Kanchrapara College

Department of Political Science

2020-2021

Course outcomes (CO) of Political Science (Programme Course)

Discipline Specific Elective Course (DSE)

5th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-DSE-T-1(A):Citizenship in a globalizing world	After completion of this course, the students will understand the concept of citizenship and citizenship as a practice in a globalizing world. CO1- Students will be able to understand the classical concept of citizenship, and its relationship with diversity. CO2- Students will also understand the idea of global justice and cosmopolitan citizenship.

6th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-DSE-T-2(A): Understanding South Asia	After completion of this course, learners will be able to understand the geopolitics of South Asia and other political issues in the region. CO1- Students will learn about the historical and colonial dimension of South Asia. CO2- Students will understand the various regimes in South Asia, socio-economic issues and regional issues playing the region.

Kanchrapara College

Department of Political Science

2020-2021

Course outcomes (CO) of Political Science (Programme Course)

Generic Elective Course (GE)

5th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-GE-T-1(A): Reading Gandhi	After completion of this course, the students will be able to understand the art of reading texts and grasp its conceptual and argumentative structure. The students will also get acquainted with the social and political thought of Gandhi. CO1 – The students will learn about the various ways of reading a text. C02 – The students will learn about Hind Swaraj in Gandhi's own words and the relevant commentaries on it. CO3 – The students will also be familiarized with issues of nationalism, communal unity, untouchability and education from Gandhian perspective.

6th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-GE-T-2(A):) Human Rights, gender and environment	After completion of this course, the students will be able to understand the conceptual dimensions and international trends with respect to human rights, gender and environment. CO1- Students will learn about caste, gender and ethnicity as distinct categories and their interconnection. CO2 – Students will also learn about the various issues related to human rights and consumer rights along with the redressal mechanisms.

	CO3 – Students will be able to analyse structure of patriarchy, gender and culture in various social settings. CO4 – Students will be able to understand various environmental issues along with the different measures taken by the UN to combat various environmental threats. There will be a special focus on the concept of sustainable development.

Kanchrapara College

Department of Political Science

Course outcomes (CO) of Political Science (Programme Course)

Skill Enhancement Course (SEC)

3rd Semester

Name of the Paper	Course Outcomes(CO)
POL-G-SEC-T-1: Legislative Practices and Procedures	After completion of this course, students will be able to identify the legislative process in India at various levels. CO1 – Students will be able to understand the powers and functions of people's representatives at different tires of governance. CO2 – Students will gain a deep understanding of legislative process which includes the entire process of a bill becoming a law. CO3 – Students will learn about the various legislative committees including the types and functions. CO4 – Students will also learn about the entire budget process and the examination of demands for grants of ministries. CO5 – Students will have an idea about the types of media and their significance for legislators. They will also have a basic idea of communication in print and electronic media.

4th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-SEC-T-2: Public opinion and survey research	After completion of these courses, learners will identify the debates and practices of public opinion and learn how to measure public opinion using qualitative methods. CO1- Students will learn about the concept and characteristics of public opinion.

	CO2- Students will learn about the various methods of measuring public opinion. CO3 – Students will learn about the different techniques of interviewing and question wording. CO4- Students will also learn how to predict poll results and grasp the various techniques of qualitative data analysis.

5th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-SEC-T-3: Democratic Awareness with legal literacy.	After completion of these courses, the students will be able to understand the various ways of legal functioning in India. CO1- Students will learn about the Fundamental Rights and Duties in the Constitution. CO2- Students will know about the various laws related to criminal jurisdiction as well as anti-terrorists laws. CO3- Students will understand the system of courts of India and gain a critical understanding of the functioning of the legal system. CO4- Students will also learn about the concept of Human Rights and various mechanisms to ensure their restoration.

6th Semester

Name of the Paper	Course Outcomes(CO)
POL-G-SEC-T-4: Peace and conflict resolution.	After completion of this course, students will be able understand the various dimensions of conflict and techniques of peace building. CO1 – Students will have an idea about conflict and its various dimensions, along with the techniques of peace building. CO2 – Students will also learn about the nature of local, sub-national and international conflicts. CO3 – Students will also learn about the various techniques of conflict resolution.

1. **General course**
   a) Inorganic Chemistry

Semester I	
Paper- **CHEMGT-1 (Theory)** **Inorganic Chemistry I**	Unit 1: **Atomic Structure** **CO1:** From this unit students will learn about Bohr's theory, Sommerfeld's modification, Pauli's exclusion principle, Hund's rule, Aufbau principle. Student will have qualitative idea about shapes of orbitals, quantum numbers and electronic configuration.
	Unit 2: **Chemical Periodicity** **CO2:** From this unit students will learn about modern IUPAC periodic table, group and periodic trends of atomic radii, ionization energy, electron affinity of s, p and d block elements.
	Unit 3: **Acids and Bases** **CO3:** From this unit students will learn about various acid base theories, solvent effects, HSAB principle, acid base equilibria.
	Unit 4: **Redox Reaction** **CO4:** From this unit students will learn about balancing of equations, standard electrode potential, formal potential, redox indicators and redox titrations.
Paper-CHEMGP-1 (Practical) **Inorganic Chemistry I**	**Unit 1: Estimation of Sodium Carbonate and Sodium Hydrogen carbonate** **CO5:** From this unit students will learn to estimate Sodium Carbonate and Sodium Hydrogen carbonate in a given mixture quantitatively. They will also learn to calculate the strength of various secondary standard solutions.
	Unit 2: **Estimation of Oxalic acid by titrating it with $KMnO_4$** **CO6:** From this unit students will learn to estimate oxalic acid using $KMnO_4$ solution quantitatively. They will also learn to calculate the strength of various secondary standard solutions.
	Unit 3: **Estimation of water of crystallization in Mohr's salt by titrating with** $KMnO_4$ **CO7:** From this unit students will learn to estimate water of crystallization in Mohr's salt by titrating with $KMnO_4$ quantitatively. They

	will also learn to calculate the strength of various secondary standard solutions.
	Unit 4: **Estimation of Fe(II) by titrating it with $K_2Cr_2O_7$** **CO8:** From this unit students will learn to estimate Fe(II) by titrating it with $K_2Cr_2O_7$ quantitatively.
	Unit 5: **Estimation of Cu(II) iodometrically using $Na_2S_2O_3$** **CO9:** From this unit students will learn to estimate Cu(II) using $Na_2S_2O_3$ Quantitatively by liberation of iodine. They will also learn to calculate the strength of various secondary standard solutions.

Semester II	
Paper- **CHEMGT-2 (Theory)** **Inorganic Chemistry II**	Unit 1: **Chemical Bonding and Molecular Structure** **CO1:** From this unit students will learn about ionic bond, lattice energy, Born-Lande equation, Born-Haber cycle, Fajan's rules, salvation energy, packing in crystals, structure of ionic solids and crystal defects. They will learn about covalent bond, V.B theory, hybridization, VSEPR theory, Bent's rule, M.O theory, dipole moment, Band theory, resonance, hydrogen bonding.
	Unit 2: **Comparative Study of p block elements** **CO2:** From this unit students will learn about group trends, electronic configuration, properties of B-Al-Ga-In-Tl, C-Si-Ge-Sn-Pb, N-P-As-Sb-Bi, O-S-Se-Te, F-Cl-Br-I.
Paper-CHEMGP-2 (Practical) **Inorganic Chemistry II**	**Unit 1: Qualitative Semimicro Analysis** **CO3:** From this unit students will learn to analyze mixture containing three radicals qualitatively. They will also learn to detect basic radicals(K^+, Mg^{2+} , Ca^{2+}, Ba^{2+}, Sr^{2+}, Al^{3+}, Cr^{3+}, Mn^{2+}, Fe^{3+}, NH_4^+ /Fe^{2+}, Co^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+} /Sn^{4+}, As^{3+}) and acid radicals(Cl^-, Br^-, I^-, S^{2-},SO_4^{2-}, NO_3^-, NO_2^-). They will also learn to perform dry tests, wet tests of above radicals.

Semester IV	
Paper- **CHEMGT-4 (Theory)** **Inorganic Chemistry III**	Unit 1: **Transition Elements (3d Series)** **CO1:** From this unit students will learn about general group trends, properties, stability, latimer diagram for Mn, Fe and Cu. They will also learn about electronic configuration, color, properties, contraction, separation of lanthanoids and actinoids.
	Unit 2: **Coordination Chemistry** **CO2:** From this unit students will learn about Werner's theory. VBT, inner and outer orbital complex and isomerism of complexes with coordination number 4 and 6. They will also learn about IUPAC nomenclature.
	Unit 3: **Crystal Field theory(CFT)** **CO3:** From this unit students will learn about postulates of CFT, CFSE, spectrochemical series, tetragonal distortion of octahedral geometry, Jahn-Teller distortion.
Paper-CHEMGP-4 (Practical) **Inorganic Chemistry III**	**Unit 1: Complexometric Estimation of Mg^{2+} or Zn^{2+} using EDTA** **CO4:** From this unit students will learn to estimate Mg^{2+} or Zn^{2+} using EDTA quantitatively.
	Unit 2: Preparation of any two of the following complexes **CO5:** From this unit students will learn to prepare Potassium tris(oxalato)chromate(III) trihydrate, Potassium bis(oxalate)cuprate(II) dehydrate or they will learn to prepare Tetraamminecarbonatocobalt(III) nitrate Tetraamminecopper(II) sulphate .

b) Organic Chemistry

Semester I	
Paper- CHEMGT-1(Organic Chemistry– I) (Theory)	Unit 1: **1.Fundamentals of Organic Chemistry** **CO1:** From this unit the students will learn fundamental science regarding basic concepts of chemistry which include chemical bond and characteristic features.
	Unit 2: **Stereochemistry** **CO2:** From this unit the students will learn presentation of molecules in different well known terminology and three dimensional features of molecules and the corresponding features.
	Unit 3: **Nucleophilic Substitution and Elimination Reactions** **CO3:** From this unit the students will learn common substitution and elimination reactions and their several classifications.
	Unit 4: **Aliphatic Hydrocarbons** **CO4:** From this unit the students will learn addition, oxidation, and reduction etc. reactions of saturated and unsaturated systems.
Paper- CHEMGT-1(Organic Chemistry– I) (Practical)	**Unit 1: Qualitative Analysis of Single Solid Organic Compound(s)** **CO5:** From this unit the students will learn how to identify practically a single solid organic compound by several chemical tests.

Semester III	
Paper- CHEMGT-3(Organic Chemistry– II) (Theory)	Unit 1: **Aromatic Hydrocarbons** **CO1:** From this unit the students will learn electrophilic, nucleophilic, cine substitution reactions of several substituted aromatic motifs.
	Unit 2: **Organometallic Compounds** **CO2:** From this unit the students will learn utilities of Grignard reagents, Organolithium reagents, Organocopper reagents.
	Unit 3: **Aryl Halides** **CO3:** From this unit the students will learn reduction, substitution, elimination reactions of aryl halides.

	Unit 4: **Alcohols, Phenols and Ethers** **CO4:** From this unit the students will learn synthesis, substitution, elimination reactions of alcohol and ether compounds.
	Unit 5: **Carbonyl Compounds** **CO5:** From this unit the students will learn nucleophilic addition, oxidation, and reduction reactions of carbonyl compounds.
Paper- CHEMGT-3(Organic Chemistry– I) (Practical)	**Unit 1: Identification of a pure organic compound** **CO6:** From this unit the students will learn several chemical tests of some specific organic compounds to identify them practically.

c) Physical Chemistry

Semester-II	
Paper-CHEMGT-2 (Theory) (Physical chemistry-I)	**Unit-1: Kinetic theory of Gases and Real** Gases **CO-1:** From this unit the students will learn different laws of Gas molecules, how velocity distributed among no of molecules, the collision properties. In this unit students will understand how a Gas can be liquified and different isotropic properties of Gaseous molecule.
	Unit-2: Liquids **CO-2:** This part mainly discussed about different surface related matter like surface tension its unit,how it changes for a liquid with temperature and different ways of measurement of it. During this topic discussion the students will learn different properties of fluid such as viscocity.They will come to know about different types of flow of liquid.
	Unit-3:Solids **CO-3:** Coming into last semester of their graduation course they will learn about solid state for a system their specific properties and different laws of crystallography.They will also understand how the latis points are distributed or arranged inside a crystal and their packing efficiency. They will learn by using Bragg's law how crystal structure can be determine

	Unit-4:Chemical Kinetics **CO-4:** Students will learn about rate and rate constant. They will understand how concentration of reactants and products changes with time. They will learn how to determine order of a complex reaction knowing steady step approximation. What are rate of catalyst in a chemical reaction that will be discussed here. They will also understand the variation of rate with temperature

Semester-II	
Paper-CHEMGP-2 (Practical) (Physical chemistry-I)	**Unit-1: Determination of surface tension by Stalgmometer** **CO-1:** From this experiment will learn to handle stalagmometer and how to utilize this instrument to determine surface tension of different solution like acitic acid.They will also learn to draw the curve surface tension vs concentration of solution
	Unit-2: Determination of viscocity of Ostwald viscometer **CO-2:** The students will use ostward viscometer to determine time of flow for a particular liquid and hence plotting a graph η vs %of concentration of solution,they will dertmine unknown concentration.
	Unit-3: Kinetics of acid catalysed hydrolysis of methyl acetate **CO3**: The students will learn how the presence of acids catalyses the hydrolysis of an ester. They will learn how to maintain time between of mixture by NaOH. They will also learn to draw corresponding graph to determine rate constant.

Semester-III	
Paper-CHEMGT-3 (Theory) (Physical chemistry-II)	**Unit-1: Chemical Energetics** **CO-1:** From this part the students will gathered the information about heat, different types of work, different processes by which one state changes to another state, relation between heat, work and internal energy. They will learn to calculate **ΔE,ΔH,q and w** in different thermodynamic process. From thermodynamic part they will know about different enthalpies and its variation. From this segment the students will learn the principle of heat engine, refrigerator. They will understand the conditions for a process to be spontaneous with the help of the concept of entropy and free energy.They will have the answer why all natural processes are irreversible etc.
	Unit-2: Chemical Equilibrium **CO-2** In chemical equilibrium chapter the students will learn different equilibrium constant such as Ka,Kc,Kp,Kx and Van't Hoff reaction isotherm, Van't Hoff equation and Van't Hoff isochore.will also learn the application of La-Chatelier principle.
	Unit-3: Ionic Equilibrium **CO3:**In this part the students will learn about types of electrolytes depending on their degree of dissociation as weak and strong>how the degree of dissociatin varies with concentration or dilution, the Ostwald dilution law/ They will learn the way of measuring ionic product of water about buffer solution and many expression of pH of different solution.

Semester-III	
Paper-CHEMGP-3 (Practical) (Physical chemistry-II)	**Unit-1: Determination of Enthalpy of Neutralisation of HCL with NaOH** **CO-1:** From this experiment the students will learn and see actually what happens when an acid and base reacts and the results shows the process is an exothermic process. They see the simple set up of Calorimeter.

	Unit-2: Determination of Enthalpy of hydration of CuSO4 **CO-2:**when a solid crystal added to water they are occur change of enthalpy as hydration of ions occur it may be endothermic or exothermic, The students will measure molar heat of solution of anhydrsous Cuso4 and also for hydrated CuSO4 to calculate enthalpy of hydration of CuSO4
	Unit-3: : Determination of pH of buffer solution by colour matching **CO3:**From this experiment the students will learn to prepare primary and secondary standard solution and basic procedure of acid and base titration using indicatior, They will be able to identify different shades of colour
	Unit-4:Measurerment of pH of different solution like aerated drinks fruit juice,Shampoos and soaps **CO-4:** The above mention materials we actually use in daily life. So from knowing the pH students will understand which food or drink is good for health or not which shampoo or soap will be good for human skin etc

Semester-IV	
Paper-CHEMGT-4 (Theory) (Physical chemistry-III)	**Unit-1:Solutions** **CO-1:**The students will learn about into types of solution ideal and corresponding Rault's law for ideal solution they will come to know about to very important topic like lever rule for completely miscible mixture and azotrope They will also know what actually occurs when a solute is distributed between two immiscible liquid solvent that is Nernst distribution .
	Unit-2:Phase equilibria **CO-2** In the phase part they learn how all the phases one substances remain in equilibrium and with change of variables P,T and C how the equilibrium being affected. They also learn some very important topic like azeotropic mixture, solvent extraction, eutectic mixture, fractional distillation etc
	Unit-3:Conductanmce **CO-3:** During discussion about conductance the students will learn the current carrying power of different electrolytic solution, different types of conductance. The students will learn different application of the concept of conductance.

	Unit-4:Electromotive Force **CO-4:** In electrochemical cell chapter they learn about cell , electrode construction of cell from chemical reaction,different types of electrode. They are taught about various reference electrodes such as SHE,SCE etc. In this chapter we also discuss pH of a solution can be determine measuring poterntial

Semester-IV	
Paper-CHEMGP-4 (Practical) (Physical chemistry-III)	**Unit-1:Application of Distribution law for the study of equilibrium $I_2(aq)+I^-(aq) \rightleftharpoons I_3^-(aq)$** **CO-1:**First students will measure the value of Kp partition coefficient between water and CHCL3 and then they will study another equilibrium between $KI+I_2 \rightleftharpoons KI_3$ using $Na_2S_2O_7$ solution ,student will titrate the libarated I_2 in presence of starch as indicator.
	Unit-2:Conductometer **CO-2** : The students will practically see how conductance varies when base(NaOH) is added to a particular acid with the help of conductometer and from conductance vs base number of drops of NaOH curve. They become able to calculate unknown concentration of acids.
	Unit-3:Potentiometer **CO-3: :** The students will learn about use of reference electrode(calomel) and Input electrode. They will observe the change of potential when drop- wise $K_2Cr_2O_7$ is added from burette to mohr salt using potentiometer. They will calculate the formal potential of Fe^{3+}/Fe^{2+} system

d) DSE Paper

Semester V	
Paper- **CHEMGTDSE-1 (Theory)** **Analytical and Environmental Chemistry**	**Unit 1: Chemical Analysis** **CO1:** From this unit students will learn about gravimetric analysis of chloride, sulphate, lead, barium, nickel, copper and zinc. They will also learn about primary and secondary standard solution, volumetric analysis of iron, copper, zinc complexometrically, volumetric analysis of $NaHCO_3$ and Na_2CO_3 mixture. They will learn about column and thin layer chromatography.
	Unit 2: Environmental Chemistry **CO2:** From this unit students will learn about composition and structure of all layers of atmosphere, major air pollutants, ozone layer, cyclone collector, catalytic convertor. They will learn about hydrosphere, source and use of water, water pollutants, DO, BOD, COD, TDS, hardness parameter. They will also learn about the lithosphere, water and air in soil, soil pollutants and controlled treatments.
Paper- **CHEMGTDSE-1 (Theory)** **Analytical Industrial Chemistry**	**Unit 1: Error Analysis and Computer Applications** **CO3:** From this unit students will learn about accuracy and precision of quantitative analysis, different types of errors, standard deviations. They will also learn about different components of computers, hardware and software, computer languages, programming and operating systems, input and output devices. They will also learn to calculate binary numbers and arithmetic.
	Unit 2: Industrial Chemistry **CO4:** From this unit students will learn about classification of fuel, origin and carbonization of coal, coal gas, producer gas, water gas, petroleum refining, cracking, knocking, octane

	number, LPG, LNG. They will also learn about manufacture of fertilizers, different types of fertilizers, mixed fertilizers. They will learn about manufacture and processing and properties of glass, ceramics, cements.
Paper- **CHEMGPDSE-1 (Practical) Analytical and Environmental Chemistry**	**Unit 1: To find the total hardness of water by EDTA Titration** **CO5:** From this unit students will learn to estimate total hardness of water by EDTA Titration quantitatively.
	Unit 2: To find the pH of an unknown solution by comparing color **CO6:** From this unit students will learn to find the pH of an unknown solution by comparing color of a series of HCl solutions + 1 drop of Methyl Orange and a similar series of NaOH solutions + 1 drop Phenolphthalein.
	Unit 3: To determine the rate constant for the acid catalysed hydrolysis of an ester **CO7:** From this unit students will learn to calculate the rate constant for the acid catalysed hydrolysis of an ester.
	Unit 4: Determination of the strength of H_2O_2 sample **CO8:** From this unit students will learn to calculate the strength of H_2O_2 sample quantitatively.
	Unit 5: To determine the solubility of a sparingly soluble salt **CO9:** From this unit students will learn to calculate solubility of a sparingly soluble salt, e.g. KHTa quantitatively.
Paper- **CHEMGPDSE-1 (Practical) Analytical Industrial Chemistry**	**Unit 1: Titration of Na_2CO_3 and $NaHCO_3$ mixture vs HCl** **CO10:** From this unit students will learn to estimate Na_2CO_3 and $NaHCO_3$ from given mixture by HCl using phenolphthalein and methyl orange indicators quantitatively.
	Unit 2:Titration of HCl and CH_3COOH mixture vs NaOH **CO11:** From this unit students will learn to calculate the concentration of HCl and CH_3COOH from given mixture by NaOH using two different indicators.
	Unit 3: Estimation of available Oxygen in

	pyrolusite **CO12:** From this unit students will learn to calculate available oxygen in pyrolusite using standardized $KMnO_4$ solutions quantitatively.

Semester VI	
Paper- **CHEMGTDSE-2(Theory)** Industrial Chemistry	Unit 1: **Polymers** **CO1:** From this unit students will learn about structure and types of plastics, polythene, polystyrene, PVC, natural rubber, synthetic rubber, synthetic fibres, nylon-66, polyester, foaming agents.
	Unit 2: **Paints** **CO2:** From this unit students will learn about primary constituents, formulation, binders and solvents obtained. They will also learn about oil based paint, latex paint.
	Unit 3: **Varnishes** **CO3:** From this unit students will learn about constituents and formulation of varnishes.
	Unit 4: **Synthetic Dyes** **CO4:** From this unit students will learn about synthesis of methyl orange, congo red, malachite green, crystal violet.
	Unit 5: **Drugs and Pharmaceuticals** **CO5:** From this unit students will learn about concept, preparations and uses of drugs and pharmaceuticals (aspirin, paracetamol, quinine,chloroquine, sulphadiazine, Phenobarbital).
	Unit 6: **Fermentation Chemicals** **CO6:** From this unit students will learn about production and purification of ethyl alcohol, citric acid, lactic acid, vitamin B12, penicillin. They will also learn about industrial chemistry.
	Unit 7: **Fats and Oils** **CO7:** From this unit students will learn about natural fat, edible and inedible oil of vegetable origin, common fatty acid. They will also learn about hydrogenation of unsaturated oil,

	production of vanaspati and margarine.
	Unit 8: **Soaps and Detergents** **CO8:** From this unit students will learn about enzyme based detergents, detergent powder, liquid soap, toilet and washing soaps.
	Unit 9: **Pesticides** **CO9:** From this unit students will learn about productions, applications and residual toxicity of gammaxane, aldrin, parathion, malathion, DDT.
	Unit 10: **Food Additives** **CO10:** From this unit students will learn about food flavor, food color, food preservatives, artificial sweeteners, food beverages.
Paper-CHEMGPDSE-2(Practical) Industrial Chemistry	**Unit 1: Estimation of saponification value of oil / ester/ fat** **CO11:** From this unit students will learn to calculate saponification value of oil / ester/ fat quantitatively.
	Unit 2: Estimation of available Chlorine in Bleaching Powder **CO12:** From this unit students will learn to calculate the concentration of available Chlorine in Bleaching Powder quantitatively.
	Unit 3: Estimation of Acetic Acid in commercial Vinegar **CO13:** From this unit students will learn to calculate the amount of acetic acid in commercial vinegar quantitatively.
	Unit 4: Estimation of Amino Acid by formol Titration **CO14:** From this unit students will learn to estimate Amino Acid by formol Titration quantitatively.

Semester VI	
Paper- CHEMGTDSE-2 (Advanced Organic Chemistry) (Theory)	Unit 1: **Carboxylic Acids and Their Derivatives** **CO1:** From this unit the students will learn synthesis of aliphatic and aromatic carboxylic acid, acid halides, amides, ester compounds and their reactions.
	Unit 2: **Amines and Diazonium Salts**

	CO2: From this unit the students will learn synthesis of aliphatic and aromatic amines and diazo compounds and their corresponding important conversions in organic chemistry.
	Unit 3: **Amino Acids and Carbohydrates** **CO3:** From this unit the students will learn classifications, characterizations, and reactions of several carbohydrate compounds like aldoses and ketoses and classifications, characterizations, reactions of several amino acids, proteins, peptides and nucleic acids.
Paper- CHEMGTDSE-2 (Advanced Organic Chemistry) (Practical)	**Unit 1: Several methods in Organic Chemistry** **CO4:** From this unit the students will practically experience nitration, benzoylation, bromination, hydrolysis etc. reactions.

e) SEC Paper

Semester III	
Paper- **CHEMHS-1B (Theory)** **Basic Analytical Chemistry** **(SEC Paper)**	**Unit 1: Introduction** **CO1:** From this unit students will learn about sampling, variability and validity of analytical measurements, presentation of experimental data and results, significant figures.
	Unit 2: Complexometry and Soil Analysis **CO2:** From this unit students will learn about complexometric titrations, chelation, use of indicators, estimation of Ca and Mg by complexometric titration. Students will also learn about composition and pH of soil samples, estimation of Ca and Mg content in soil sample.
	Unit 3: Analysis of Water **CO3:** From this unit students will learn about water sampling methods, water purification methods, determination of pH of water samples and determination of BOD.
	Unit 4: Analysis of Food Products **CO4:** From this unit students will learn about food processing, food preservations, adulteration, identification of adulterants, analysis of preservatives and coloring matter.

	Unit 5: Chromatography **CO5:** From this unit students will learn about principles of chromatography, paper chromatography, TLC and paper chromatographic separation of mixture of metal ions.
	Unit 6: Ion-exchange **CO6:** From this unit students will learn about ion-exchange chromatography, column chromatography and ion-exchange resin.
	Unit 7: Analysis of Cosmetics **CO7:** From this unit students will learn about major and minor constituents of cosmetics, analysis of deodorants and antiperspirants, determination of constituents of talcum powder.
	Unit 8: Suggested Applications(any one) **CO8:** From this unit students will learn about study of phenolphthalein in trap cases or analysis arson accelerants or analysis of gasoline .
	Unit 9: Suggested Instrumental demonstrations **CO9:** From this unit students will learn about estimation of macro nutrients in soil samples by flame photometry, spectrophotometric, determination of iron in vitamin or dietary tablets and spectrophotometric determination of caffeine and benzoic acid in soft drinks.

Semester IV	
Paper- **CHEMHS – 2A (Theory)** **Pharmaceutical Chemistry** **(SEC)**	Unit 1: **Drugs and Pharmaceuticals** **CO6:** From this unit students will learn about design, discovery, development, synthesis of drugs. They will learn about anti inflammatory, antipyretic agents, antibiotic, antifungal agent, antiviral, antibacterial agents.

	Unit 2: **Fermentation** **CO6:** From this unit students will learn about aerobic and anaerobic fermentation. They will also learn about production of antibiotics, penicillin, citric acid, glutamic acid, lysine, vitamin B12, vitamin B2, Vitamin C.
	Unit 3: **Hands on Practical** **CO6:** From this unit students will learn about preparation and analysis of aspirin. They will also learn about preparation of magnesium bisilicate.

Semester V	
Paper- **CHEMHS - 2B (Theory)** **Analytical Clinical Biochemistry** **(SEC)**	**Unit 1: Review of Concepts from core course** **CO13:** From this unit students will learn about carbohydrates, proteins, enzymes, lipids, biocatalysis, importance in green chemistry and chemical industry.
	Unit 2: Biochemistry of disease : A diagnostic approach by blood and urine analysis **CO14:** From this unit students will learn about blood, blood sampling, preservation of samples, estimation of blood sugar, estimation of urea, estimation of creatinine, estimation of cholesterol and bilirubin, urine sampling and preservation, estimation of constituents of normal and pathological urine.
	Unit 3: Hands On Practical **CO15:** From this unit students will learn about identification and estimation of carbohydrates, lipids, proteins. They will also learn about determination of iodine number of oil, saponification number of oil, cholesterol using Liebermann-Burchard reaction, protein by Biuret reaction and determination of nucleic acids.

Semester VI	
Paper- **CHEMHS – 1A (Theory)** **(IT skills for Chemist)**	**Unit 1: Mathematics** **CO1:** From this unit students will learn about several mathematical relations regarding equations of chemistry and their fundamental concepts.
	Unit 2: Computer programming **CO2:** From this unit students will learn about computer programming regarding matrix and other common terminologies related with physical chemistry.
	Unit 3: Hands On Practical **CO3:** From this unit students will learn about drawing of chemical structures and their identification of characteristic features from mnentioned software.

Department of Chemistry

Course Outcomes (COs)

The Department follows the syllabus and curriculum structure as mandated by the affiliating University. During the three years of the B.Sc Honours and Program courses, several theory and practical papers are covered. The semester wise distribution of the papers and their course outcomes are listed below.

1. **Honours Course**
   a) Organic Chemistry (Core Course)

Semester I	
Paper- **CHEMHT-2 (Theory)**	Unit 1: **Bonding and Physical Properties** **CO1:** From this unit the students will learn fundamental science regarding basic concepts of chemistry which include chemical bond and characteristic features.
	Unit 2: **General Treatment of Reaction Mechanism – I** **CO2:** From this unit the students will learn electron movement and presentation of arrow in several chemical reactions.
	Unit 3: **Stereochemistry-I** **CO3:** From this unit the students will learn presentation of molecules in different well known terminology and three dimensional features of molecules and the corresponding features.
Paper-CHEMHP-2 (Practical)	**Unit 1: Separation** **CO4:** From this unit the students will learn how to separate 2 components from a mixture.
	Unit 2: **Determination of boiling point** **CO5:** From this unit the students will learn how to observe boiling point using heating mantle.
	Unit 3: **Identification of a Pure Organic Compound by chemical test(s)** **CO6:** From this unit the students will learn several chemical tests of some specific organic compounds to identify them practically.

Semester II	
Paper- **CHEMHT-4 (Theory)**	Unit 1: **Stereochemistry-II** **CO1:** From this unit the students will learn three dimensional features of molecules and the corresponding terminologies.
	Unit 2: **General Treatment of Reaction Mechanism – II** **CO2:** From this unit the students will learn reaction kinetics which includes energy change during chemical reaction.
	Unit 3: **Substitution and Elimination Reactions** **CO3:** From this unit the students will learn common substitution and elimination reactions and their several classifications.
Paper-CHEMHP-4 (Practical)	**Unit 1: Organic Preparation and Purification** **CO4:** From this unit the students will practically experience nitration, benzoylation, bromination, hydrolysis etc. reactions.

Semester III	
Paper- **CHEMHT-7 (Theory)**	Unit 1: **Chemistry of alkenes and alkynes** **CO1:** From this unit the students will learn addition, oxidation, and reduction etc. reactions of unsaturated systems.
	Unit 2: **Aromatic Substitution** **CO2:** From this unit the students will learn electrophilic, nucleophilic, cine substitution reactions of several substituted aromatic motifs.
	Unit 3: **Carbonyl and Related Compounds** **CO3:** From this unit the students will learn nucleophilic addition, oxidation, and reduction reactions of carbonyl compounds.
	Unit 4: Organometallics **CO4:** From this unit the students will learn utilities of Grignard reagents, Organolithium reagents, organocopper reagents.
Paper-CHEMHP-7 (Practical)	**Unit 1: Qualitative Analysis of Single Solid Organic Compounds** **CO5:** From this unit the students will learn how to identify practically a single solid organic compound by several chemical tests.

Semester IV	
Paper- **CHEMHT-10 (Theory)**	Unit 1: **Nitrogen compounds** **CO1:** From this unit the students will learn classification and special features of nitrogen based organic compounds.
	Unit 2: **Rearrangements: Mechanism with evidence and stereochemical features** **CO2:** From this unit the students will learn different types of rearrangements, migration properties of different groups with special attention to stereochemical course.
	Unit 3: **The Logic of Organic Synthesis** **CO3:** From this unit the students will learn how to design the synthesis of valuable organic motifs which include medicinal and material science fields.
	Unit 4: Organic Spectroscopy **CO4:** From this unit the students will learn to characterize molecules with the utilization of spectroscopic data which include UV, IR, NMR spectroscopy.
Paper-CHEMHP-10 (Practical)	**Unit 1: Quantitative Estimation** **CO5:** From this unit the students will learn how to do quantitative estimation of unknown solution via well established practical methods.

Semester VI	
Paper- **CHEMHT-14 (Theory)**	Unit 1: **Carbocycles and Heterocycles** **CO1:** From this unit the students will learn structural features and reactions of several polynuclear hydrocarbons and heterocyclic compounds.
	Unit 2: **Cyclic Stereochemistry** **CO2:** From this unit the students will learn stereochemical outcomes of several cyclic compounds with special attention to cyclohexane systems.
	Unit 3: **Pericyclic reactions** **CO3:** From this unit the students will learn classifications of pericyclic reactions and the corresponding mechanism including FMO approach.
	Unit 4: Carbohydrates **CO4:** From this unit the students will learn classifications, characterizations, reactions of several carbohydrate compounds like aldoses and ketoses.
	Unit 5: Biomolecules **CO5:** From this unit the students will learn classifications, characterizations, reactions of several amino acids, proteins, peptides and nucleic acids.
Paper-CHEMHP-14 (Practical)	**Unit 1: Chromatographic Separations** **CO6:** From this unit the students will learn to identify practically amino acids, carbohydrates, dyes by means of paper and thin layer chromatographic methods.
	Unit 2: Spectroscopic Analysis of Organic Compounds **CO7:** From this unit the students will learn to identify organic compounds by means of IR and NMR data.

b) Inorganic Chemistry (Core Course)

Semester I	
Paper- **CHEMHT-1 (Theory)** **Inorganic Chemistry IA**	Unit 1: **Extra nuclear Structure of atom** **CO1:** From this unit students will learn about Bohr's theory, Sommerfeld's modification, de-Broglie's concept, Heisenberg's uncertainty principle, Schrödinger wave equation, Pauli's exclusion principle, Hund's rule, Aufbau principle. Student will have qualitative idea about radial probability function, shapes of orbitals, quantum numbers, microstates and electronic configuration.
	Unit 2: **Periodic properties** **CO2:** From this unit students will learn about modern IUPAC periodic table, group and periodic trends of atomic radii, ionization energy, electron affinity of s, p and d block elements. They will learn about various electronegativity scales.
Paper-CHEMHP-1 (Practical) **Inorganic Chemistry IA**	**Unit 1: Method of preparation of standard solutions of titrants** **CO3:** From this unit students will learn to prepare various standard solutions. They will also learn to calculate actual strength of various standard solutions.
	Unit 2: **Estimation of carbonate and hydroxide present together in a mixture** **CO4:** From this unit students will learn to estimate carbonate and hydroxide present together in a mixture quantitatively. They will also learn to calculate the strength of various secondary standard solutions.
	Unit 3: **Estimation of carbonate and bicarbonate present together in a mixture** **CO6:** From this unit students will learn to estimate carbonate and bicarbonate present together in a mixture quantitatively. They will also learn to calculate the strength of various secondary standard solutions.

Semester II	
Paper- **CHEMHT-3 (Theory)** **Inorganic Chemistry IB**	Unit 1: **Redox Reactions and precipitation reactions** **CO1:** From this unit students will learn about complementary, noncomplementary, disproportionation, comproportionation reactions, electrochemical series. They will also learn about Nernst equation, standard redox potentials, formal potential, solubility product, common ion effect and its applications.
	Unit 2: **Acid-Base Concepts and Solvents** **CO2:** From this unit students will learn about various acid base theories, solvent effects, HSAB principle, acid base equilibria. They will learn to calculate pH of solution. They will also learn about acid base neutralization curves and indicators.
Paper-CHEMHP-3 (Practical) **Inorganic Chemistry IB**	**Unit 1: Estimation of Fe(II) using $K_2Cr_2O_7$ solution** **CO3:** From this unit students will learn to estimate Fe(II) by standard $K_2Cr_2O_7$ solution quantitatively.
	Unit 2: Estimation of Fe(III) using $K_2Cr_2O_7$ and $KMnO_4$ solution **CO4:** From this unit students will learn to estimate Fe(III) by standard $K_2Cr_2O_7$ solution quantitatively. They will also learn to estimate Fe(III) by standardized $KMnO_4$ solution. They will also learn to calculate the strength of $KMnO_4$ solution.
	Unit 3: Estimation of Ca^{2+} using $KMnO_4$ solution **CO5:** From this unit students will learn to estimate **Ca^{2+}** by standardized $KMnO_4$ solution. They will also learn to calculate the strength of $KMnO_4$ solution.
	Unit 4: Estimation of Cu^{2+} iodometrically **CO6:** From this unit students will learn to estimate Cu^{2+} using standardized $Na_2S_2O_3$ solution quantitatively by liberation of Iodine. They will also learn to calculate the strength of $Na_2S_2O_3$ solution.

	Unit 5: Estimation of Cr^{3+} using $K_2Cr_2O_7$ solution **CO7:** From this unit students will learn to estimate **Cr^{3+}** by standard $K_2Cr_2O_7$ solution quantitatively.

Semester III	
Paper- **CHEMHT-6 (Theory)** **Inorganic Chemistry II**	Unit 1: **Chemical Bonding - I** **CO1:** From this unit students will learn about ionic bond, lattice energy, Born-Lande equation, Born-Haber cycle, Fajan's rules, salvation energy, packing in crystals, structure of ionic solids and crystal defects.
	Unit 2: **Chemical Bonding - II** **CO2:** From this unit students will learn about covalent bond, V.B theory, hybridization, VSEPR theory, Bent's rule, M.O theory, dipole moment, Band theory, resonance, hydrogen bonding.
	Unit 3: **Metal extraction and purification: Basic Metallurgy** **CO3:** From this unit students will learn about ores and minerals, operations in metallurgy. They will learn to draw flow chart diagram for the extraction of pure Ti, Ni, and U.
Paper-CHEMHP-6 (Practical) **Inorganic Chemistry II**	**Unit 1: Estimation of Fe(II) and Fe(III) in a given mixture using $K_2Cr_2O_7$ solution** **CO4:** From this unit students will learn to estimate Fe(II) and Fe(III) in given mixture by standard $K_2Cr_2O_7$ solution quantitatively.
	Unit 2: Estimation of Fe(III) and Cu(II) in a given mixture using $K_2Cr_2O_7$ solution **CO5:** From this unit students will learn to estimate Fe(III) and Cu(II) in given mixture by standard $K_2Cr_2O_7$ solution quantitatively.
	Unit 3: Estimation of Cr(VI) and Mn(II) in a given mixture using $K_2Cr_2O_7$ solution **CO6:** From this unit students will learn to estimate Cr(VI) and Mn(II) in given mixture by standard $K_2Cr_2O_7$ solution quantitatively.
	Unit 4: Estimation of Fe(III) and Cr(VI) in a given mixture using $K_2Cr_2O_7$ solution **CO7:** From this unit students will learn to estimate Fe(III) and Cr(VI) in given mixture by standard $K_2Cr_2O_7$ solution quantitatively.

	Unit 5: Estimation of Fe(II) and Mn(II) in a given mixture using $KMnO_4$ solution **CO8:** From this unit students will learn to estimate Fe(II) and Mn(II) in given mixture by standardised $KMnO_4$ solution quantitatively. They will also learn to calculate the strength of $KMnO_4$ solution.
	Unit 6: Estimation of Fe(III) and Ca(II) in a given mixture using $KMnO_4$ solution **CO9:** From this unit students will learn to estimate Fe(III) and Ca(II) in given mixture by standardised $KMnO_4$ solution quantitatively. They will also learn to calculate the strength of $KMnO_4$ solution.

Semester IV	
Paper- **CHEMHT-9 (Theory)** **Inorganic Chemistry III**	Unit 1: **Radioactivity and nuclear chemistry** **CO1:** From this unit students will learn about atomic nucleus, different modes of decay, mass defect, packing fraction, nuclear binding energy, nuclear forces, artificial radio activity, moderators. They will also learn about application of radio isotopes, fission, fusion, spallation reactions, and IUPAC nomenclature of super heavy elements.
	Unit 2: **Chemistry of s and p block elements** **CO2:** From this unit students will learn about diagonal relationship and anomalous behavior of each group, allotropy , catenation, study of Berylium hydrides and halides, Boron compounds, oxides and oxyacids of S, P, Cl, oxides of xenon, various silicates.
	Unit 3: **Coordination Chemistry - I** **CO3:** From this unit students will learn about double salts, complex salts, Werner's theory, EAN rule, legands, chelates, stereochemistry and isomerism of complexes. They will learn to write the IUPAC nomenclature of coordination compounds. They will also learn to calculate stability constants of coordination compounds.
Paper-CHEMHP-9 (Practical) **Inorganic Chemistry III**	**Unit 1: Complexometric Titration** **CO4:** From this unit students will learn to calculate the total hardness of water using EDTA. They will learn to estimate Ca(II) and

	Mg(II) in a given mixture by complexometric titration using EDTA. They will also learn to estimate Zn(II) and Mg(II) in a given mixture by complexometric titration using EDTA.
	Unit 2: Inorganic Preparation **CO5:** From this unit students will learn to prepare Mohr's salt, Potassium tris(oxalato)chromate(III) trihydrate, Tetraamminecarbonatocobalt(III) nitrate, Potassium bis(oxalate)cuprate(II) dihydrate, Tris(ethylenediamine)nickel(II) chloride.

Semester V	
Paper- **CHEMHT-11 (Theory)** **Inorganic Chemistry IV**	**Unit 1: Coordination Chemistry - II** **CO1:** From this unit students will learn about V.B theory, CFT, CFSE, MOT, Jahn Tellar theorem, L-S coupling, R-S ground state term, ORGEL diagram.
	Unit 2: Magneto Chemistry **CO2:** From this unit students will learn about classifications of magnetic substances Curie and Curie-Weiss law, TIP, magnetic susceptibility, paramagnetism, diamagnetism, antiferromagnetism.
	Unit 3: Chemistry of d and f block elements **CO3:** From this unit students will learn about characteristic properties of d and f block elements, general comparison between d and f block elements, lanthanoids and actinoids.
	Unit 4: Reaction kinetics and Mechanism **CO4:** From this unit students will learn about inorganic reaction mechanism, substitution reaction in square planner and octahedral complexes, *trans* effect, *cis* effect.
Paper- **CHEMHP-11 (Practical)** **Inorganic Chemistry IV**	**Unit 1: Quantitative** **CO5:** From this unit students will learn to estimate available chlorine in bleaching powder using iodometry and available oxygen in pyrolusite using permanganometry and Cu in brass using iodometry and Fe in cement using permanganometry. They will also learn to estimate chloride gravimetrically and Ni(II) using DMG gravimetrically.
	Unit 2: Experiment **CO6:** From this unit students will learn to

	separate Ni(II) and Co(II) by paper chromatography. They will learn to measure 10Dq by spectrophotometric method. They will also learn to prepare $Mn(acac)_3$ and they will learn to determine λ_{max} of $Mn(acac)_3$ colorimetrically.

Semester VI	
Paper- **CHEMHT-13(Theory)** **Inorganic Chemistry V**	Unit 1: **Molecular symmetry and point group** **CO1:** From this unit students will learn about concept of symmetry elements, symmetry operations, concept of point group and their application for atomic orbitals.
	Unit 2: **Bio-inorganic Chemistry** **CO2:** From this unit students will learn about brief review of role of metal ions in living system, structure of ATP, Na^+ ion pump, proteins, enzymes, ionophores. They will also learn about haemoglobin, myoglobin, ferredoxins, chlorophyll, carboxy peptidase A, cytochrome c, carbonic anhydrase B. They will learn about biological nitrogen fixation, toxic metals, chelation therapy.
	Unit 3: **Organometallic Chemistry and Catalysis** **CO3:** From this unit students will learn about definition, classification, preparation of organometallic compounds. They will learn about 16 electron and 18 electron rule, Wacker process, Ziegler-Natta catalyst, Wilkinson's catalyst, hydroformylation. They will also learn about Zeise's salt, ferrocene.
Paper-CHEMHP-13(Practical) **Inorganic Chemistry V**	**Unit 1: Qualitative Semimicro Analysis** **CO6:** From this unit students will learn to analyze mixture containing four radicals qualitatively. They will also learn to detect basic radicals(K^+, Mg^{2+} , Ca^{2+}, Ba^{2+}, Sr^{2+}, Al^{3+}, Cr^{3+}, Mn^{2+}, Fe^{3+}, NH_4^+ /Fe^{2+}, Co^{2+}, Cu^{2+}, Zn^{2+}, Pb^{2+}, Cd^{2+}, Bi^{3+}, Sn^{2+} /Sn^{4+}, As^{3+}) and acid radicals(Cl^-, Br^-, I^-, S^{2-},SO_4^{2-}, NO_3^-, NO_2^-, BO_3^{3-}, H_3BO_3, PO_4^{3-}, AsO_4^{3-}) and insoluble materials (Cr_2O_3, Fe_2O_3, Al_2O_3, SnO_2, $PbSO_4$, $BaSO_4$, $SrSO_4$). They will also learn to perform dry tests, wet tests of above radicals.

c) Physical Chemistry

Semester-I	
Paper- CHEMHT-1 (Theory) Physical Chemistry-IA	**Unit-1**:**Kinetic Theory and Gaseous state** **CO1**:From this unit the students will learn different laws of Gas molecules, how velocity distributed among no of molecules, the collision properties. In this unit students will understand how a Gas can be liquified and different isotropic properties of Gaseous molecule.
	Unit-2: Chemical Thermodynamics-I **CO-2:** From this part the students will gathered the information about heat, different types of work, different processes by which one state changes to another state, relation between heat, work and internal energy. They will learn to calculate **ΔE,ΔH,q and w** in different thermodynamic process. From thermodynamic part they will know about different enthalpies and its variation.
Paper- CHEMHP-1 (Practical) Physical Chemistry-IA	**Unit-1**:**pH determination of buffer solution by colour matchimg** **CO1**: From this experiment the students will learn to prepare primary and secondary standard solution and basic procedure of acid and base titration using indicatior, They will be able to identify different shades of colour.
	Unit-2: Heat of neutralization of strong acid and strong base **CO-2:** From this experiment the students will learn and see actually what happens when an acid and base reacts and the results shows the process is an exothermic process. They see the simple set up of Calorimeter.
	Unit-3: Heat of solution of oxalic acid from solubility measurement **CO-3:** The students will learn the titration procedure how to piptte out a solution, how to prepare phenolapthalein indicator and also will learn the application of Van't Hoff equation.

Semester-II	
Paper- CHEMHT-3 (Theory) Physical Chemistry-IB	**Unit-1**:**Chemical thermodynamics-II** **CO1 :**From this segment the students will learn the principle of heat engine, refrigerator. They will understand the conditions for a process to be spontaneous with the help of the concept of entropy and free energy.They will have the answer why all natural processes are irreversible etc.
	Unit-2: Chemical Kinetics **CO2:**Students will learn about rate and rate constant. They will understand how concentration of reactants and products changes with time. They will learn how to determine order of a complex reaction knowing steady step approximation. What are rate of catalyst in a chemical reaction that will be discussed here. They will also understand the variation of rate with temperature.
Paper- CHEMHP-3 (Practical) Physical Chemistry-IB	**Unit-1: Kinetics of acid catalysed hydrolysis of methyl acetate** **CO1**: The students will learn how the presence of acids catalyses the hydrolysis of an ester. They will learn how to maintain time between of mixture by NaOH. They will also learn to draw corresponding graph to determine rate constant.
	Unit-2: Kinetics of decomposition of H2O2 **CO2:** Generally we taught them the above experiment in presence of KI so they perform Iodometry titration by thiosulphate. They learn to prepare fresh starch as indicator.

Semester-III	
Paper- CHEMHT-5 (Theory) Physical Chemistry-II	**Unit-1**:**Transport Process** **CO-1:** During this topic discussion the students will learn different properties of fluid such as viscocity.They will come to know about different types of flow of liquid. During discussion about conductance the students will learn the current carrying power of different electrolytic solution, different types of conductance. The students will learn different application of the concept of conductance.

	Unit-2: Application of Thermodynamics-I **CO-2:** In this portion the students will come to know about the chemical potential different partial molar quantity specially Gibbs and Helmholtz free energy In chemical equilibrium chapter the students will learn different equilibrium constant such as Ka,Kc,Kp,Kx and Van't Hoff reaction isotherm, Van't Hoff equation and Van't Hoff isochore.will also learn the application of La-Chatelier principle.
	Unit-3:Foundation of Quantum Mechanics **CO-3:** In this topic the students will learn different phenomena like Zeeman effect,Compton effect, PEE and will be able to prove with the help of quantum mechanics they will also learn about operator and operator algebra, operator types. They will understand wave particle duality of photon. They will able to calculate the expectation value
Paper- CHEMHP-5 (Practical) Physical Chemistry-II	**Unit-1**:**Determination of viscocity of Ostwald viscometer** **CO-1:** The students will use ostward viscometer to determine time of flow for a particular liquid and hence plotting a graph η vs %of concentration of solution,they will dertmine unknown concentration.
	Unit-2:Determination of K_D of CHCL3 ⇌I2 ⇌H2O system **CO-2:** The students will learn and see the mutual solubility between CHCL3 and H2O and also determine how I2 is distributed between two layers. They will also learn to separate organic layer and aquous layer. They will verify Nernst distributions law.

Semester-III	
Paper- CHEMHP-5 (Practical) Physical Chemistry-II	**Unit-3**:**conductometric titration acid vs base** **CO-3:** The students will practically see how conductance varies when base(NaOH) is added to a particular acid with the help of conductometer and from conductance vs base number of drops of NaOH curve. They become able to calculate unknown concentration of acids.

	Unit-4: verification of Ostwald dilution law **CO -4:**using conductometer the students will verify Ostwald law by preparing different concentration and measure the conductance. Then they will plot 1/**λ vs λc which will be straight line**

Semester-IV	
Paper- CHEMHT-8 (Theory) Physical Chemistry-III	**Unit-1**: **Application of Thermodynamics-II** **CO-1:**students will come to know about different colligative properties and the different laws like Raoult's law, Van't law.They will also know how these laws are applied to determine the moleculer weight of unknown solute In the phase part they learn how all the phases one substances remain in equilibrium and with change of variables P,T and C how the equilibrium being affected. They also learn some very important topic like azeotropic mixture, solvent extraction, eutectic mixture, fractional distillation etc
	Unit-2:Electrical properties of molecules **CO-2**: The students get some idea about activity, activity co-efficient, the ionic strength and a very important topic Debye–Hückel limiting law. In electrochemical cell chapter they learn about cell , electrode construction of cell from chemical reaction,different types of electrode. They are taught about various reference electrodes such as SHE,SCE etc. In this chapter we also discuss pH of a solution can be determine measuring poterntial The concept of polarization of polar and non polar molecules are also discussed here different ways of measuring dipole moment

	Unit-3:**Quantum Chemistry** **CO-3:** From here students will understand the core part of quantum commutation rule, details treatment of angular momentum using Schrödinger wave equation they able to understand Rigid Rotar Model of di atomic molecule they learn VBT and MOT for H2, H2+ molecule using quantum mechanics and their comparison
Paper- CHEMHP-8 (Practical) Physical Chemistry-III	**Unit-1**: **Potentiometric titration of Mohr's salt vs K2Cr2O7** **CO-1:** The students will learn about use of reference electrode(calomel) and Input electrode. They will observe the change of potential when drop-wise K2Cr2O7 is added from burette to mohr salt using potentiometer. They will calculate the formal potential of Fe3+/Fe2+ system
	Unit-2:Determination of Ksp for AgCl; Potentiometrically **CO-2**: In this experiment students will observe when AgNO3 and KCl reacts how potential changes during precipitation of AgCl. In this case use of silver electriodebeing learn. They perform this experiment potentiometrically.

Semester-IV	
Paper- CHEMHP-8 (Practical) Physical Chemistry-III	**Unit-3**:**pH-metric titration of Acid vs Strong Base** **CO-3:**The students will observe the change in pH when a base(NaOH) is added to an acidic solution attached with a pH meter and plotting **ΔpH/Δn Vs n they can determine the unknown concentration of acids from intersection of two curve**
	Unit-4: Study of Phenol water diagram **CO -4:** From these experiment the students will observe how mutual solubility between phenol and water increases with increase of temperature and at a given temperature the whole mixture become totally homogeneous. They will also draw a curve by plotting mutual solubility temperature vs composition.

Semester-V	
Paper- CHEMHT-12 (Theory) Physical Chemistry-IV	**Unit-1**:**Molecular Spectroscopy** **CO-1:**From this very important part of chemistry the students will understand the principle and theory of different spectroscopy like rotational , vibrational, Raman spectra. They will learn the application of spectra of a molecule in aspects of science.
	Unit-2: Photochemistry **CO-2**:In this part students will learn what actually happen when a molecule absorbs some energy from photon. Different photophysical process like fluroseence , phosphorescence etc. They understand very important law of photochemistry Lambert'-Beer's law, Frank-Condon principle and application of photochemistry
	Unit-3:Surface phenomena **CO-3:** This part mainly discussed about different surface related matter like surface tension its unit,how it changes for a liquid with temperature and different ways of measurement of it It also explains the phenomena adsorption and different adsorption isotherm like Freundlich,Langmuir and BET adsorption and also the student will know about different properties of colloid solution like optical , electrical properties

Semester-V	
Paper- CHEMHP-12 (Practical) Physical Chemistry-IV	**Unit-1: Determination of surface tension by Stalgmometer** **CO-1:** From this experiment will learn to handle stalagmometer and how to utilize this instrument to determine surface tension of different solution like acitic acid.They will also learn to draw the curve surface tension vs concentration of solution
	Unit-2: Determination of CMC from surface tension measurement **CO-2:** The students will practically observed how surfacetension of a colloid solution changes of CMC and from surface tension vs concentration curve for colloid they learn to determine CMC
	Unit-3:Verification of Lambert-Beer's law Spectrophotometrically **CO-3:**The students will be working with spectrophotometer will determine optical density for solution of different concentration. They will draw a plot of O.D vs concentration of soluition where they nwill get a straight line passing through origin There are also more three importance concept on spectromter from which they will learn more or less

d) Skill Enhancement Course-1

Semester III	
Paper- **CHEMHS - 1B (Theory)** **Basic Analytical Chemistry**	**Unit 1: Introduction** **CO1:** From this unit students will learn about sampling, variability and validity of analytical measurements, presentation of experimental data and results, significant figures.
	Unit 2: Complexometry and Soil Analysis **CO2:** From this unit students will learn about complexometric titrations, chelation, use of indicators, estimation of Ca and Mg by complexometric titration. Students will also learn about composition and pH of soil samples, estimation of Ca and Mg content in soil sample.
	Unit 3: Analysis of Water **CO3:** From this unit students will learn about water sampling methods, water purification methods, determination of pH of water samples and determination of BOD.
	Unit 4: Analysis of Food Products **CO4:** From this unit students will learn about food processing, food preservations, adulteration, identification of adulterants, analysis of preservatives and coloring matter.
	Unit 5: Chromatography **CO5:** From this unit students will learn about principles of chromatography, paper chromatography, TLC and paper chromatographic separation of mixture of metal ions.
	Unit 6: Ion-exchange **CO6:** From this unit students will learn about ion-exchange chromatography, column chromatography and ion-exchange resin.
	Unit 7: Analysis of Cosmetics **CO7:** From this unit students will learn about major and minor constituents of cosmetics, analysis of deodorants and antiperspirants, determination of constituents of talcum powder.

	Unit 8: Suggested Applications(any one) **CO8:** From this unit students will learn about study of phenolphthalein in trap cases or analysis arson accelerants or analysis of gasoline .
	Unit 9: Suggested Instrumental demonstrations **CO9:** From this unit students will learn about estimation of macro nutrients in soil samples by flame photometry, spectrophotometric, determination of iron in vitamin or dietary tablets and spectrophotometric determination of caffeine and benzoic acid in soft drinks.

e) Skill Enhancement Course-2

Semester IV	
Paper- CHEMHS – 2A (Theory) (Pharmaceutical Chemistry)	Unit 1: **Drugs & Pharmaceuticals** **CO1:** From this unit the students will learn basic concepts of drug design, development and synthesis of drugs.
	Unit 2: **Fermentation** **CO2:** From this unit the students will learn aerobic and anaerobic fermentation processes.

f) Discipline Specific Elective-1

Semester V	
Paper- **CHEMHTDSE-1B (Theory) Inorganic Materials of Industrial Importance**	**Unit 1: Silicate Industries** **CO1:** From this unit students will learn about manufacture and processing and properties of glass, ceramics, cements.
	Unit 2: Fertilizers **CO2:** From this unit students will learn about manufacture of fertilizers, different types of fertilizers, mixed fertilizers.
	Unit 3: Surface Coatings **CO3:** From this unit students will learn about objectives of coating surfaces, preliminary treatment of surface, classification of surface coatings. They will also learn about paints and pigments formulation, properties of pigments and paints, metallic coating.
	Unit 4: Batteries **CO4:** From this unit students will learn about primary and secondary batteries, role and characteristics of battery, working of battery. They will also learn about fuel cell, solar cell and polymer cell.
	Unit 5: Alloys **CO5:** From this unit students will learn about classification of alloys, ferrous and non ferrous alloys, specific properties of elements in alloys, manufacture of steel. They will also learn about composition and properties of different types of steels.
	Unit 6: Catalysis **CO6:** From this unit students will learn about general principles and properties of catalysts, homogenous and heterogenous catalysis, deactivation or regeneration of catalysts, zeolites.
	Unit 7: Chemical Explosives **CO7:** From this unit students will learn about origin of explosive properties in organic compounds. They will also learn about preparation and explosive properties of lead azide, PETN, RDX, rocket propellants.

Paper- **CHEMHPDSE-1B (Practical) Inorganic Materials of Industrial Importance**	**Unit 1: Determination of free acidity in ammonium sulphate fertilizer** **CO8:** From this unit students will learn to determine free acidity in ammonium sulphate fertilizer quantitatively.
	Unit 2: Estimation of Ca in Calcium ammonium nitrate fertilizer **CO9:** From this unit students will learn to estimate Ca in Calcium ammonium nitrate fertilizer quantitatively.
	Unit 3: Estimation of phosphoric acid in superphosphate fertilizer **CO10:** From this unit students will learn to estimate phosphoric acid in superphosphate fertilizer quantitatively.
	Unit 4: Electroless metallic coatings on ceramic and plastic material **CO11:** From this unit students will learn to do electroless metallic coatings on ceramic and plastic material.
	Unit 5: Determination of composition of dolomite by complexometric titration **CO12:** From this unit students will learn to determine composition of dolomite by complexometric titration quantitatively.
	Unit 6: Analysis of (Cu, Ni) ; (Cu, Zn) in alloy or synthetic samples **CO13:** From this unit students will learn to analyze (Cu, Ni) ; (Cu, Zn) in alloy or synthetic samples.
	Unit 7: Analysis of Cement **CO14:** From this unit students will learn to analyze cement.
	Unit 8: Preparation of pigment(Zinc oxide) **CO15:** From this unit students will learn to prepare pigment(Zinc oxide).

g) Discipline Specific Elective-2

Semester V	
Paper- CHEMHTDSE-2B (Theory) (Instrumental Methods of Chemical Analysis)	Unit 1: **Introduction to spectroscopic methods of analysis** **CO1:** From this unit the students will learn basic concepts of instrumental methods regarding spectroscopic analysis.
	Unit 2: **Molecular spectroscopy** **CO2:** From this unit the students will learn about mathematical deduction and their applications regarding UV-Visible/ Near IR – emission, absorption and fluorescence.
	Unit 3: **Chromatography** **CO3:** From this unit the student will learn several classification of Chromatography and basic concepts of separation technique.
	Unit 4: **Elemental analysis** **CO4:** From this unit the student will learn about basic concepts and mathematical deduction regarding Mass spectrometry, atomic spectroscopy: atomic absorption, atomic emission, and atomic fluorescence.
	Unit 5: **NMR spectroscopy** **CO5:** From this unit the student will learn instrumental technique, splitting matters, couplings and other basic concepts of NMR spectroscopy.
	Unit 6: **Electroanalytical techniques** **CO6:** From this unit the students will learn about basic concepts and applications of Potentiometry & Voltammetry.
	Unit 7: **Radiochemical Methods: Elementary Analysis** **CO7:** From this unit student will learn Basic idea of X-ray analysis and electron spectroscopy (surface analysis).
Paper- CHEMHPDSE-2B (Practical) (Instrumental Methods of Chemical Analysis)	**Unit 1: Instrumental Methods of Chemical Analysis** **CO8:** From this unit students will learn about detection and determination of organic and inorganic materials with the help of several spectroscopical analyses.

h) DSE part of Physical Chemistry

Semester-V	
Paper- CHEMTDSE-1A (Theory-DSE) Polymer Chemistry	**CO** :-As in everyday life nowadays different ploymer materials become very essential for us so the students also learn about polymer.Their nomenclature, classification and their basis, basic properties of polymer ,their preparation procedure ,conditions.In this part they also come know in details about some specific important polymer like PVC, Styren,Nylon6,6 etc.In this part students will also learn to determine the molecular weihght of polymer

Semester-V	
Paper- CHEMTDSE-1A (Practical-DSE) Polymer Chemistry	**CO**:-In this part the will learn mainly different process of determinining molecular weight of polymer like viscosity method ,End group analysis, Colorometric methods and they will also try to synthysis some common polymer like Styrene ,Acrylic acid,Nylon 6,6 etc

Semester-VI	
Paper- CHEMTDSE-3 (Theory-DSE-3) Advance Physical Chemistry	**Unit-1:Crystal structure** **CO-1:**Coming into last semester of their graduation course they will learn about solid state for a system their specific properties and different laws of crystallography.They will also understand how the latis points are distributed or arranged inside a crystal and their packing efficiency. They will learn by using Bragg's law how crystal structure can be determine

	Unit-2:Statistical Thermodynamics **CO-2:**In this segment students will learn the basic difference between thermodynamics and statistics they will know about phase space,macro state ,micro state thermodynamic probability and they will derive the Maxwell-Boltzmann distribution law
	Unit-3:Special selected topics **CO-3:** there are some remaining part in physical chemistry which are discussed here like Dulong-Petit's law Einatein theory, Debye-T3 law etc The students will learn about absolute entropy,residual entropy, Nerst heat theorm and some selected important phenomena of polymer
Paper- CHEMPDSE-3 (Practical-DSE) Advance Physical Chemistry	**Unit-1:Computer programming based on Numericals methods** **CO-1** whatever the students learn thoughout the course of physical chemistry they have to put their knowledge to computer process using different software. They need to work on rules of equations, numerical differential ,numerical intrigation and need to learn how molecule can be drawn using chem draw software.
Paper- CHEMPDSE-4 (Project work) (Practical)	**CO-**In this part students will select any topic of chemistry and will learn to prepare a power point presentation using computer and they will deliver a short lecture on their PPT, in this way the students will gain the faith and confidence to say something before few spectators

Department of Commerce

Kanchrapara College

2020-2021

PROGRAMME OUTCOMES (POs)

Kanchrapara College is affiliated to the University of Kalyani, West Bengal. The college follows the guidelines and syllabus prescribed by the Affiliated University.

PO Numbers	Upon completion of B.Com Degree Programme the graduates will be able to
PO 1	The three years course aims to provide thorough understanding and inclusive knowledge in areas such as accounting, finance, taxation, business law, corporate law, marketing management, human resource management, etc. which will instill in students the knowledge and capability of understanding the business world and economy.
PO 2	The students through the curriculum are exposed to the use of relevant and contemporary software packages. This programme enables the students to be technologically updated and thereby making them job ready.
PO 3	Seminars, project work, and case studies will enable students to get practical exposure and bridge gap between industry and academia.
PO 4	Students can independently start up their own Business.
PO 5	The course will help in developing analytical, leadership and decision-making skills among the students thereby making them better managers.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO Numbers	Upon completion of B.Com Degree Programme the graduates will be able to
PSO 1	Students will gain thorough systematic and subject skills within various disciplines of finance, auditing and taxation, accounting, management, communication, computer.
PSO 2	Enhance practical knowledge to prepare various accounts in order to meet the national requirements
PSO 3	Prepare financial statements of business using accounting principles, concepts, conventions and provisions
PSO 4	Implement traditional and modern strategies and practices of management theories, marketing, human resource management, economics, costing, banking, auditing and taxation

PSO 5	Use mathematical and statistical tools in academics, business and research
PSO 6	Develop competency in students to make them employable in the global market
PSO 7	Develop the skills of students to equip themselves as successful entrepreneurs
PSO 8	Students will prove themselves in different professional exams like C.A., CS, CMA, MBA, UPSC as well as other competitive courses.
PSO 9	Students will be able to do their higher education and can make research in the field of finance and commerce.

PROGRAMME: BACHELOR OF COMMERCE (HONS)

Course Outcomes (COs)

Semester I	
Course Title & Course Code	**Course Outcomes**
FINANCIAL ACCOUNTING – 1 UG BCOM-H-CC-T-01	Upon completion of the course, students will be able to **CO1:** Enable the students to learn principles and concepts of Accountancy. **CO2:** Explain and determine depreciation and value of inventory. **CO3:** Understand the theoretical framework of accounting and to prepare financial statements of Profit Seeking and Non-for Profit Organization. **CO4:** Find out the technical expertise in maintaining the books of accounts.
PRINCIPLES OF MANAGEMENT UG BCOM-H-CC-T-02	Upon completion of the course, students will be able to **CO1**: Understand of the basic concepts of management in order to aid in understanding of how an organization functions, and in understanding the complexity and wide variety of issues managers face in today's business firms. **CO2:** Gain knowledge about the managerial functions, managerial skills, different management theories, leadership styles and communication process etc. **CO3**: Understand the organization structure, delegation of authority and span of control. **CO4:** Diagnose and solve organizational problems and develop optimal managerial decisions.
MICRO ECONOMICS UG BCOM-H-GE-T-01	Upon completion of the course, students will be able to **CO1:** Understand consumer behavior and its application in economics. **CO2:** Know the producers' behavior and various theories of production. **CO3:** Describe various forms of market structures:

	competitive market and imperfectly competitive markets. **CO4:** Understand the factor market behavior and distribution.

Semester II	
Course Title & Course Code	**Course Outcomes**
MARKETING MANAGEMENT UG BCOM-H-CC-T-03	Upon completion of the course, students will be able to **CO1:** Learn the marketing concept, nature, scope and importance of marketing and marketing environment. **CO2:** Analyze the market based on segmentation, targeting and positioning. **CO3:** Know consumer behavior and their decision making process. **CO4:** Make decision on product, price, promotion mix and distribution. **CO5:** Understand changing dimension of shopping and the concept of Retailing and Retail Management.
BUSINESS LAWS UG BCOM-H-CC-T-04	Upon completion of the course, students will be able to **CO1:** Well verse in basic provisions regarding legal framework governing the business world.. **CO2:** Gain basic concepts, terms & provisions of Mercantile and Business Laws. **CO3:** Develop the awareness regarding these laws affecting trade business, and commerce.
BUSINESS MATHEMATICS AND STATISTICS UG BCOM-H-GE-T-02	Upon completion of the course, students will be able to **CO1:** develop the students ability to deal with numerical and quantitative issues in business.. **CO2:** enable the use of statistical, graphical and algebraic techniques wherever relevant. **CO3:** have a proper understanding of Statistical applications in Economics and Management.

Semester III	
Course Title & Course Code	**Course Outcomes**
FINANCIAL ACCOUNTING - 2 UG BCOM-H-CC-T-05	Upon completion of the course, students will be able to **CO1:** Understand the concepts of partnership firm and prepare accounts for dissolution of a partnership firm. **CO2:** Learn accounting for hire purchase transactions, leases, branches and departments. **CO3:** Know the accounting treatment in issue of shares at par premium and discount, issues of debenture, managerial remuneration, calculation of goodwill and shares and liquidator's statement of affairs. **CO4:** Describe the characteristics of different financial assets such as money market instruments, bonds, and stocks, and

	how to buy and sell these assets in financial markets.
INCOME TAX LAW UG BCOM-H-CC-T-06	Upon completion of the course, students will be able to **CO1:** Understand the basic concepts in the law of income tax and determine the residential status of different persons.. **CO2:** Identify the five heads in which income is categorized and compute income under the heads 'Salaries' and 'Income from House Property'. **CO3:** Compute income under the head ' Profits and gains of business or profession', 'Capital gains'and 'Income from other sources'. **CO4:** Understand clubbing provisions, aggregate income after set-off and carry forward of losses, and deductions allowed under the Income Tax Act; and further to compute taxable income and tax liability of individuals and firms.
HUMAN RESOURCE MANAGEMENT UG BCOM-H-CC-T-07	Upon completion of the course, students will be able to **CO1:** Understand the nature, scope functions and importance of HRM and incorporate them in the changing environment. **CO2:** Apply right recruitment and selection process in business scenario. **CO3:** Analyze the training needs, apply the right training method and evaluate the same. **CO4:** Determine compensation package, wage structure, salaries raises and list the commonly used performance measurement methods in an organization.
MACRO ECONOMICS UG BCOM-H-GE-T-03	Upon completion of the course, students will be able to **CO1:** Familiar with measures of economic performance, learn to use these indicators to evaluate current economic conditions, and understand how markets function in a capitalistic society. **CO2:** Understand the major perspectives that determine the performance of the overall economy. **CO3:** Learn the key approaches to macroeconomic policy and develop skills to analyze impacts of policy actions and to evaluate the advantages and disadvantages of different policies.
E-COMMERCE AND COMPUTER APPLICATIONS IN BUSINESS UG BCOM-H-SEC-T+P-01A	Upon completion of the course, students will be able to **CO1:** Understand the basics of E-commerce, current and emerging business models. **CO2:** Gain knowledge on different models of e-commerce. **CO3:** Identify the emerging modes of e-payment. **CO4:** Understand the importance of security, privacy, ethical and legal issues of e-commerce. **CO5:** Create and design a spreadsheet for general office use. **CO6:** Possess a working knowledge of basic functions and formulas in MS-Excel. **CO7:** Execute practical aspects of accounting principles in

	recording financial accounts accurately through Tally.
PERSONAL SELLING AND SALESMANSHIP UG BCOM-H-SEC-T-01B	Upon completion of the course, students will be able to **CO1:** Discuss the role of personal selling, types of salespersons, and characteristics of a good salesman and also differentiate between personal selling and salesmanship. **CO2:** Understand the buying motives and their uses in personal selling. **CO3:** Explain the steps involved in the selling process followed by a salesperson while selling a product. **CO4:** Discuss the basic elements every sales report should have and prepare sales reports and documents.

Semester IV	
Course Title & Course Code	**Course Outcomes**
COST ACCOUNTING UG BCOM-H-CC-T-08	Upon completion of the course, students will be able to **CO1:** Understand basic cost concepts, elements of cost and cost sheet. **CO2:** Understand the difference between financial accounting and cost accounting. **CO3:** Know the constituents of material cost, different methods for pricing the issue of material and ascertain stock levels. **CO4:** Gain insight of methods of wage payment. Incentive schemes and treatment of idle time, over time, labour turnover. **CO5:** Classify, allocate, apportion overheads **CO6:** Help in accumulating and interpreting costs, including process costing, contract costing, and operating costing for assisting the management in decision making in cost controlling and making strategic planning and decision on improving cost efficiency.
INDIRECT TAX LAWS UG BCOM-H-CC-T-09	Upon completion of the course, students will be able to **CO1:** Understand the basic principles underlying the Indirect Taxation Statutes (with reference to Goods & Service Tax Act 2017) and to compute the amount of CGST, SGST, and IGST payable after considering the eligible input tax credit. **CO2:** Examine the method of the tax credit. Inflows and outflows, tax imposition, tax exemption, tax deduction, Delivery of goods and services, Tax rates, Periodic tax returns. Place of delivery of goods and services and its impact on GST. **CO3:** Develop the understanding of the basic and practical aspects of customs law.
COMPANY LAW UG BCOM-H-CC-T-10	Upon completion of the course, students will be able to **CO1:** Explain the fundamental principles and regulations of

	corporate law, such as separate legal identity, limited liability, and the responsibilities of company directors. **CO2:** Identify suitable legal requirements, duties, rights, and remedies for company concerns. **CO3:** Address basic problems in corporate law, Using the knowledge and abilities acquired in this course.
INDIAN ECONOMICS UG BCOM-H-GE-T-04	Upon completion of the course, students will be able to **CO1:** Comprehend the basic characteristics of economic development and economic growth. **CO2:** Understand the indices of economic development. **CO3:** Analyze the demographic trends in India. **CO4:** Realize the causes and measures of poverty inequalities and unemployment. **CO5:** Study the various economic and social issues.
TAX RETURNS AND FILING OF TAX RETURNS UG BCOM-H-SEC-T-02A	Upon completion of the course, students will be able to **CO1:** File of Income tax returns (ITR1) and compute the tax liability of individuals. **CO2:** Compute the assessment of GST and they will be able to e-file GSTR-1 and GSTR-4.
OFFICE MANAGEMENT AND SECRETARIAL PRACTICE UG BCOM-H-SEC-T-02B	Upon completion of the course, students will be able to **CO1:** Understand the importance of mail, handling of different mails, sorting of mails, etc. and learn about different office forms and Types of forms used in Business Organization. **CO2:** know vouching, verification and valuation of assets, they will be able to maintain stock register and assets register of office. **CO3:** Understand different types of accounts, Passbook and Cheque book and recording of those and understand different modes of payments. **CO4:** Understand the duties and responsibilities of a personal secretary.

Semester V	
Course Title & Course Code	**Course Outcomes**
CORPORATE ACCOUNTING UG BCOM-H-CC-T-11	Upon completion of the course, students will be able to **CO1:** Develop an understanding of accounting for share capital and debentures. **CO2:** Prepare financial statements of a company. **CO3:** Understand the accounting for amalgamation and liquidation of companies. **CO4:** Prepare consolidated balance sheet for Holding company.
AUDITING UG BCOM-H-CC-T-12	Upon completion of the course, students will be able to **CO1:** understand the objectives of audit, principles and

	techniques governing audit etc. **CO2:** Understand the different types of audit and relationship with other disciplines. **CO3:** Concept of Internal Control – Internal Check and Internal Audit. **CO4:** Gain knowledge of vouching and verification of Assets & Liabilities. **CO5:** Gain the knowledge of special areas of audit such as Cost audit, Tax audit, and Management audit, audit in EDP environment, computer aided audit techniques and tools. **CO6:** Prepare Audit report.
BUSINESS COMMUNICATION AND ENTREPRENEURSHIP DEVELOPMENT UG BCOM-H-DSE-T-01A	Upon completion of the course, students will be able to **CO1:** Realize the significance of effective communication in business. **CO2:** Gain knowledge on drafting of official letters and documents. **CO3:** Develop appropriate skills for report writing and different ways of documentation. **CO4:** Understand the concept of entrepreneurship in the context of Indian economic scenario. **CO5:** Understand entrepreneurial process for initiating new venture creation. **CO6:** Understand various dimensions of managing a business enterprise once it is formed.
CORPORATE GOVERNANCE AND SOCIAL RESPONSIBILITY OF BUSINESS UG BCOM-H-DSE-T-01B	Upon completion of the course, students will be able to **CO1:** Understand the concept of Corporate Governance, theories and models relating to it. **CO2:** Major Corporate Scandals in India and abroad, Corporate Governance issues noticed in various corporate failures, Codes & standards on Corporate Governance. **CO3:** Discuss the whistle-blower legislation across countries. **CO4:** Gain knowledge of CSR, relationship of Strategic Planning and Corporate Social Responsibility; relationship of CSR with Corporate Sustainability; CSR, CSR and Corporate Governance; CSR provisions under the Companies Act 2013.
ACCOUNTING FOR LOCAL BODIES UG BCOM-H-DSE-T-02A	Upon completion of the course, students will be able to **CO1:** Understand the Concept of local bodies; Salient features of 73rd Amendment of the Constitution in 1992, Article 243J- Audit of Accounts, and provisions related to Accounts in the West Bengal Panchayat Act, 1973. **CO2:** Prepare financial Statements of Panchayat Raj Institutions and Municipalities. **CO3:** Discuss the overview of Accounting Standards for Local Bodies issued by the Institute of Chartered Accountants of India.
INTERNATIONAL BUSINESS	Upon completion of the course, students will be able to

UG BCOM-H-DSE-T-02B	**CO1:** Develop basic and broad knowledge in international business environment, strategies and management and be able to apply concepts, principles and theories to simple business situations. **CO2:** Aware of the different thinking and viewpoints of diverse cultures. **CO3:** Understand the global business environment and its impacts on businesses.

Semester VI	
Course Title & Course Code	**Course Outcomes**
FINANCIAL MANAGEMENT UG BCOM-H-CC-T-13	Upon completion of the course, students will be able to **CO1:** Explain the nature and scope of financial management as well as time value of money and risk return trade off. **CO2:** Calculate weighted average cost of capital and financial, operating and combined leverages. **CO3:** Analyze capital budgeting process and capital budgeting techniques, estimate various capital structure theories and factors affecting capital structure decisions in a firm. **CO4:** Critically examine various theories of dividend and factors affecting dividend policy. **CO5:** Evaluate working capital requirement. **CO6:** Develop an understanding of cash flow and fund flow statements.
PROJECT WORK UG BCOM-H-CC-T-14	Upon completion of the course, students will be able to **CO1:** Understand different concepts related to business research and the methods of business research. **CO2:** Learn about collection, analysis, presentation and interpretation of data.
MANAGEMENT ACCOUNTING UG BCOM-H-DSE-T- 03A	Upon completion of the course, students will be able to **CO1:** Understand thoroughly the conceptual framework of Management Accounting and differences between different branches of accounting. **CO2:** Understand budgetary control system as a tool of managerial planning and control; ability to prepare various types of budget. **CO3:** understand standard costing system as a tool of managerial control; calculation of variances in respect of each element of cost and sales; control ratios. **CO4:** Understand the concept of relevant and irrelevant costs and make decisions related to different business situations using marginal costing and differential costing techniques. **CO5:** Analyze financial statement using ratio analysis.
ADVERTISING	Upon completion of the course, students will be able to

UG BCOM-H-DSE-T- 03B	**CO1:** Demonstrate an understanding of the overall role advertising plays in the business world. **CO2:** Describe advertising strategies and budgets. **CO3:** Identify and understand the various advertising media. **CO4:** Demonstrate an understanding of how an advertising agency operates.
INDIAN FINANCIAL SYSTEM UG BCOM-H-DSE-T- 04A	Upon completion of the course, students will be able to **CO1:** Know the significance and function of the financial system in relation to the macroeconomic environment. **CO2:** Understand the concepts of Money Market and Capital Market. **CO3:** Demonstrate knowledge of the Indian financial services sector's current structure and regulation. **CO4:** Analyze and develop marketing strategies for financial products and services.
BANKING AND INSURANCE UG BCOM-H-DSE-T- 04B	Upon completion of the course, students will be able to **CO1:** Give a thorough knowledge on Indian Banking System and Acts pertaining to it. **CO2:** Discuss the types and rules of crossing a cheque and endorsement. **CO3:** Understand the principles of sound lending, Secured vs. unsecured advances, types of advances, advances against various securities. **CO4:** Know the application of mobile banking, virtual banking, E-payments, transfer funds using Smart card, NEFT, RTGS, ECS etc. **CO5:** Gain knowledge on types of business risk, types of insurance, and functions and role of IRDA.

PROGRAMME: BACHELOR OF COMMERCE (GENERAL)

Course Outcomes (COs)

Semester I	
Course Title & Course Code	**Course Outcomes**
FINANCIAL ACCOUNTING – 1 UG BCOM-G-CC-T-01	Upon completion of the course, students will be able to **CO1:** Enable the students to learn principles and concepts of Accountancy. **CO2:** Explain and determine depreciation and value of inventory. **CO3:** Understand the theoretical framework of accounting and to prepare financial statements of Profit Seeking and Non-for Profit Organization. **CO4:** Find out the technical expertise in maintaining the books of accounts.

PRINCIPLES OF MANAGEMENT UG BCOM-G-CC-T-02	Upon completion of the course, students will be able to **CO1**: Understand of the basic concepts of management in order to aid in understanding of how an organization functions, and in understanding the complexity and wide variety of issues managers face in today's business firms. **CO2:** Gain knowledge about the managerial functions, managerial skills, different management theories, leadership styles and communication process etc. **CO3**: Understand the organization structure, delegation of authority and span of control. **CO4:** Diagnose and solve organizational problems and develop optimal managerial decisions.

Semester II	
Course Title & Course Code	**Course Outcomes**
MARKETING MANAGEMENT UG BCOM-G-CC-T-04	Upon completion of the course, students will be able to **CO1:** Learn the marketing concept, nature, scope and importance of marketing and marketing environment. **CO2:** Analyze the market based on segmentation, targeting and positioning. **CO3:** Know consumer behavior and their decision making process. **CO4:** Make decision on product, price, promotion mix and distribution. **CO5:** Understand changing dimension of shopping and the concept of Retailing and Retail Management.
BUSINESS LAWS UG BCOM-G-CC-T-05	Upon completion of the course, students will be able to **CO1:** Well verse in basic provisions regarding legal framework governing the business world.. **CO2:** Gain basic concepts, terms & provisions of Mercantile and Business Laws. **CO3:** Develop the awareness regarding these laws affecting trade business, and commerce.

Semester III	
Course Title & Course Code	**Course Outcomes**
FINANCIAL ACCOUNTING - 2 UG BCOM-G-CC-T-07	Upon completion of the course, students will be able to **CO1:** Understand the concepts of partnership firm and prepare accounts for dissolution of a partnership firm. **CO2:** Learn accounting for hire purchase transactions, leases, branches and departments. **CO3:** Know the accounting treatment in issue of shares at par premium and discount, issues of debenture, managerial remuneration, calculation of goodwill and shares and

	liquidator's statement of affairs. **CO4:** Describe the characteristics of different financial assets such as money market instruments, bonds, and stocks, and how to buy and sell these assets in financial markets.
INCOME TAX LAW UG BCOM-G-CC-T-08	Upon completion of the course, students will be able to **CO1:** Understand the basic concepts in the law of income tax and determine the residential status of different persons.. **CO2:** Identify the five heads in which income is categorized and compute income under the heads 'Salaries' and 'Income from House Property'. **CO3:** Compute income under the head ' Profits and gains of business or profession', 'Capital gains'and 'Income from other sources'. **CO4:** Understand clubbing provisions, aggregate income after set-off and carry forward of losses, and deductions allowed under the Income Tax Act; and further to compute taxable income and tax liability of individuals and firms.
E-COMMERCE AND COMPUTER APPLICATIONS IN BUSINESS UG BCOM-G-SEC-T+P-01A	Upon completion of the course, students will be able to **CO1:** Understand the basics of E-commerce, current and emerging business models. **CO2:** Gain knowledge on different models of e-commerce. **CO3:** Identify the emerging modes of e-payment. **CO4:** Understand the importance of security, privacy, ethical and legal issues of e-commerce. **CO5:** Create and design a spreadsheet for general office use. **CO6:** Possess a working knowledge of basic functions and formulas in MS-Excel. **CO7:** Execute practical aspects of accounting principles in recording financial accounts accurately through Tally.
PERSONAL SELLING AND SALESMANSHIP UG BCOM-G-SEC-T-01B	Upon completion of the course, students will be able to **CO1:** Discuss the role of personal selling, types of salespersons, and characteristics of a good salesman and also differentiate between personal selling and salesmanship. **CO2:** Understand the buying motives and their uses in personal selling. **CO3:** Explain the steps involved in the selling process followed by a salesperson while selling a product. **CO4:** Discuss the basic elements every sales report should have and prepare sales reports and documents.

Semester IV	
Course Title & Course Code	**Course Outcomes**
COST ACCOUNTING UG BCOM-G-CC-T-10	Upon completion of the course, students will be able to **CO1:** Understand basic cost concepts, elements of cost and cost sheet.

	CO2: Understand the difference between financial accounting and cost accounting. **CO3:** Know the constituents of material cost, different methods for pricing the issue of material and ascertain stock levels. **CO4:** Gain insight of methods of wage payment. Incentive schemes and treatment of idle time, over time, labour turnover. **CO5:** Classify, allocate, apportion overheads **CO6:** Help in accumulating and interpreting costs, including process costing, contract costing, and operating costing for assisting the management in decision making in cost controlling and making strategic planning and decision on improving cost efficiency.
INDIRECT TAX LAWS UG BCOM-G-CC-T-11	Upon completion of the course, students will be able to **CO1:** Understand the basic principles underlying the Indirect Taxation Statutes (with reference to Goods & Service Tax Act 2017) and to compute the amount of CGST, SGST, and IGST payable after considering the eligible input tax credit. **CO2:** Examine the method of the tax credit. Inflows and outflows, tax imposition, tax exemption, tax deduction, Delivery of goods and services, Tax rates, Periodic tax returns. Place of delivery of goods and services and its impact on GST. **CO3:** Develop the understanding of the basic and practical aspects of customs law.
TAX RETURNS AND FILING OF TAX RETURNS UG BCOM-G-SEC-T-02A	Upon completion of the course, students will be able to **CO1:** File of Income tax returns (ITR1) and compute the tax liability of individuals. **CO2:** Compute the assessment of GST and they will be able to e-file GSTR-1 and GSTR-4.
OFFICE MANAGEMENT AND SECRETARIAL PRACTICE UG BCOM-G-SEC-T-02B	Upon completion of the course, students will be able to **CO1:** Understand the importance of mail, handling of different mails, sorting of mails, etc. and learn about different office forms and Types of forms used in Business Organization. **CO2:** know vouching, verification and valuation of assets, they will be able to maintain stock register and assets register of office. **CO3:** Understand different types of accounts, Passbook and Cheque book and recording of those and understand different modes of payments. **CO4:** Understand the duties and responsibilities of a personal secretary.

Semester V	
Course Title & Course Code	**Course Outcomes**
BUSINESS COMMUNICATION AND ENTREPRENEURSHIP DEVELOPMENT UG BCOM-G-DSE-T-01A	Upon completion of the course, students will be able to **CO1:** Realize the significance of effective communication in business. **CO2:** Gain knowledge on drafting of official letters and documents. **CO3:** Develop appropriate skills for report writing and different ways of documentation. **CO4:** Understand the concept of entrepreneurship in the context of Indian economic scenario. **CO5:** Understand entrepreneurial process for initiating new venture creation. **CO6:** Understand various dimensions of managing a business enterprise once it is formed.
CORPORATE GOVERNANCE AND SOCIAL RESPONSIBILITY OF BUSINESS UG BCOM-G-DSE-T-01B	Upon completion of the course, students will be able to **CO1:** Understand the concept of Corporate Governance, theories and models relating to it. **CO2:** Major Corporate Scandals in India and abroad, Corporate Governance issues noticed in various corporate failures, Codes & standards on Corporate Governance. **CO3:** Discuss the whistle-blower legislation across countries. **CO4:** Gain knowledge of CSR, relationship of Strategic Planning and Corporate Social Responsibility; relationship of CSR with Corporate Sustainability; CSR, CSR and Corporate Governance; CSR provisions under the Companies Act 2013.
ACCOUNTING FOR LOCAL BODIES UG BCOM-G-DSE-T-02A	Upon completion of the course, students will be able to **CO1:** Understand the Concept of local bodies; Salient features of 73rd Amendment of the Constitution in 1992, Article 243J- Audit of Accounts, and provisions related to Accounts in the West Bengal Panchayat Act, 1973. **CO2:** Prepare financial Statements of Panchayat Raj Institutions and Municipalities. **CO3:** Discuss the overview of Accounting Standards for Local Bodies issued by the Institute of Chartered Accountants of India.
INTERNATIONAL BUSINESS UG BCOM-G-DSE-T-02B	Upon completion of the course, students will be able to **CO1:** Develop basic and broad knowledge in international business environment, strategies and management and be able to apply concepts, principles and theories to simple business situations. **CO2:** Aware of the different thinking and viewpoints of diverse cultures. **CO3:** Understand the global business environment and its impacts on businesses.
BUSINESS MATHEMATICS	Upon completion of the course, students will be able to

AND STATISTICS UG BCOM-G-GE-T-01	**CO1:** develop the students ability to deal with numerical and quantitative issues in business.. **CO2:** enable the use of statistical, graphical and algebraic techniques wherever relevant. **CO3:** have a proper understanding of Statistical applications in Economics and Management.
CORPORATE ACCOUNTING AND FINANCIAL MANAGEMENT UG BCOM-G-SEC-T-03A	Upon completion of the course, students will be able to **CO1:** Develop an understanding of accounting for share capital and debentures. **CO2:** Prepare financial statements of a company. **CO3:** Understand the valuation of Goodwill and Shares. **CO4:** Explain the nature and scope of financial management as well as different sources of finance. **CO5:** Calculate weighted average cost of capital. **CO6:** Evaluate working capital requirement. **CO7:** Develop an understanding of cash flow statement.
RURAL MARKETING AND SERVICES MARKETING UG BCOM-G-SEC-T-03B	Upon completion of the course, students will be able to **CO1:** Develop an understanding of importance, evolution or phases of rural marketing, rural vs. urban marketing. **CO2:** Discuss the factors influencing rural buying behaviour, buying pattern of rural consumers and rural marketing strategies. **CO3:** Grasp the basic idea of agricultural inputs, co-operative marketing, public distribution system and agricultural marketing in India. **CO4:** Explain the characteristics and types of Services, reasons for growth of service industry in India. **CO5:** Discuss in details elements of service marketing mix. **CO6:** Critically examine elements service marketing mix of different Non-Profit and Profit Organizations.

Semester VI	
Course Title & Course Code	**Course Outcomes**
MANAGEMENT ACCOUNTING UG BCOM-G-DSE-T-03A	Upon completion of the course, students will be able to **CO1:** Understand thoroughly the conceptual framework of Management Accounting and differences between different branches of accounting. **CO2:** Understand budgetary control system as a tool of managerial planning and control; ability to prepare various types of budget. **CO3:** understand standard costing system as a tool of managerial control; calculation of variances in respect of each element of cost and sales; control ratios. **CO4:** Understand the concept of relevant and irrelevant costs and make decisions related to different business situations

	using marginal costing and differential costing techniques. **CO5:** Analyze financial statement using ratio analysis.
ADVERTISING UG BCOM-G-DSE-T-03B	Upon completion of the course, students will be able to **CO1:** Demonstrate an understanding of the overall role advertising plays in the business world. **CO2:** Describe advertising strategies and budgets. **CO3:** Identify and understand the various advertising media. **CO4:** Demonstrate an understanding of how an advertising agency operates.
INDIAN FINANCIAL SYSTEM UG BCOM-G-DSE-T-04A	Upon completion of the course, students will be able to **CO1:** Know the significance and function of the financial system in relation to the macroeconomic environment. **CO2:** Understand the concepts of Money Market and Capital Market. **CO3:** Demonstrate knowledge of the Indian financial services sector's current structure and regulation. **CO4:** Analyze and develop marketing strategies for financial products and services.
BANKING AND INSURANCE UG BCOM-G-DSE-T-04B	Upon completion of the course, students will be able to **CO1:** Give a thorough knowledge on Indian Banking System and Acts pertaining to it. **CO2:** Discuss the types and rules of crossing a cheque and endorsement. **CO3:** Understand the principles of sound lending, Secured vs. unsecured advances, types of advances, advances against various securities. **CO4:** Know the application of mobile banking, virtual banking, E-payments, transfer funds using Smart card, NEFT, RTGS, ECS etc. **CO5:** Gain knowledge on types of business risk, types of insurance, and functions and role of IRDA.
INDIAN ECONOMICS UG BCOM-G-GE-T-02	Upon completion of the course, students will be able to **CO1:** Comprehend the basic characteristics of economic development and economic growth. **CO2:** Understand the indices of economic development. **CO3:** Analyze the demographic trends in India. **CO4:** Realize the causes and measures of poverty inequalities and unemployment. **CO5:** Study the various economic and social issues.
PROJECT WORK UG BCOM-G-SEC-T-04A	Upon completion of the course, students will be able to **CO1:** Understand different concepts related to business research and the methods of business research. **CO2:** Learn about collection, analysis, presentation and interpretation of data.
AUDITING UG BCOM-G-SEC-T-04B	Upon completion of the course, students will be able to **CO1:** understand the objectives of audit, principles and

	techniques governing audit etc. **CO2:** Understand the different types of audit and relationship with other disciplines. **CO3:** Concept of Internal Control – Internal Check and Internal Audit. **CO4:** Gain knowledge of vouching and verification of Assets & Liabilities. **CO5:** Gain the knowledge of special areas of audit such as Cost audit, Tax audit, and Management audit, audit in EDP environment, computer aided audit techniques and tools. **CO6:** Prepare Audit report.