and determination of population density by capture
	Practical based on Unit I	recapture method.
	and Unit II	CO2: Know about pedigree analysis of human traits confer
		perfection on Mendelian principles .
		CO3 : Advancement in experimental motive and patience is
		acquired through dissolved oxygen estimation.
		CO4: Spot identification makes them expert in quick

	appreciation what they know.

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Course		Semester IV
code		
	IVA	CO1: Know about types of microbes and their features.
	60MARKS	CO2: Familiarize with Probiotics and human welfare.
	Unit –I	CO3: Know about Cholera and Amoebiosis and their
	Microbiology, Parasitology	controlling system .
	and Immunology	CO4: Gather knowledge of the fundamentals of
		Plasmodium, Wuchereria and Echylostoma .
		CO5: Understandlife history and host parasite interaction of
		Taenia and Round worm.
		CO6: Understand all about the immune system of animal .
ZOOH4	Unit –II : Tools and techniques	CO1:Gather theoretical knowledge on pH meter,
	IN BIOlogy	colorimeter, Centrifuge, Chromatography and
		electrophoresis.
		CO2: Know and understand about LM and EM.
		CO3: Familiarize with the technique of permanent slide
		preparation .
	IV B	CO1:Know Gramm Staining method, Gut Parasite collection,
	40MARKS	Permanent slide preparation based on theory IV A.
	Practical based on Unit I	
	and Unit II	

Course	Paper & Unit	Semester V
code		
	V/VA	CO1 : Know about convergent and divergent adaptation of
	100MARKS	placental mammals.
	Unit –I	CO2: Acquainted with the adaptation of Camel, Whale and
	Adaptation.	Pigeon
	Zoogeography &	CO3: Understand Colouration and Mimicry.
	Ethology	CO4: Know about the distribution of animal and realms on earth .
		CO5: Gather knowledge of animal behaviour and effects of
		pheromones in the communication of animals .
	Unit –II :	CO1: Understand and know about the physiology of
	Animal Physiology	digestion, $O_2$ , $CO_2$ transport in blood of mammals.
	, , ,	CO2: Gather information about comparative mode of
		respiration in Lata, , Pigeon , Human .
		CO3: This course provide knowledge about excretion in fish,
		bird, mammal and osmoregulation in freshwater and marine
ZOOH5		fish .
		CO4: Course impart knowledge of action potential and
		nerve impulse conduction .
	Unit – III :	CO1: Know all about biodiversity , in-situ , ex-situ
	Biodiversity and	conservation .
	Conservation	CO2: Know about endangered, rare , vulnerable and

		threatened species ,their meaning and protection measure . CO3: This course provide information regarding Tiger and Rhino conservation . CO4: Learns about National Park, Biosphere Reserve , Sanctuaries and CITIES.
	UNIT – IV Biostatistics	<ul> <li>CO1: Learn about central tendency and their relationship.</li> <li>CO2: Know the concept of probability, correlation, hypothesis testing.</li> <li>CO3: Attain the system of graphical computation of data.</li> <li>CO4: Learn about statistical analysis.</li> </ul>
ZOOH6	VB/VI 100MARKS Practical Paper	<ul> <li>CO1: Perfection of theoretical knowledge of adaptation through specimen visualization representing</li> <li>Chordates.</li> <li>CO2: Attain information of diversity of world animal .</li> <li>CO3: Familiarize with the principle and procedure of blood grouping, haemin crystal , blood film preparation and WBC identification.</li> <li>CO4: Understand the Chi-square and t test through solving problems.</li> <li>CO5: Know how the field study report is prepared on local fauna observation .</li> </ul>

Course code	Paper & Unit	Semester VI
VIA/VII 100MARKS Unit –I Environmental Biology	VIA/VII 100MARKS Unit –I Environmental Biology	<ul> <li>CO1: Know practical supporting evidence of Origin of life</li> <li>CO2: Learn about Geologic Time table .</li> <li>CO3: Theoretical information regarding genetic variation in natural population and genetic frequency change .</li> <li>CO4: Know how selection and isolation is taken place in natural population .</li> <li>CO5: Understand how species is developed in nature</li> </ul>
ZOOH7	Unit –II : Biochemistry	<ul> <li>CO1: Understand the concept of PH and buffer and their role in biological application.</li> <li>CO2 :This course explains classification and functions of protein, lipid, carbohydrate and nucleic acid.</li> <li>CO3 : Know all about enzyme.</li> <li>CO4: Learn about ATP generation process , TCA Cycle and the process of Glycolysis.</li> </ul>
	Unit –III Endocrinology and reproductive biology	<ul> <li>CO1:This course explains the structure and function of endocrine glands</li> <li>CO2. Explain about the humans disorders due to Pituitary and Thyroid gland malfunction</li> <li>CO3: Impart knowledge of hormonal control of spermatogenesis, Oogenesis and Ovulation.</li> </ul>

	CO4: Gathers knowledge of Oestrous cycle in seasonal breeding animal .
Unit – IV Molecular Biology and Genetic Engineering	<ul> <li>CO1: Familiarize about the replication, transcription and translation in bacteria.</li> <li>CO2: Know substructure of gene through Benzer's T4 r II experiment .</li> <li>CO3: Understand the Concept of cistron, recon ,mucon and Lac-Operon .</li> <li>CO4: Familiarize genetic basis of cancer .</li> <li>CO5: This course illustrate about the DNA Recombinant technology, hazards and benefits of genetic engineering .</li> </ul>

Course code	Paper & Unit	Semester VI
	VIII	CO1: Know practically the comparative aspect of bones
	100 MARKS	of toad, lizard, pigeon and guinea pig. CO2: Acquire visualized understanding of salivary amylase action and estimation of glucose. CO3: Visualize the tissue system of endocrine gland under microscope.
ZOOH8	Practical paper	CO4: Know the procedure of finding out the allele frequency and genotype frequency . CO5: Understand the process of identification of genetical disorder through karyotype analysis.

Course code	Paper & Unit	Semester VI
ZOOH9	XI Project Paper	<ul> <li>CO1: Know about how to generate a hypothesis or topic.</li> <li>CO2: Gather knowledge about designing a project work .</li> <li>CO3: They know about the control experiment.</li> <li>CO4: Familiar with standardization .</li> <li>CO5: Know about performing experiment and observation.</li> <li>CO6: Learn how the raw data is collected.</li> <li>CO7: Know tabulation of data.</li> <li>CO8 : Familiarize with analysing the data using statistical tools and formula.</li> <li>CO9: Understand to draw the conclusion through comparing with the hypothesis.</li> <li>CO10 : Know the art of report writing .</li> <li>CO11: Practice presenting .</li> </ul>