

Department of Chemistry						
Academic Calender and Academic Plan						
1st Semester General Course (July 2018 - Dec 2018) CC / GE / GEH						
Name of the paper	Module or Unit No	Topic	Name of the teacher	To be Completed during the month and year	No of PPT classes	Continuous Internal Assesment in which month
CC / GE /GEH	I	Atomic Structure Chemical Periodicity Acids and Bases	KB	YES	0	AUG,SEP,NOV
CC / GE /GEH	II	Electronic displacements: Stereochemistry	KT	YES	0	AUG,SEP,NOV
CC / GE /GEH	III	Kinetic Theory of Gases and Real gases , Liquids	SB	YES	0	AUG,SEP,NOV
CC / GE /GEH	IV	Chemical Kinetics Nucleophilic Substitution and Elimination Reactions	SC	YES	0	AUG,SEP,NOV
CC / GE /GEH	V	PRACTICAL CHEMISTRY Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture. Estimation of oxalic acid by titrating it with KMnO <sub>4</sub> . Estimation of water of crystallization in Mohr's salt by titrating with KMnO <sub>4</sub> . Estimation of Fe (II) ions by titrating it with K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> using internal indicator. Estimation of Cu (II) ions iodometrically using Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> . Estimation of Fe(II) and Fe(III) in a given mixture using K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> solution	KB & KT	YES	0	

<b>Course Outcome</b>	<p>Students will be able to</p> <ul style="list-style-type: none"> <li>• To understand kinetic theory of gases</li> <li>• To get an introduction to the basic concepts of pressure, temperature and velocity of ideal gases.</li> <li>• To explain the key concepts of degree of freedom, equipartition of energy and specific heat</li> <li>• To get a concept of collision among molecules and with the wall</li> <li>• To understand deviation of real gas from ideal behavior.</li> <li>• To understand critical constant and vanderwall's constant.</li> <li>• To be able to derive rate equations from mechanistic data</li> <li>• To make use of simple models for predictive understanding of physical phenomena associated to kinetics</li> <li>• To study the dependence of the rate of chemical reactions on properties like pressure, temperature, presence of catalyst</li> <li>• To explain various theories and models relating to structure of atoms and their merits and demerits</li> <li>• To explain various electrochemical properties of elements in the periodic table vis-à-vis electronic configuration .</li> <li>• To discuss various theories pertaining to definition and classification of acids and bases</li> </ul>
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**2nd Semester General Course (Jan 2019 - June 2019) CC / GE / GEH**

Name of the paper	Module or Unit No	Topic	Name of the teacher	To be Completed during the month and year	No of PPT classes	Continuous Internal Assesment in which month
CC / GE /GEH	I	REDOX REACTION	KB	YES	0	FEB,MAR,APRIL MAY
CC / GE /GEH	II	ALIPHATIC HYDROCARBON	KT	YES	0	FEB,MAR, APRIL MAY
CC / GE /GEH	III	CHEMICAL EQUILIBRIUM SOLUTIONS EQUILIBRIA  PHASE SOLIDS	SB	YES	0	FEB,MAR, APRIL MAY
CC / GE /GEH	IV	CHEMICAL THERMODYNAMICS	SC	YES	0	FEB,MAR, APRIL MAY

CC / GE /GEH	<p>PRACTICAL CHEMISTRY</p> <p>Study of kinetics of acid-catalyzed hydrolysis of methyl acetate</p> <p>Study of kinetics of decomposition of H<sub>2</sub>O<sub>2</sub> (Clock Reaction )</p> <p>Study of viscosity of unknown liquid (glycerol, sugar) with respect to water.</p> <p>Determination of solubility of sparingly soluble salt in water, in electrolyte with common ions and in neutral electrolyte (using common indicator)</p> <p>Preparation of buffer solutions and find the pH of an unknown buffer solution by colour matching method</p>	SC/SB	YES		
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<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>• To understand the principle of conservation of energy and how this principle can be used to assess the energy changes that accompany physical and chemical processes.</li> <li>• To examine the means by which a system can exchange energy with its surroundings in terms of the work it may do or the heat it may produce.</li> <li>• To understand the thermodynamic description of mixtures state function, exact, inexact differential</li> <li>• To understand the statements of 1st and 2nd laws of thermodynamics.</li> <li>• To learn the thermodynamic aspects of various processes and reactions.</li> <li>• To understand the concept of thermochemistry enthalpy change of different processes</li> <li>• To get the concept of Entropy (S) from Carnot cycle and the significance of Helmholtz free energy(A) &amp; Gibb's free energy (G)</li> <li>• To explain the criteria of spontaneity in terms of S,H and G.</li> <li>• To be able to derive important thermodynamic relations</li> <li>• To learn the basic concept of equilibrium</li> <li>• To understand Raoult's law</li> <li>• To compare Henry's law and Raoult's law to explain ideal solutions</li> <li>• To describe ideal liquid mixtures.</li> <li>• To explain non-ideal liquid-vapour systems.</li> <li>• To state and explain azeotropic mixtures.</li> <li>• To explain partially miscible and immiscible liquid systems by taking appropriate examples.</li> <li>• To describe how a solute distribute itself in two immiscible liquids,</li> <li>• To state and explain Nernst's distribution law,</li>   <li>• To apply and derive an expression for modified Nernst distribution law for a special case in which solute associate or dissociate in one of the solvent ,</li> <li>• To classify systems as heterogeneous and homogeneous systems</li> <li>• To define equilibrium and metastable equilibrium</li> <li>• To appreciate the importance of phase rule equation in dealing with heterogeneous</li> <li>• General Preparation of different alkanes, alkenes and alkynes with mechanism</li> <li>• Some important Chemical reactions of alkanes, alkenes and alkynes with mechanism</li> <li>• Addition of an unsymmetrical addendum to an unsymmetrical substrate by applying Markonikoff's rule</li> <li>• Acidity of protons of acetylene</li> <li>• To explain the concept of redox reactions on th basis of redox potentials.</li> <li>• to discuss the feasibility of redox titration, redox indicators, redox potential at the equivalence point</li>   <li>• To explain the concept of redox reactions on th basis of redox potentials.</li> </ul>
<b>3rd Semester General Course (July 2019 - Dec 2019) CC / GE / GEH</b>	

Name of the paper	Module or Unit No	Topic	Name of the teacher	To be Completed during the month and year	No of PPT classes	Continuous Internal Assessment in which month
CC / GE /GEH	I	Chemical Bonding and Molecular Structure Comparative study of p-block elements. Transition elements (3d series)	KB	YES	2	SEP,OCT,NOV
CC / GE /GEH	II	Aromatic Hydrocarbons Aryl Halides	KT	YES	1	SEP,OCT,NOV
CC / GE /GEH	III	Conductance	AK	YES	1	SEP,OCT,NOV
CC / GE /GEH	IV	Ionic Equilibria Electromotive force	KR	YES	1	SEP,OCT,NOV
CC / GE /GEH	V	Organometallic Compounds Coordination Chemistry	SC	YES	0	SEP,OCT,NOV
		PRACTICAL CHEMISTRY Qualitative semimicro analysis of mixtures containing two radicals. Emphasis should be given to the understanding of the chemistry of different reactions. Cation Radicals: Na <sup>+</sup> ,K <sup>+</sup> , Ca <sup>2+</sup> , Sr <sup>2+</sup> , Ba <sup>2+</sup> , Al <sup>3+</sup> , Cr <sup>3+</sup> , Mn <sup>2+</sup> /Mn <sup>4+</sup> , Fe <sup>3+</sup> , Co <sup>2+</sup> /Co <sup>3+</sup> , Ni <sup>2+</sup> , Cu <sup>2+</sup> , Zn <sup>2+</sup> , Pb <sup>2+</sup> , Sn <sup>2+</sup> /Sn <sup>4+</sup> , NH <sub>4</sub> <sup>+</sup> . Anion Radicals: F <sup>-</sup> , Cl <sup>-</sup> , Br <sup>-</sup> , BrO <sub>3</sub> <sup>-</sup> , I <sup>-</sup> , IO <sub>3</sub> <sup>-</sup> , SCN <sup>-</sup> , S <sub>2</sub> <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , NO <sub>3</sub> <sup>-</sup> , NO <sub>2</sub> <sup>-</sup> , PO <sub>4</sub> <sup>3-</sup> , AsO <sub>4</sub> <sup>3-</sup> ,BO <sub>3</sub> <sup>3-</sup> , CrO <sub>4</sub> <sup>2-</sup> / Cr <sub>2</sub> O <sub>7</sub> <sup>2-</sup>	KB	YES	0	

<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>• To discuss about the structure of ionic compounds and Their important properties.</li> <li>• Able to calculate the theoretical values of lattice energy and also experimental value.</li> <li>• To discuss about covalent molecules, VSEPR theory. MO treatment of homonuclear and hetero nuclear molecules.</li> <li>• To explain the concept of electronic configuration of p block elements, their common oxidation states, inert pair effect, about their important compounds.</li> <li>• CO-1. To explain their knowledge relating electronic configuration, colour, magnetic properties, different oxidation states catalytic properties for Mn, Fe, Cu</li> <li>• To discuss Werner's coordination theory, valence bond theory, drawback of VBT, complexities in orbitals of some selected elements etc.</li> <li>• To develop an understanding of electrochemistry and the methods used to study the response of an electrolyte through current of potential</li> <li>• To understand why standard reduction potentials are used and how they are determined.</li> <li>• To understand the relationship between chemical energy (Gibbs free energy change for a redox reaction) and electrical energy (electromotive force or cell potential) in an electrochemical cell.</li> <li>• To explain the various terms such as specific conductance, equivalent conductance and molar conductance.</li> <li>• To Explain the effect of dilution on specific conductance, equivalent conductance and molar conductance</li> <li>• To understand the ionic mobility of different ions,</li> <li>• methods of determination of ionic mobility of ions</li> <li>• To understand Kohlrausch's law and its applications</li> <li>• To understand the basic concepts of Arrhenius theory of electrolytic dissociation, evidences in support of Arrhenius theory of electrolytic dissociation and its limitation,</li> <li>• To understand Ostwald's dilution law and its application in determination of Dissociation constant of weak electrolyt</li> </ul>
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**3rd Semester General Course (July 2019 - Dec 2019) SEC**

Name of the paper	Module or Unit No	Topic	Name of the teacher	To be Completed during the month and year	No of PPT classes	Continuous Internal Assessment in which month
SEC		Carbohydrates	SC	YES	0	SEP,OCT,NOV
SEC		Proteins	SC	YES	0	SEP,OCT,NOV
SEC		Enzymes	SC	YES	0	SEP,OCT,NOV
SEC		Lipids	SC	YES	0	SEP,OCT,NOV
SEC		Lipoproteins	SC	YES	0	SEP,OCT,NOV

<b>SEC</b>		Biochemistry of disease Blood Urine	SC	YES	0	SEP,OCT,NOV
<b>Course Outcome</b>	<p>Explain the structure carbohydrates and amino acids, their physical and chemical properties and their function in living organisms. Describe the function of enzyme as a catalyst in maximum biological reaction and learn about the function of enzyme, and also see how they are related to things they come across in daily life. Understand the effect of cholesterol and triglycerides in human body Know about steroid hormone which regulates carbohydrate metabolism and has an anti-inflammatory effect on the body. It helps maintain blood pressure and regulate the salt and water balance in our body. . understand some of the types of disease that might be treatable by gene therapy</p>					
<b>4th Semester General Course (Jan 2020 - Jun 2020) CC / GE / GEH</b>						
<b>Name of the paper</b>	<b>Module or Unit No</b>	<b>Topic</b>	<b>Name of the teacher</b>	<b>To be Completed during the month and year</b>	<b>No of PPT classes</b>	<b>Continuous Internal Assessment in which month</b>
CC / GE /GEH		Alcohols, Phenols and Ethers Amines and Diazonium Salts	KR	NO	0	NO
CC / GE /GEH		Crystal Field theory Quantum chemistry	AK	NO	0	NO
CC / GE /GEH		Carbonyl Compounds Carboxylic Acids and Their Derivatives Amino Acids and Carbohydrates	SC	NO	0	NO

	<p>PRACTICAL CHEMISTRY</p> <p>1. Qualitative Analysis of Single Solid Organic Compound(s)  Experiment A: Detection of special elements (N, Cl, and S) in organic compounds. Experiment B: Solubility and Classification (solvents: H<sub>2</sub>O, dil. HCl, dil. NaOH)  Experiment C: Detection of functional groups: Aromatic-NO<sub>2</sub>, Aromatic -NH<sub>2</sub>, -COOH, carbonyl (no distinction of -CHO and &gt;C=O needed), -OH (phenolic) in solid organic compounds.  Experiments A - C with unknown (at least 6) solid samples containing not more than two of the above type of functional groups should be done.</p> <p>2. Identification of a pure organic compound  Solid compounds: oxalic acid, tartaric acid, succinic acid, resorcinol, urea, glucose, benzoic acid and salicylic acid.  Liquid Compounds: methyl alcohol, ethyl alcohol, acetone, aniline, dimethylaniline, benzaldehyde, chloroform and nitrobenzene.</p>				
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<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>• The structural differences of Alcohols: 1°, 2°- and 3°- alcohols, Preparation, Identification of primary, secondary and tertiary alcohols, several reactions of alcohols with mechanism</li> <li>• The preparation of diols, Pinacol- pinacolone rearrangement (with mechanism) using diols</li> <li>• The various methods for preparing Phenols and their important reactions</li> <li>• Preparation of aromatic Ethers and their reactions</li> <li>• <b>o Carbonyl Compounds</b></li> <li>• The students will be learnt different types of Aliphatic and aromatic Carbonyl compounds both aldehydes and ketones by</li> <li>• Preparations of them by different methods both oxidative and reductive</li> <li>• Several types of reactions of them with mechanism</li> <li>• Reactivity differences between aldehyde and ketones</li> <li>• Different Condensation reactions of carbonyl compounds having <math>\alpha</math> H atoms</li> <li>• Some named reactions</li> <li>• <b>o Carboxylic Acids and Their Derivatives</b></li> <li>• The students will have a knowledge about</li> <li>• The structural differences and strengths of carboxylic acids : aliphatic and aromatic,</li> <li>• The Preparations of acids</li> <li>• several derivative of acids preparations</li> <li>• <b>o Amines and Diazonium Salts</b></li> <li>• The structural differences of Amines: 1°, 2°- and 3°- amines, Preparation, Identification of primary, secondary and tertiary amines, several reactions of amines with mechanism</li> <li>• The preparation of diazonium salts from aromatic amines</li> <li>• The various methods for preparing different organic compounds by using benzene diazonium salts</li> <li>• <b>o Amino Acids and Carbohydrates</b></li> <li>• The students will be learnt different types of Amino acids and Carbohydrates by</li> <li>• Preparations of them by different methods</li> <li>• Several types of reactions of them with mechanism</li> <li>• zwitterion, isoelectric point in case of Amino acids</li> <li>• Different reactions of aldoses by ring size increasing and decreasing</li> <li>• Elementary idea about Mutarotation i.e, change in the specific rotation of aldohexoses with time</li> <li>• To express the concept of Crystal Field theory</li> </ul>
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4th Semester General Course (Jan 2020 - Jun 2020) SEC						
Name of the paper	Module or Unit No	Topic	Name of the teacher	To be Completed during the month and year	No of PPT classes	Continuous Internal Assessment in which month

<b>SEC</b>	I	Drugs & Pharmaceuticals	KT	NO	0	NO
<b>SEC</b>	II	Fermentation	SC	NO	0	NO
<b>Course Outcome</b>	<ul style="list-style-type: none"> <li>• The drug designing</li> <li>• The synthesis of several drugs e.g., Analgesics Agents, Antipyretic Agents, Anti-inflammatory Agents, Antibiotics Agents, Antifungal Agents, Antiviral Agents, and HIV-AIDS related drugs by adopting the general established method. <ul style="list-style-type: none"> <li>o Aerobic and anaerobic fermentation</li> </ul> </li> <li>• Production of (i) Ethyl alcohol and citric acid, (ii) Antibiotics; Penicillin, Cephalosporin, Chloromycetin and Streptomycin, (iii) Lysine, Glutamic acid, Vitamin B2, Vitamin B12 and Vitamin C.</li> </ul>					