DEPARTMENT OF CHEMISTRY

LESSON PLAN

2020-2021

LESSON PLAN

2020-2021

ODD SEMESTER

PHYSICAL

CHEMISTRY

III B.Sc. -Chemistry - 5 hours /week

Week	Topics	Reference Books
1	Chemical Kinetics: order and molecularity - Methods to determine the rate of the reactions-derivation of rate constants of I, II, III and zero order reactions and examples.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
2	Derivation for time for half change with examples- Methods to determine the order of reactions – Experimental methods in the study of kinetics of reactions- Volumetry, Manometry.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
3	Polarimetry, Dilatometry and Colorimetry Effect of temperature on the rate of reactions – Arrhenius equation and concept of energy of activation.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
4	Collision theory and derivation of rate constant for bimolecular reactions –Lindemann ‘s theory of unimolecular reactions.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.

		Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
5	Theory of Absolute Reaction Rates-thermodynamic derivation for the rate constant fora bimolecular reaction from it-Comparison of Collision theory and ARRT-significance of entropy and free energy of activation.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
6	Complex reactions : types - consecutive, parallel and reversible reactions (no derivation, only examples).	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
7	Photochemistry-laws of light absorption and laws of photochemistry-Jablonski diagram-Fluorescence and Phosphorescence.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
8	Primary and secondary reactions – quantum yield - Experimental determination, Eder's and Uranyl oxalate actinometers.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.

9	Kinetics of Hydrogen – Bromine reaction, photolysis of aldehyde-photosensitization-Chemiluminescence. Lasers- uses of lasers.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Jainudeen, Chemical Kinetics and Photochemistry, 1st Edition, Jazeeme publication, 1982.
10	Phase equilibria – Gibbs phase rule –statement, definition of terms and derivation - applications to one component systems – Water and Sulphur systems.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Gurtu, Phase Rule, 2nd Edition, Pragathi Prakash Publications, 1972.
11	Thermal analysis and cooling curves – reduced phase rule - Two component system – lead silver system - freezing mixtures - compound formation with congruent melting point.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Gurtu, Phase Rule, 2nd Edition, Pragathi Prakash Publications, 1972.
12	Zn-Mg system, Ferric Chloride water system - incongruent melting point, Na-K system, CST and effect of impurity on Phenol – Water system.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. Gurtu, Phase Rule, 2nd Edition, Pragathi Prakash Publications, 1972.
13	Catalysis-definition-homogeneous catalysis-function of a catalyst in terms of Gibbs free energy of activation. Heterogenous catalysis-Mechanisms of surface reactions.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.
14	Simple decompositions on surfaces -Kinetics of unimolecular surface reactions. Enzyme catalysis-Derivation of Michaelis Menton equation.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical

		Chemistry, 43rd Edition, Vishal Publishing Co., 2008.
15	Adsorption - physisorption and chemisorption - Freundlich adsorption isotherm -Langmuir adsorption isotherm - BET equation (no derivation) - applications of adsorption.	R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008.

I M.Sc. 1 hour/week

KINETICS AND PHOTO

CHEMISTRY

S.No	Topics	Reference Books
1	Partition functions and activated complex-Eyring equation	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
2	Derivation of rate constant	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
3	Determination of free energy, enthalpy and entropy of activation and their significance	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
4	Potential energy surfaces	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
5	Potential energy surfaces	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
6	Applications of ACT to reactions in solution - effect of pressure	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
7	Effect of dielectric constant -single sphere model	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
8	Effect of dielectric constant -double sphere model	Chemical Kinetics by Laidler

		Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
9	Effect of ionic strength on reactions in solution	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
10	Cage effect	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
11	Kinetic isotope effect	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
12	Kinetic isotope effect	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
13	Linear free energy relationships– Hammett equation	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
14	Linear free energy relationships– Hammett equation	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -
15	Linear free energy relationships– Taft equation	Chemical Kinetics by Laidler Kinetics Kinetics and Mechanisms of Chemical Transformations by J.Rajaram J.C. Kuriacose -

Auxilium College (Autonomous), Gandhi Nagar, Vellore – 632 006.

Lesson Plan for the year 2020 – 2021

UCCHK16 - ELECTRO CHEMISTRY

Dr.S.Jhancy Mary

Week	Portions to be covered	Reference	Platform (LMS)

Week 1	Electrochemistry: Conductance - Metallic and electrolytic conductors - specific, equivalent and molar conductance - Measurement of conductance.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 2	Variation of conductance with dilution for strong and weak electrolytes (qualitative explanation) – Transport number and its determination by Hittorf's method.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom

Week 3	Ionic mobility - determination of ionic mobility – effect of temperature and concentration on ionic mobility, Ionic conductance - Kohlrausch's law and its applications.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 4	Theory of strong electrolytes - Debye – Huckel - Onsager theory-verification of Onsager equation.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 5	Wein effect and Debye Falkenhagen effect-ionic strength - activity and activity coefficients of strong electrolytes.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol	Google Classroom

		Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	
Week 6	Applications of conductivity measurements – degree of hydrolysis, solubility product and conductometric titrations.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 7	EMF: Galvanic cells-reversible and irreversible electrodes and cells - standard cell – working of Weston saturated and unsaturated standard standard cells. EMF and its measurement.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom

Week 8	Types of electrodes - metal-metal ion, gas, metal-metal insoluble salt, amalgam and oxidation-reduction electrodes – electrode reactions-electrode potentials - reference electrodes-standard electrode potentials.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 9	Derivation of Nernst equation for electrode potential and cell emf - sign conventions - electrochemical series and its applications-formation of cells - electrode and cell reactions – cell emf.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 10	Chemical cells and Concentration cells with and without transference – examples and derivation of expressions for their emf's - liquid junction potential.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001.	Google Classroom

		B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	
Week 11	Applications of emf measurements- calculation of ΔG, ΔH, ΔS and equilibrium constants- pH and pKa- buffer solutions and buffer action- Handerson's equations- determination of pH using hydrogen, quinhydrone and glass electrodes.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 12	Potentiometric titrations- acid –base, redox and precipitation titrations- advantages of potentiometric titrations.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom

Week 13	Applications of Concentration cells - determination of valency of ions - transport number – ionic product of water - solubility product.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 14	Polarization - decomposition potential - over voltage.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom
Week 15	Storage cells -lead acid battery - mechanism of discharging and recharging-fuel cells – types of fuel cells – Hydrogen – Oxygen fuel cell.	B. R. Puri, L. R Sharma and M.S Pathania, Principles of Physical Chemistry, 43rd Edition, Vishal Publishing Co., 2008. M.S. Yadav, Electrochemistry, Second Revised Edition, Anmol Publications Pvt. Ltd, New Delhi, 2001. B.K Sharma, Electrochemistry, 4th Edition, Goel Publishing House, 1990.	Google Classroom

Lesson Plan for the year 2020 – 2021

PCCH019 – THERMODYNAMICS

1 hour/week

Dr.S.Jhancy Mary

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	Thermodynamics and Mathematical Probability	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 2	Sterling approximation	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 3	Lagrange's method of indeterminate multipliers	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 4	Distribution and most probable distribution	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 5	Distinguishable and Indistinguishable particles	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 6	Statistical Mechanics-Maxwell-Boltzmann distribution law-Derivation and applications	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 7	Bose–Einstein distribution law-derivation and applications	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 8	Fermi –Dirac distribution law-Derivation and applications	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 9	Comparison of the distribution laws	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom

Week 10	Relation between partition and thermodynamic functions	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 11	Different types of ensembles and Ensemble averaging	Statistical Thermodynamics by M.C. Gupta Thermodynamics by Rajaram Kuriacose	Google Classroom
Week 12	Working out of Problems		Google Classroom
Week 13	Working out of Problems		Google Classroom
Week 14	Revision		Google Classroom
Week 15	Revision		Google Classroom

Auxilium College (Autonomous), Vellore - 6

Odd Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

UCCHG16 - Inorganic Chemistry

Week	Portions to be Covered	References	Platform (LMS)
I	Unit I - General characteristics of d block elements and comparative study of Ti and V group elements.	Inorganic Chemistry by P. L. Soni and Puri & Sharma.	Google Classroom – Google Meet
II	Unit I - Comparative study of Cr, Mn and Fe group elements.	Inorganic Chemistry by P. L. Soni and Puri & Sharma.	Google Classroom – Google Meet
III	Unit I - Chemistry of lanthanides and actinides.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
IV	Unit II - Metallurgy and metallurgical processes - general methods of extraction, various concentration, refining and reduction methods.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
V	Unit II - Extraction, properties and uses of Ti, Zr, Pt and Th.	Modern Inorganic Chemistry by R. D. Madan and Advanced Inorganic Chemistry by Cotton and Wilkinson.	Google Classroom – Google Meet
VI	Unit II - Extraction, properties and uses of U. Preparation and uses of ammonium molybdate, vanadium pentoxide, uranium hexa fluoride. Steel alloys - heat treatment of steel.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet

VII	Unit III - Fundamental particles of the nucleus - nucleon terminology, nuclides, isotopes, isobars, isotones, mirror nuclei and isomers.	Essentials of Nuclear Chemistry by H J Arnikar.	Google Classroom – Google Meet
VIII	Unit III - Nuclear forces operating between the nucleons - meson exchange theory and nuclear fluid theory, N/P ratio, curves, stability belts, the whole number rule and packing fraction.	Essentials of Nuclear Chemistry by H J Arnikar and Elements of Nuclear Chemistry by A. K. Srivastava & P. C. Jain.	Google Classroom – Google Meet
IX	Unit III - Natural radioactivity - properties of radioactive rays - radioactive series including neptunium series - group displacement law - rate of disintegration and half-life period.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
X	Unit IV - Nuclear binding energy: Mass defect - simple calculations involving mass defect and B.E per nucleon - magic numbers - liquid drop model - shell model.	Modern Inorganic Chemistry by R. D. Madan, Essentials of Nuclear Chemistry by H J Arnikar and Elements of Nuclear Chemistry by A. K. Srivastava & P. C. Jain.	Google Classroom – Google Meet
XI	Unit IV - Artificial radioactivity - induced radioactivity - nuclear transmutation reactions.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
XII	Unit IV - Nuclear fission - nuclear energy - nuclear reactors - breeder reactor, nuclear power projects in India, nuclear fusion – thermonuclear reactions – energy source of the sun. and the stars.	Modern Inorganic Chemistry by R. D. Madan, Essentials of Nuclear Chemistry by H J Arnikar.	Google Classroom – Google Meet
XIII	Unit V - Biological importance of Fe, Zn, Mg and Co.	Fundamental Concepts of Applied Chemistry by Jayashree Ghosh and epgpathshala.	Google Classroom – Google Meet

XIV	Unit V - Biological role of Mo, Na, K, Ca and P.	Fundamental Concepts of Applied Chemistry by Jayashree Ghosh and epgpathshala.	Google Classroom – Google Meet
XV	Unit V - Inorganic medicinal chemistry - radio pharmaceuticals, chelate therapy and contrast agents in MRI.	Fundamental Concepts of Applied Chemistry by Jayashree Ghosh and epgpathshala.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Odd Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

UCCHD19 - General Chemistry III

Week	Portions to be Covered	References	Platform (LMS)
I	Unit 5.1 - The Solid State - differences between crystalline and amorphous solids, elements of symmetry, unit cell, space lattice, Bravais lattices, law of rational indices and Miller indices.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
II	Unit 5.2 - X - ray diffraction – derivation of the Bragg's equation – experimental methods – Laue's method and powder method.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
III	Unit 5.3 - Types of crystals - characteristics of molecular and covalent crystals.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet

IV	Unit 5.3 - Characteristics of metallic and ionic crystals.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
V	Unit 4.1 - Thermodynamics - types of systems – isolated, closed, open, homogeneous and heterogeneous systems, phase.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VI	Unit 4.1 - State of a system, state variables. Thermodynamic equilibrium - thermal, mechanical and chemical equilibria, extensive and intensive properties.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VII	Unit 4.1 - Thermodynamic process and their types - isothermal, adiabatic and isobaric processes, reversible and irreversible processes, nature of work and heat.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VIII	Unit 4.2 - The first law of thermodynamics - concept of internal energy, statements of I law, state functions, exact and inexact differentials, the Euler reciprocal relation.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
IX	Unit 4.2 - Enthalpy of a system, enthalpies of vaporization and fusion, heat capacity of a system - relationship between C_p and C_v in gaseous systems.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet

X	Unit 4.2 - Calculation of w, ΔU, q and ΔH for expansion and compression of ideal gases under reversible and irreversible isothermal conditions. Adiabatic expansion - calculation of w, ΔU and ΔH, final temperatures in reversible and irreversible adiabatic expansions.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
XI	Unit 4.2 - Comparison of isothermal and adiabatic expansions, zeroth law of thermodynamics.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
XII	Unit 4.3 - Thermochemistry - heat of reaction, exothermic and endothermic reactions, relationship between q_p and q_v, standard enthalpy changes of reactions, standard enthalpies of combustion, neutralization and formation.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
XIII	Unit 4.3 - Determination of enthalpies of reactions, variation of enthalpy of reaction with temperature - Kirchhoff's equations. Bond energies- definition, calculation and applications of bond energies.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
XIV	Unit 4.4 - The Second law of thermodynamics - need for the second	Principles of Physical Chemistry by B. R.	Google Classroom – Google Meet

	law, statements of II law, spontaneous processes.	Puri, L. R Sharma and M.S Pathania.	
XV	Unit 4.4 - Carnot's cycle - efficiency of a heat engine-Carnot's theorem (statement only).	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Odd Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

PCCHK19 - Molecular Spectroscopy

Week	Portions to be Covered	References	Platform (LMS)
I	Unit 3.3 - Mossbauer spectroscopy - Mossbauer effect, recoilless emission and absorption, Doppler effect.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
II	Unit 3.3 - Instrumentation, hyperfine interaction - chemical isomer shift, quadruple interaction and magnetic splitting.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
III	Unit 3.4 - Interpretation of spectra - bonding and structures of Fe^{2+} and Fe^{3+} compounds, Sn^{2+} and Sn^{4+} compounds and detection of oxidation states and in-equivalent MB atoms.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet

IV	Unit 3.4 - Applications of Mossbauer spectroscopy.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
V	Unit 4.1 - ESR - principle, origin of an EPR signal, derivative spectra.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
VI	Unit 4.1 - g value - factors affecting the magnitude of g values, anisotropy.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
VII	Unit 4.1 - Hyperfine interactions – hyperfine coupling constant, relative intensities of EPR signals, hyperfine splitting in Cu and Mn compounds.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
VIII	Unit 4.2 - Interpretation of the spectra of simple carbon centered free radicals, zero field splitting and Kramer's degeneracy.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
IX	Unit 4.2 - Electron delocalization – Mc Connell's equation, line width in solid state EPR.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
X	Unit 4.2 - Applications of EPR.	Physical Methods in Inorganic Chemistry by R.S. Drago.	Google Classroom – Google Meet
XI	Unit 4.3 - Photoelectron spectroscopy – Photo electric effect, UV and X-ray PES.	Physical Methods in Inorganic Chemistry by R.S. Drago, Spectroscopy by Kaur, epgpathshala.	Google Classroom – Google Meet

XII	Unit 4.3 - Koopmans' theorem, fine structure in PES, interpretation of photo electron spectra of H_2 and N_2.	Physical Methods in Inorganic Chemistry by R.S. Drago, Spectroscopy by Kaur, epgpathshala.	Google Classroom – Google Meet
XIII	Unit 4.3 - Interpretation of photo electron spectra of O_2, CO, NO, N_2O.	Physical Methods in Inorganic Chemistry by R.S. Drago, Spectroscopy by Kaur, epgpathshala.	Google Classroom – Google Meet
XIV	Unit 4.3 - Interpretation of photo electron spectra of H_2O, azide, HCl and NH_3.	Physical Methods in Inorganic Chemistry by R.S. Drago, Spectroscopy by Kaur, epgpathshala.	Google Classroom – Google Meet
XV	Unit 4.4 - Electron Spectroscopy for Chemical Analysis – applications of ESCA.	Physical Methods in Inorganic Chemistry by R.S. Drago, Spectroscopy by Kaur, epgpathshala.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Even Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

UCCHJ16 - Coordination Chemistry

Week	Portions to be Covered	References	Platform (LMS)
I	Unit I - Co-ordination compounds: Definition of terms used – classification of ligands – chelation and effect of chelation – applications – co-ordination number and stereochemistry of complexes.	Coordination Chemistry by M. Satake Y. Mido, Coordination Chemistry by Gurdeep Chatwal and M. S. Yadav, Concise Coordination Chemistry by R Gopalan and V Ramalingam.	Google Classroom – Google Meet
II	Unit I – Nomenclature of Coordination compounds.	Coordination Chemistry by M. Satake Y. Mido.	Google Classroom – Google Meet
III	Unit I - Isomerism in complexes – conformation isomerism, ionization isomerism, hydrate isomerism, linkage isomerism, ligand isomerism, co-ordination isomerism, co-ordination position isomerism, polymerization isomerism, geometrical and optical isomerism in 4 and 6 co-ordinated complexes.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
IV	Unit II - Theory of coordination compounds – Werner theory and its experimental verifications.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet

V	Unit II - Sidgwick theory - EAN rule-limitations.	Modern Inorganic Chemistry by R. D. Madan and Advanced Inorganic Chemistry by Cotton and Wilkinson.	Google Classroom – Google Meet
VI	Unit II - Theory of bonding - Valence bond theory – hybridization, geometry and magnetic properties – failures of VBT.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
VII	Unit III - Crystal Field theory – Factors affecting the magnitude Δ o - spectro chemical series - splitting of d – orbitals in octahedral, tetrahedral and square planar complexes.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
VIII	Unit III - Crystal field stabilization energy – Calculation of CFSE in octahedral and tetrahedral complexes – low spin and high spin complexes.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
IX	Unit III - Explanation of magnetic properties and colour using CFT. Comparison between VBT and CFT.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
X	Unit IV - Covalency in transition metal complexes: Evidences for covalency. Molecular Orbital theory: Metal orbitals and elementary idea, ligand orbitals suitable for σ and π bonding in octahedral Geometry.	Modern Inorganic Chemistry by R. D. Madan and Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli and R. D. Madan.	Google Classroom – Google Meet
XI	Unit IV - Construction of qualitative MO energy level diagram for σ – bonding in octahedral geometry. Effect of π bonding on the value of Δo.	Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli and R. D. Madan.	Google Classroom – Google Meet

XII	Unit IV - Relationship between π bonding ability of ligands and spectrochemical series, Comparison between CFT and MO theories.	Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli and R. D. Madan.	Google Classroom – Google Meet
XIII	Unit V - Pi acceptor ligands: Syntheses, properties of carbonyls of Ni, Cr, Fe.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
XIV	Unit V - Syntheses, properties of carbonyls of Co, Mn, W and Mo.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet
XV	Unit V - bonding, hybridization and structures of carbonyls of Ni, Cr, Fe, Co, Mn, W and Mo.	Modern Inorganic Chemistry by R. D. Madan.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Even Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

UCCHE19 - General Chemistry IV

Week	Portions to be Covered	References	Platform (LMS)
I	Unit 5.1 - Entropy – the concept of entropy, entropy changes in isothermal expansion of an ideal gas, in reversible and irreversible processes, entropy change accompanying change of phase.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
II	Unit 5.1 - Calculation of entropy changes with changes in T, V, and P, entropy changes in different processes, entropy of a mixture of ideal gases, entropy of mixing, physical significance of entropy.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet

III	Unit 5.2 - Helmholtz and Gibbs free energy functions, variation of free energy change with T and P.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
IV	Unit 5.2 - Maxwell's relations, criteria for reversible and irreversible processes, Gibbs-Helmholtz equation.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
V	Unit 5.3 - Partial molar properties – concept of chemical potential, the Gibbs-Duhem equation, variation of chemical potential with temperature and pressure.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VI	Unit 5.3 - Chemical potential in a system of ideal gases, Clausius-Clapeyron equation – applications.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VII	Unit 5.4 - Third law of thermodynamics - Nernst heat theorem, statement of third law.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
VIII	Unit 5.4 - Determination of absolute entropies of solids, liquids and gases, residual entropy.	Principles of Physical Chemistry by B. R. Puri, L. R Sharma and M.S Pathania.	Google Classroom – Google Meet
IX	Unit 4.1 - Alcohols - reactions of alcohols with Na, HX, esterification, oxidation with alk. $KMnO_4$, acidic	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and	Google Classroom – Google Meet

	dichromate, con HNO_3, catalytic dehydrogenation.	Advanced Organic Chemistry by Bahl and Arun Bahl.	
X	Unit 4.2 - Dihydric alcohol-glycol- preparation, properties and uses,	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet
XI	Unit 4.2 - Trihydric alcohol – Glycerol- preparation, properties and uses.	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet
XII	Unit 4.3 - Ethers- isomerism, preparation by Williamson synthesis.	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet
XIII	Unit 4.3 - Reactions of ethers.	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet

XIV	Unit 4.4 - Epoxides- preparation from alkene, ring opening reactions.	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet
XV	Unit 4.4 - Reaction with alcohol, ammonia derivative and $LiAlH_4$.	Textbook of Organic Chemistry, P.L. Soni and H.M. Chawla and Advanced Organic Chemistry by Bahl and Arun Bahl.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Even Semester Lesson Plan

2020-2021

Dr. J. Rosaline Ezhilarasi

PCCHE20 – Advanced Coordination Chemistry

Week	Portions to be Covered	References	Platform (LMS)
I	Unit 2.1 - CFT - salient features of CFT, crystal field splitting of d-orbitals in octahedral complexes.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet

II	Unit 2.1 - Factors affecting the magnitude of Δ_o,	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
III	Unit 2.1 - Crystal field splitting of d-orbitals in tetrahedral, tetragonal and square planar complexes.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
IV	Unit 2.2 - Consequences of CF splitting - formation of high-spin and low-spin complexes.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
V	Unit 2.2 - Distribution of d-electrons.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
VI	Unit 2.3 - CFSE - calculation of CFSE for various d systems in O_h and T_d fields.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet

VII	Unit 2.3 - Uses of CFSE values,	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
VIII	Unit 2.3 - Applications of CFT, limitations.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
IX	Unit 2.4 - Jahn-Teller distortion - theorem, z-in and z-out cases.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
X	Unit 2.4 - Causes and consequences of Jahn-Teller distortion.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
XI	Unit 2.5 - MOT - experimental evidences for metal-ligand covalent bonding in complexes, σ–bonding in O_h complexes.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet

XII	Unit 2.5 - Construction of MO diagrams.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
XIII	Unit 2.6 - Pi-bonding in O_h complexes, effect of π–bonding on the value of Δ_o.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
XIV	Unit 2.6 - Relation between pi bonding ability of ligands and spectrochemical series,	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet
XV	Unit 2.6 - Comparison of CFT with MOT.	Concise Coordination Chemistry by R. Gopalan, Selected Topics in Inorganic Chemistry by Wahid U. Malik, G. D. Tuli, R. D. Madan.	Google Classroom – Google Meet

Auxilium College (Autonomous), Vellore - 6

Dr. J. Rosaline Ezhilarasi, Lesson Plan, 2020-2021

PRACTICAL II: UCCHF19 –VOLUMETRIC ESTIMATION

Week	Portions to be Covered	References	Platform (LMS)
I	Introduction to Volumetric Estimation – terms involved – principle.	-	Google Classroom – Google Meet
II	Volumetric Estimation – introduction to apparatus – handling procedure – calculation.	-	Google Classroom – Google Meet
III	Estimation of NaOH – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
IV	Estimation of Borax – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
V	Estimation of Oxalic acid – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
VI	Estimation of Sodium nitrite – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
VII	Estimation of Copper – principle involved – procedure – calculation –	Lab Manual	1. Google Meet

	assignment on writing the procedure in the observation note book.		2. Google Classroom
VIII	Estimation of Potassium dichromate – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
IX	Estimation of Magnesium – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
X	Estimation of Ferrous ion – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
XI	Estimation of Chloride in neutral medium – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
XII	Estimation of Calcium – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
XIII	Determination of percentage of Manganese dioxide in Pyrolusite – principle involved – procedure – calculation – assignment on writing	Lab Manual	1. Google Meet 2. Google Classroom

	the procedure in the observation note book.		
XIV	Estimation of alkalinity of a water sample – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom
XV	Estimation of temporary and permanent hardness of water – principle involved – procedure – calculation – assignment on writing the procedure in the observation note book.	Lab Manual	1. Google Meet 2. Google Classroom

AUXILIUM COLLEGE (AUTONOMOUS) VELLORE – 6.

LESSON PLAN
2020-2021

UCCHH16

Organic Chemistry

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	4	I	Stereoisomerism: Optical isomerism - Projection formulae: Fischer, Flying wedge, Sawhorse and Newmann projection formulae- Cahn – Ingold – Prelog rules – R-S notations for optical isomers with one and two asymmetric carbon atoms.	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Group discussion and Written test
II	4	I	Optical activity in compounds not containing asymmetric carbon atoms – Biphenyls (atropisomerism), allenes and spiranes	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari	Group discussion and Written test

			Geometrical isomerism: Cis - trans, syn – anti and E-Z notations		Organic Reaction Mechanisms - Tewari	
III	4	I	Geometrical isomerism in maleic and fumaric acids and unsymmetrical ketoximes – methods of distinguishing geometrical isomers using melting point, dipole moment, dehydration, cyclisation and heat of combustion and hydrogenation.	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Group discussion and Written test
IV	4	II	Tautomerism: Definition- keto- enol tautomerism (identification, acid and base catalysed mechanisms, preparations and characteristics), nitro-acinitro tautomerism and amido-imido tautomerism.	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms – Tewari	Quiz
V	4	II	Conformational analysis: Conformational analysis of ethane and n- butane	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal	Quiz

			including energy diagrams – conformers of cyclohexane – axial and equatorial bonds – ring flipping showing axial equatorial inter conversions		Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	
VI	4	II	conformers of mono and di substituted cyclohexanes – 1:2 and 1:3 interactions	Chalk and Board, Power point	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Quiz
VII	4	III	Active methylene group – Characteristic reactions of active methylene groups in Malonic, Acetoacetic and cyano acetic esters and their synthetic uses.	Chalk and Board, Power point	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms – Tewari	Group discussion and Written test
VIII	4	III	Organic photochemistry: Carbonyl polarization – Reactivity of carbonyl group - acidity of alpha hydrogen. Photochemistry of carbonyl compounds	Chalk and Board, Power point	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari	Group discussion and Written test

					Organic Reaction Mechanisms - Tewari	
IX	4	III	Norrish type I and II reactions. Photo reduction, addition and isomerization.	Chalk and Board, Powerpoint	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms – Tewari	Group discussion and Written test
X	4	IV	Reaction Mechanisms: Mechanism of Aldol, Benzoin and Darzen condensation– Claisen, Cannizaro, Reformatsky,	Chalk and Board, Seminar	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Seminar
XI	4	IV	Perkin, Knoevenagal, Michael addition, haloform, Dakin, Wittig and Dieckmann reactions.	Chalk and Board,Seminar	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms – Tewari	Seminar

XII	4	IV	Mechanism of reduction with sodium borohydride, $LiAlH_4$, Wolf Kishner and MPV reduction.	Chalk and Board, Seminar	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Seminar
XIII	4	V	Molecular rearrangements: Classification as anionotropic – cationotropic and inter molecular – intra molecular. Pinacol-Pinacolone rearrangement Beckmann	Chalk and Board,Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms – Tewari	Quiz
XIV	4	V	Claisen rearrangement (sigmatropic), Paraclaisen rearrangement, Favorskii rearrangements, Fries rearrangements (two mechanisms),	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari Organic Reaction Mechanisms - Tewari	Quiz
XV	4	V	Benzidine rearrangement**.** (Mechanism, evidence for carbonium ion intermediate formation – migratory attitude – inter / intra molecular rearrangement)	Chalk and Board, Group discussion	Reaction and reagents – O.P.Agarwal Organic Stereochemistry- Tewari	Quiz

					Organic Reaction Mechanisms - Tewari	

PCCHJ19

SYNTHETIC ORGANIC CHEMISTRY

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	2	I	Retrosynthesis, disconnection approach, synthons, linear and convergent Synthesis	Chalk and Board, Group discussion	Disconnection Approach- Stuart Warren	Group Discussion and written test
II	2	I	One group C-X disconnection and two group C-X disconnection. Umpolung of reactivity	Chalk and Board, Group discussion	Disconnection Approach- Stuart Warren	Group discussion and written test
III	2	I	Protection of functional groups (hydroxyl, amino, carbonyl and carboxyl groups).	Chalk and Board, Group discussion	Disconnection Approach- Stuart Warren	Group discussion and written test
IV	2	I	Synthesis of target molecules based on disconnection and synthon approach - Asprin, 3- methyl-1-pentane, methyl - 3-phenyl butanoate	Chalk and Board, power point	Disconnection Approach- Stuart Warren	Quiz

V	2	I	Cis - 1- isopropyl -2- benzyl ethylene and 2,6 dibromoaniline, reserpine,	Chalk and Board, power point	Disconnection Approach- Stuart Warren	Quiz
VI	2	I	Saccharine, paracetamol, morpholine.	Chalk and Board, Power point	Disconnection Approach- Stuart Warren	Quiz
VII	2	II	Prostereoisomerism- prochirality, topicity of ligands and faces- homotopic, heterotopic and enantiotopic.	Chalk and Board, Power point	Advanced Organic Chemistry by Clayden & Greeves	Group Discussion and written test
VIII	2	II	Asymmetric synthesis, chiral auxiliaries, methods of asymmetric induction, substrate	Chalk and Board, Power point	Advanced Organic Chemistry by Clayden & Greeves	Group discussion and written test
IX	2	II	Reagent and catalyst controlled reactions- Examples.	Chalk and Board, Power point	Advanced Organic Chemistry by Clayden & Greeves	Group discussion and written test

X	2	II	Determination of enantiomeric and diastereomeric excess, enantio-discrimination.	Chalk and Board, Power point	Advanced Organic Chemistry by Clayden & Greeves	Seminar
XI	2	II	Methods of resolution-mechanical separation, formation of diastereomers,	Chalk and Board, seminar	Advanced Organic Chemistry by Clayden & Greeves	Seminar
XII	2	II	Chromatography and biochemical transformation	Chalk and Board, seminar	Advanced Organic Chemistry by Clayden & Greeves	Seminar
XIII	2	V	Chemoselectivity – reduction and oxidation-examples, calculation.	Chalk and Board,Group discussion	Organic synthesis by Puneet Karnard	Quiz
XIV	2	V	Regioselectivity-Birch reduction. Stereoselectivity – Principle	Chalk and Board, Group discussion	Organic synthesis by Puneet Karnard	Quiz
XV	2	V	Diastereoselective reaction – hydroboration (formation of an alcohol).	Chalk and Board, Group discussion	Organic synthesis by Puneet Karnard	Quiz

UCCHA20

General Chemistry I

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	2	I	Valency, oxidation number, oxidation and reduction in terms of oxidation number, calculation of oxidation state - acids, bases, salts, oxidizing and reducing agents. Oxidation, reduction and redox reactions (definition and examples)	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Group Discussion and written test
II	2	I	Oxidising and reducing agents (definition and examples). Balancing chemical equations - oxidation number method.	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Group discussion and written test

III	2	I	Balancing chemical equations - ion electron method.	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Group discussion and written test
IV	2	II	Modern periodic law, general classification of elements in periodic table, general characteristics of s, and p block elements	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Quiz
V	2	I	General characteristics of d and f block elements	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Quiz
VI	2	IV	Acids and Bases- concepts- Arrhenius, Lowry-Bronsted and Lewis acid – base theory, acid- base equilibria,	Chalk and Board, Models	Physical Chemistry – Puri and Sharma	Quiz
VII	2	IV	Definition of pH of strong and weak acid solutions, calculation.	Chalk and Board, Group discussion	Physical Chemistry – Puri and Sharma	Group Discussion and written test
VIII	2	IV	Hard and soft acids and bases – definition	Chalk and Board, Group discussion	Physical Chemistry – Puri and Sharma	Group discussion and written test

IX	2	IV	Buffer solutions, relative strength of acids and bases from Ka and K_b values	Chalk and Board, Group discussion	Physical Chemistry – Puri and Sharma	Group discussion and written test
X	2	IV	Henderson-Hasselbalch equations.	Chalk and Board, Seminar	Physical Chemistry – Puri and Sharma	Seminar
XI	2	V	Common ion effect, concept of sparingly soluble salts,	Chalk and Board, seminar	Practical Chemistry – O.P Pandey	Seminar
XII	2	V	Solubility product principle, relation between solubility and solubility product.	Chalk and Board, seminar	Practical Chemistry – O.P Pandey	Seminar
XIII	2	V	Application of common ion effect and solubility product principle in inorganic qualitative analysis,	Chalk and Board,Group discussion	Practical Chemistry – O.P Pandey	Quiz
XIV	2	V	Eliminating the interfering radicals, significance of sodium carbonate extract	Chalk and Board, Group discussion	Practical Chemistry – O.P Pandey	Quiz
XV	2	V	Spot test reagents – Magneson, Aluminon, Nesslers, Thiourea, Cupferon and DMG.	Chalk and Board, Group discussion	Practical Chemistry – O.P Pandey	Quiz

UECHC16

Chemistry of Natural Products

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	4	I	Carbohydrates: Classification, Chain lengthening and shortening of aldoses, Epimerisation, Constitution of glucose,Reactions of glucose- osazone formation, Cyclic structure- pyranose and furanose forms,Mutarotation and its mechanism	Chalk and Board, Group discussion	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Group discussion and Written test
II	4	I	Determination of ring size – Haworth projection formula, Constitution of fructose, Reactions of fructose – osazone, Configuration of glucose and fructose	Chalk and Board, Group discussion	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Group discussion and Written test
III	4	I	Constitution of sucrose, maltose, starch and cellulose	Chalk and Board, Group discussion	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Group discussion and Written test

IV	4	II	Classification of aminoacids- essential and nonessential aminoacids, Preparation of alpha aminoacids and properties- Zwitter ions, Isoelectric points	Chalk and Board, Group discussion	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Quiz
V	4	II	Synthesis of peptides, Classification of proteins, Denaturation	Chalk and Board, Group discussion	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Quiz
VI	4	II	Primary and secondary structure of proteins- Helical and Sheet structure	Chalk and Board, Power point	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol I – Gurdeep Chatwal	Quiz
VII	4	III	Nucleic acid, Nucleoside, Nucleotide, Phosphodiester bonds, types of nucleic acids	Chalk and Board, Power point	Organic chemistry- Anupa and Anup and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Group discussion and Written test
VIII	4	III	RNA and DNA structures,Sequencing of DNA, Synthesising an oligonucleotide array	Chalk and Board, Power point	Organic chemistry- Anupa and Anup and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Group discussion and Written test

IX	4	III	Denaturation of RNA and DNA, Replication, Transcription and Translation, Protein synthesis	Chalk and Board, Powerpoint	Organic chemistry- Anupa and Anup and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Group discussion and Written test
X	4	IV	Terpenes- Classification, Isoprene rule, Structure elucidation of geraniol, citral	Chalk and Board, Seminar	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Seminar
XI	4	IV	Structure elucidation of alpha- pinene, Alkaloids- Classification, General methods of structure determination.	Chalk and Board,Seminar	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Seminar
XII	4	IV	Structure elucidation of coniine, piperine and nicotine	Chalk and Board, Seminar	Advanced organic chemistry- Bahl and Bahl, Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Seminar
XIII	4	V	Flavones- Sources, Isolation, Separation,Purification and properties.Structure elucidation of flavone	Chalk and Board,Group discussion	Chemistry of Natural Products- Vol II – Gurdeep Chatwal	Quiz

XIV	4	V	Structure elucidation of flavone, Vitamins-Source, Classification.	Chalk and Board, Group discussion	Chemistry of Natural Products-Vol I and Vol II – Gurdeep Chatwal	Quiz
XV	4	V	Structure elucidation of thiamine and ascorbic acid	Chalk and Board, Group discussion	Chemistry of Natural Products-Vol I – Gurdeep Chatwal	Quiz

PECHG19

Organometallic and Bioinorganic Chemistry

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	3	I	Introduction-18 electron rule and EAN rule – calculation, hapacity-definition.	Chalk and Board, Group discussion	Organometallic chemistry of transition metals by Robert H. Crabtree	Group Discussion and written test
II	3	I	Metal carbonyl complexes and poly nuclear carbonyl complexes-- Preparation and properties, Structure and Bonding.	Chalk and Board, Group discussion	Organometallic chemistry of transition metals by Robert H. Crabtree	Group discussion and written test
III	3	I	Carbonylate ion, Carbonyl hydride complex- Preparation and properties, Structure	Chalk and Board, Group discussion	Organometallic chemistry of transition metals by Robert H. Crabtree	Group discussion and written test

			and Bonding.			
IV	3	II	Nitrosyl complex, Metal alkyls - Preparation and properties, Structure and Bonding.	Chalk and Board, Group discussion	Organometallic chemistry of transition metals by Robert H. Crabtree	Quiz
V	3	I	Carbenes, Carbynes and carbides, non-aromatic alkenes and alkyne complex, metallocenes - Preparation and properties, Structure and Bonding.	Chalk and Board, Group discussion	Organometallic chemistry of transition metals by Robert H. Crabtree	Quiz
VI	3	IV	Metallo porphyrin and respiration (cytochromes).	Chalk and Board, Power point	Bioinorganic chemistry by Asim K Das	Quiz
VII	3	IV	Interaction between heme and dioxygen - Structure and function of haemoglobin	Chalk and Board, Power point	Bioinorganic chemistry by Asim K Das	Group Discussion and written test

VIII	3	IV	Ferredoxin and Rubredoxin, Blue copper protein.	Chalk and Board, Power point	Bioinorganic chemistry by Asim K Das	Group discussion and written test
IX	3	IV	Ion transport in membranes, Na, K balance, calcium in living cells (transport and regulation) selectivity of Ca^{2+} over Mg^{2+}	Chalk and Board, Power point	Bioinorganic chemistry by Asim K Das	Group discussion and written test
X	3	IV	Nitrogen fixation-atmospheric, industrial and biological.	Chalk and Board, Power point	Bioinorganic chemistry by Asim K Das	Seminar
XI	3	V	Biological role of metalloenzymes - carboxy peptidases	Chalk and Board, seminar	Bioinorganic chemistry by Asim K Das	Seminar
XII	3	V	Carbonic anhydrase- catalase,	Chalk and Board, seminar	Bioinorganic chemistry by Asim K Das	Seminar
XIII	3	V	Peroxidase, oxatransferase enzymes, xanthine oxidase.	Chalk and Board,Group discussion	Bioinorganic chemistry by Asim K Das	Quiz

XIV	3	V	Metals used for diagnosis.	Chalk and Board, Group discussion	Bioinorganic chemistry by Asim K Das	Quiz
XV	3	V	Chemotherapy with particular reference to anticancer drugs (platinum ammine halides, metallocenes and their halides).	Chalk and Board, Group discussion	Bioinorganic chemistry by Asim K Das	Quiz

UCCHB20

General Chemistry II

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology& Student Centric Methods** *	**Learning Resources ***	**Method of Evaluation** **(Student Centric Methods * can be incorporated here)**
I	2	I	Electron displacement effects – Inductive effect – effect on bond length, dipole moment, reactivity of alkyl halides	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Group Discussion and written test
II	2	I	Strength of carboxylic acids and basic character of amines, Electromeric effect, comparison with inductive effect	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Group discussion and written test
III	2	I	Mesomeric effect, comparison with inductive effect	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Group discussion and written test
IV	2	II	Hyperconjugation, Steric effect	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Quiz

V	2	I	Bond fission-homolytic and heterolytic, reaction intermediates, carbocations-generation, structure, stability and reactions	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Quiz
VI	2	IV	Cabanions-generation, structure, stability and reactions	Chalk and Board, Models	Reaction mechanisms including reaction intermediates by Aluwaliah	Quiz
VII	2	IV	Free radicals-generation, structure, stability and reactions	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Group Discussion and written test
VIII	2	IV	Generation of benzyne, nitrenes and carbenes	Chalk and Board, Group discussion	Reaction mechanisms including reaction intermediates by Aluwaliah	Group discussion and written test
IX	2	IV	Alkanes- chemical properties, mechanism of halogenation of alkanes	Chalk and Board, Group discussion	Advanced organic chemistry by Bahl and Bahl	Group discussion and written test
X	2	IV	Alkynes- acidity of alkynes, formation of acetylides	Chalk and Board, Seminar	Advanced organic chemistry by Bahl and Bahl	Quiz
XI	2	V	Addition reactions with water, hydrogen halides, halogens	Chalk and Board, seminar	Advanced organic chemistry by Bahl and Bahl	Quiz

XII	2	V	Oxidation, ozonolysis and hydroxylation with $KMnO_4$	Chalk and Board, seminar	Advanced organic chemistry by Bahl and Bahl	Quiz
XIII	2	V	Exceptional properties of Lithium, diagonal relationship of Lithium and Magnesium	Chalk and Board,Group discussion	Advanced inorganic Chemistry – R.D. Madan	Quiz
XIV	2	V	Lithium- occurrence, ores, extraction from phosphate and silicate ores and uses	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Quiz
XV	2	V	Preparation, properties and uses of lithium carbonate	Chalk and Board, Group discussion	Advanced inorganic Chemistry – R.D. Madan	Quiz

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Lesson Plan for the Year 2020 – 2021

ODD SEMESTER

Programme	**B.Sc. Chemistry**
Programme Code	**U17**
Semester	**I**
Course	**General Chemistry-I**
Course Code	**UCCHA20**
Hours	**3**
Credits	**5**
Total Hours	**45**
Max Marks	**40+60**
Course Instructor/Coordinator	**Dr. V. Sugantha Kumari**

Week	Portions to be covered	Reference	Platform (LMS)
I	Unit –IV Gaseous state - kinetic gas equation, derivation, gas laws from the kinetic gas equation, types of velocities - mean, Root Mean Square Velocity (RMS), Most Probable Velocities (MPV), calculation of molecular velocities. (No derivation).	i) Principles of Physical Chemistry by Puri and Sharma ii)Textbook of Physical Chemistry by P.L.Soni.	Google Meet
II	Maxwell's distribution of molecular velocities (derivation), equipartition of energy, collision number, Collision diameter, mean free path, definition.(No derivation)	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
III	Equipartition of energy, collision number, Collision diameter, mean free path, definition.(No derivation)	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
IV	Real gases – deviation from ideal behavior – van der Waals' equation- Virial equation of state, Boyle's temperature (No derivation).	i) Principles of Physical Chemistry by Puri and Sharma	Google Meet

		ii) Textbook of Physical Chemistry by P.L.Soni.	
V	Joule's law, Joule Thomson effect, Joule Thomson Coefficient and its derivation, inversion temperature and its significance. (No derivation)	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
VI	Liquid State - qualitative treatment of the structure of liquids, surface tension – Definition, effects of surface tension, experimental determination – capillary rise method – drop weight method, applications	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
VII	Viscosity – definition, effects of viscosity on temperature and pressure, experimental determination - Saybolt Viscometer and Ostwald's Viscometer method	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet

VIII	Unit –III Concept of Hybridization – definition, characteristics of hybrid orbitals, modes of hybridization	i) Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
IX	Hybridization – tetra valency of carbon, geometry of molecules - methane, ethane, ethylene, acetylene and benzene	ii) Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
X	Unit –V Classical Mechanics –the e/m of an electron, Rutherford's scattering experiments, Rutherford atomic model.	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
X1	The Bohr theory of hydrogen atom, Sommerfeld extension of the Bohr theory.	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
XII	Photoelectric effect and Compton effect- Wave mechanical concept of the atom, de Broglie's relationship	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet

XIII	Davisson and Germer experiment, wave nature of electron, Heisenberg's uncertainty principle	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
XIV	Quantum mechanics- postulates of quantum mechanics, concept of operators, angular wave function, Eigen values, Schrodinger wave equation (no derivation) and significance of wave functions.	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet
XV	Radial and angular wave functions, probability distribution of electrons, radial probability distribution curves.	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Google Meet

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Lesson Plan for the Year 2020 – 2021

ODD SEMESTER

Programme	**M.Sc. Chemistry**
Programme Code	**P14**
Semester	**III**
Course	**Electro Chemistry**
Course Code	**PCCHL20**
Hours	**3**
Credits	**4**
Total Hours	**45**
Max Marks	**40+60**
Course Instructor/Coordinator	**Dr. V. Sugantha Kumari**

Week	Portions to be covered	Reference	Platform (LMS)
I	Unit –I : Activity and Activity coefficient, Mean ionic and Mean ionic activity coefficient, Ionic Strength and related problems. Debye Huckel Theory of Strong electrolytes	i) Introduction to Electrochemistry by Samuel Glasstone ii) Principles of Physical Chemistry by Puri and Sharma	Google Meet
II	Unit-I: Determination of activity coefficient by electrochemical method. Debye Huckel limiting law qualitative and quantitative verification of Debye Huckel Limiting law	i) Introduction to Electrochemistry by Samuel Glasstone ii) Principles of Physical Chemistry by Puri and Sharma	Google Meet
III	Unit-II: Different types of current-kinetic current, catalytic current, current for reversible and irreversible system. Qualitative and quantitative application of polarography to inorganic system	i) Analytical Chemistry by Khopkar ii) Instrumental Methods of Chemical analysis by M.S. Yadav	Google Meet

IV	Unit-II: Amperometric titrations, theory Types of titration curves	i) Analytical Chemistry by Khopkar i) Instrumental Methods of Chemical analysis by M.S. Yadav	Google Meet
V	Unit-II: Successive titration, Indicator electrode application Successive titration, Indicator electrode application	i) Analytical Chemistry by Khopkar ii) Instrumental Methods of Chemical analysis by M.S. Yadav	Google Meet
VI	Unit-II: Cyclic Voltammetry and its application	i)Instrumental Methods of Chemical analysis by M.S. Yadav ii) Analytical Chemistry by Khopkar iii) Principles of Physical Chemistry by Puri and Sharma	Google Meet
VII	Unit-II: Potentiometric titrations, equivalence point potential for Fe^{2+}/Fe^{3+}-MnO_4^-, H^+/Mn^{2+} Systems	i) Instrumental Methods of Chemical analysis by M.S. Yadav	

	Potentiometric titrations-determination of concentration of the species at the equivalence point.	ii) Analytical Chemistry by Khopkar iii) Principles of Physical Chemistry by Puri and Sharma	
VIII	Unit-III: Electrode-electrolyte interface- electrical double layer-Electrocapillary maximum. Lippmann Equation.	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet
IX	Unit-III: Structure of double layers - Helmholtz Perrin, Guoy-Chapmann Model of double layers.	i)Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet
X	Unit-III: Stern model of electrical double layers. Fick's law of diffusion-Factors affecting Fick's law of diffusion-Significance.	i) Modern Electrochemistry by J. Bockris and Reddy	Google Meet

		ii) Introduction to Electrochemistry by Samuel Glasstone	
XI	Unit-III: Membrane potential – current across the biological membrane– Axon membrane	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet
XII	Unit-III- Electrokinetic phenomena- Electroosmosis, Electrophoresis, Sedimentation Potential and Streaming potential.	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet
XIII	Unit-IV: Over potential- mechanism of the hydrogen and oxygen evolution reaction. Rates of simple electrode reactions- elementary electron –electrode process.	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet

XIV	Unit-IV: Butler-Volmer equation for single step electron transfer reaction, significance of electron exchange current density and symmetry factor. Rates of multistep electrode reactions, Butler–Volmer equation for a multistep reaction, transfer coefficient and its significance.	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet
XV	Unit-IV: Corrosion of metals – Theories of corrosion- types of corrosion-Pourbaix diagram Passivation of metals- Flade Potential- Evan's diagram Electro deposition – principle and applications, electrochemical reactions of technological interest.	i) Modern Electrochemistry by J. Bockris and Reddy ii) Introduction to Electrochemistry by Samuel Glasstone	Google Meet

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Lesson Plan for the Year 2020 – 2021

Programme	**M.Sc. Chemistry**
Programme code	**P14**
Semester	**I**
Course	**Polymer Chemistry**
Course Code	**PECHA20**
Hours	**1**
Credits	**4**
Total Hours	**15**
Max Marks	**40+60**
Course Instructor/Coordinator	**Dr. V. Sugantha Kumari**

Week	Portions to be covered	Reference	Platform (LMS)
I	Unit –II : Polymer Characterization methods - Crystalline nature- degree of crystallinity, degree of crystallisability .	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
II	X-ray diffraction studies.	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
III	Glass transition temperature (Tg) – Definition, Factors affecting glass transition temperature	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
IV	Importance of glass tranisition temperature-	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet

V	Relationship between glass transition temperature and melting point.	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
VI	Study of polymers – Differential Scanning Calorimetric (DSC)	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
VII	Thermo gravimetric analysis of polymers	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
VIII	Relation to structure - surface morphology- Scanning Electron Microscopy (SEM).	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet

IX	Size of the particle determination – Transmission Electron Microscopy (TEM)	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
X	Biopolymers- natural– starch, cellulose, chitosan and silk	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
XI	Synthetic polymers - polyvinyl alcohol (PVA), polyvinylpyrrolidone and polylactic acid.	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer	Google Meet
XII	Biomedical application of biopolymers- dental materials, ophthalmology, orthopeadic Implants,	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer iii) Polymer Science and Technology by R. Joel	Google Meet
XIII	Biomedical application of biopolymers in tissue	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar	Google Meet

	engineering and drug delivery.	ii) Textbook of Polymer Science by F.W. Billmeyer iii) Polymer Science and Technology by R. Joel	
XIV	Industrial Applications of biopolymers- packaging, food packaging.	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer iii) Polymer Science and Technology by R. Joel	Google Meet
XV	Industrial application of biopolymers in automotive and electronics application	i) Polymer Science by V.R. Gowariker, N.V. Viswanathan and Jayadev Sreedhar ii) Textbook of Polymer Science by F.W. Billmeyer iii) Polymer Science and Technology by R. Joel	Google Meet

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Lesson Plan for the Year 2020 – 2021

EVEN SEMESTER

Programme	**B.Sc. Chemistry**
Programme Code	**U17**
Semester	**II**
Course	**General Chemistry-II**
Course Code	**UCCHB20**
Hours	**3**
Credits	**5**
Total Hours	**45**
Max Marks	**40+60**
Course Instructor/Coordinator	**Dr. V. Sugantha Kumari**

Week	Portions to be covered	Reference	Platform (LMS)
I	Alkanes - chemical properties, mechanis of free radical reactions, halogenation alkanes	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
II	Alkenes - addition reactions of alkenes with hydrogen, halogens, hydrogen halides- Markownikoff's rule and anti Markownikoff's rule (peroxide effect), sulphuric acid, water.	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
III	Markownikoff's rule and anti Markownikoff's rule (peroxide effect), sulphuric acid, water.	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
IV	Hydroboration, ozonolysis, hydroxylatio with $KMnO_4$, allylic substitution by NBS	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet
V	Dienes - types, stability and 1,2 and 1,4 addition reactions - Diels –Alder reaction and its application.	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Google Meet

VI	Mesomorphic state - Liquid crystals – classification, thermotropic and lyotropic, Smectic, Nematic and Cholestric liquid crystals	i) Principles of Physical Chemistry by Puri and Sharma ii) Textbook of Physical Chemistry by P.L.Soni.	Chalk and talk method
VII	Molecular arrangements and its applications.	Principles of Physical Chemistry by Puri and Sharma	Chalk and talk method
VIII	Solutions - solutions of gases in liquids, Henry's law. Solutions of liquids in liquids- Raoult's law	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Chalk and talk method
IX	Binary liquid mixtures and ideal solutions- Deviations from ideal behaviour,	Advanced Organic Chemistry by B.S Bahl and Arun Bahl	Chalk and talk method
X	Vapour pressure-composition curves and boiling point composition curves	Principles of Physical Chemistry by Puri and Sharma	Chalk and talk method
X1	Distillation -types of distillation, fractional distillation, steam distillation.	Principles of Physical Chemistry by Puri and Sharma	Chalk and talk method

XII	Vacuum distillation, column distillation and azeotropic distillation.	Principles of Physical Chemistry by Puri and Sharma	Chalk and talk method
XIII	Colloidal State - colloidal systems- classification of colloids.	Principles of Physical Chemistry by Puri and Sharma .	Chalk and talk method
XIV	Preparation of colloidal solutions, dispersion methods and condensation methods	Principles of Physical Chemistry by Puri and Sharma. Textbook of Physical Chemistry by P.L.Soni.	Chalk and talk method
XV	Properties of colloidal systems – Tyndall effect, importance and applications of colloids	Principles of Physical Chemistry by Puri and Sharma. Textbook of Physical Chemistry by P.L.Soni.	Chalk and talk method

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Lesson Plan for the Year 2020 – 2021

EVEN SEMESTER

II M.Sc., Chemistry

PCCHM19-Natural Products and Bioorganic Chemistry

Week	Portions to be covered	Reference	Platform (LMS)
I	Amino acids - metabolism of amino acids - oxidative deamination, transamination reactions and urea cycle.	Organic Chemistry by I. L. Finar. Organic Chemistry of Natural Products by Gurdeep R. Chatwal	Chalk and talk method
II	Peptides - synthesis of tripeptide - solid phase peptide synthesis - Merrifield synthesis.	Organic Chemistry by I. L. Finar. Organic Chemistry of Natural Products by Gurdeep R. Chatwal	Chalk and talk method
III	Separation and purification of proteins, dialysis, gel filtration and electrophoresis.	Organic Chemistry by I. L. Finar. Organic Chemistry of Natural Products by Gurdeep R. Chatwal	Chalk and talk method

IV	Structural aspects of proteins	Organic Chemistry by I. L. Finar. Organic Chemistry of Natural Products by Gurdeep R. Chatwal	Chalk and talk method
V	Determination of structure of proteins by XRD method.	Organic Chemistry by I. L. Finar. Organic Chemistry of Natural Products by Gurdeep R. Chatwal	Chalk and talk method
VI	Determination of structure of proteins by cryoscopy method and NMR .	Organic Chemistry by I. L. Finar. Organic Chemistry. of Natural Products by Gurdeep R Chatwal	Chalk and talk method
VII	Biosynthesis of amino acids - phenylalanine, tyrosine and proline only	Organic Chemistry by I. L. Finar.	Chalk and talk method

		Organic Chemistry of Natural Products by Gurdeep R. Chatwal	
VIII	Nucleic acids - introduction - types of nucleic acids - structure of nucleosides and nucleotides.	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
IX	DNA and RNA-polynucleotide chain - structural features of DNA and RNA - Watson-Crick Model.	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
X	Chemical and enzymatic hydrolysis of nucleic acids	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
XI	DNA sequence determination by chemical and enzymatic methods	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
XII	DNA metabolism-replication - mechanism-	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
XIII	Transcription - synthesis of RNA and its mechanism.	Principles of Biochemistry by	Chalk and talk method

		Nelson and Cox Lehninger.	
XIV	Genetic code - origin and evolution,	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method
XV	Salient features- Wobble hypothesis.	Principles of Biochemistry by Nelson and Cox Lehninger.	Chalk and talk method

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Lesson Plan for the Year 2020 – 2021

EVEN SEMESTER

Programme	**M.Sc. Chemistry**
Programme code	**P14**
Semester	**II**
Course	**Group Theory and Quantum Chemistry**
Course Code	**PCCHF20**
Hours	**3**
Credits	**4**
Total Hours	**45**
Max Marks	**40+60**
Course Instructor/Coordinator	**Dr. V. Sugantha Kumari**

Week	Portions to be covered	Reference	Platform (LMS)
I	Introduction - symmetry elements and symmetry operations, group postulates and types of groups, sub groups, abelian and non-abelian groups	Group Theory and Its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Google Meet
II	Group multiplication table, similarity transformations and classes of symmetry operations	Group Theory and Its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Google Meet
III	Molecular point groups - point groups of molecules, point groups of tetrahedral and octahedral molecules. Identification of symmetry operations and determination of point groups.	Group Theory and Its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Google Meet
IV	Matrices - matrix representations of symmetry operations,	Group Theory and its Applications to Chemistry by K. V. Raman	Google Meet

	reducible and irreducible representations.	Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	
V	Orthogonality theorem and its consequences, properties of irreducible representations, labelling of irreducible representations.	Group Theory and its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Chalk and talk method
VI	Crystallographic symmetry - the 32 crystallographic point groups - space groups - screw axis - glide planes - comparison of crystallographic symmetry with molecular symmetry.	Group Theory and its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Chalk and talk method
VII	Construction of character table for C_{2V} and C_{3V} point groups - explanation for the complete character table for C_{2V} and C_{3V} point groups.	Group Theory and its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Chalk and talk method

		Group theory and its application by A. Salahuddin Kunju and G. Krishnan	
VIII	Selection rules for vibrational IR and Raman spectra. Mutual exclusion rule for molecules with centre of symmetry.	Group Theory and its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan	Chalk and talk method
IX	Applications to molecular vibrations (IR and Raman) for determining symmetry of normal modes of vibration in nonlinear molecules H_2O, CH_4, BF_3 and NH_3 using group theory	Group Theory and its Applications to Chemistry by K. V. Raman Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan Group theory and its application by A. Salahuddin Kunju and G. Krishnan	Chalk and talk method
X	Hybrid orbitals in nonlinear molecules CH_4, XeF_4, BF_3, SF_6, NH_3. Application of group	Group Theory and its Applications to Chemistry by K. V. Raman	Chalk and talk method

	theory to electronic spectra of ethylene and formaldehyde.	Group Theory in Chemistry by M. S. Gopinathan and V. Ramakrishnan Group theory and its application by A. Salahuddin Kunju and G. Krishnan	
XI	Approximation methods - variation methods - trial wave function - application of variation method to hydrogen and helium atoms.	Quantum Chemistry by R. K. Prasad Quantum Chemistry by D. A. Mcquarrie Quantum Chemistry by A. K. Chandra	Chalk and talk method
XII	Perturbation method and its application to particle in one dimensional box.	Quantum Chemistry by R. K. Prasad Quantum Chemistry by D. A. Mcquarrie Quantum Chemistry by A. K. Chandra	Chalk and talk method
XIII	Born Oppenheimer approximation - treatment of molecules - application to helium atom. Hydrogen molecule -	Quantum Chemistry by R. K. Prasad Quantum Chemistry by	Chalk and talk method

	Heiter-London theory or valence bond treatment - energy level diagram.	D. A. Mcquarrie Quantum Chemistry by A. K. Chandra	
XIV	Linear Combination of Atomic Orbitals (LCAO) - molecular orbital theory for hydrogen molecule ion and hydrogen molecule.	Quantum Chemistry by R. K. Prasad Quantum Chemistry by D. A. Mcquarrie Quantum Chemistry by A. K. Chandra	Chalk and talk method
XV	Huckel's theory for conjugated molecules - ethylene, butadiene and benzene - semi empirical methods - Slater orbital and Hartree Fock–Self Consistent Field (HFSCF) methods.	Quantum Chemistry by R. K. Prasad Quantum Chemistry by D. A. Mcquarrie Quantum Chemistry by A. K. Chandra	Chalk and talk method

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Lesson Plan for the year 2020 – 2021

ODD SEMESTER

UACHA20 - Allied chemistry I

Week	Portions to be covered	Reference	Platform (LMS)
1	Chemical kinetics - rate of reaction, rate law, factors affecting rate of the reaction	Principles of Physical Chemistry B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
2	Molecularity and Order of the reaction, difference between order and molecularity	Principles of Physical Chemistry B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
3	Methods of determining the order of a reaction, Collision theory for a bimolecular reaction	Textbook of Allied Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom
4	Derivation of rate constant of a first order reaction and half life period, Arrhenius theory- effect of temperature on reaction rate	Principles of Physical Chemistry B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
5	Introduction to qualitative and quantitative analysis, Principles of volumetric analysis	Principles of Inorganic Chemistry B.R Puri, L. R Sharma, and Kalia K. C	Google Classroom
6	Separation and purification techniques	Textbook of Allied	

	– extraction, distillation and crystallization	Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom
7	Chromatography- column chromatography - principle, packing of columns, method of separation, identification of compounds and applications.	Fundamentals of analytical chemistry Skoog, Douglas A. West, Donald M	Google Classroom
8	Paper chromatography – principle, procedure, R_f value and applications	Textbook of Allied Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom
9	Thin layer chromatography - principle, procedure, R_f value and applications	Textbook of Allied Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom
10	Cements, setting of cements	Industrial chemistry Jain and Jain	Google Classroom
11	Explosives - TNT	Textbook of Allied Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom
12	Nitroglycerine and Dynamite	Textbook of Allied Chemistry V.Veeraiyan and A.N.S. Vasudevan	Google Classroom

Lesson Plan for the year 2020 – 2021

ODD SEMESTER

PCCHC20 – KINETICS AND PHOTOCHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
1	Catalysis- Homogeneous catalysis - Acid-Base catalysis – types of acid-base catalysis specific and general acid-base catalysis. Mechanisms and kinetics of acid-base catalysed reactions- protolytic and prototropic mechanism – Bronsted catalysis law	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
2	Enzyme catalysis – types of enzyme catalysis, rate of enzymes catalysed reaction by Michaelis-Menton mechanism – study of effect of substrate concentration, pH and temperature on enzyme catalysed reactions – inhibition in enzyme catalysed reactions.	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
3	Heterogeneous catalysis - surface reactions, types - physisorption and chemisorption, difference between physisorption and chemisorption, Lennard-Jones plots, Adsorption isotherms- Langmuir and BET isotherms – Postulates and derivations.	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
4	Kinetics of surface reactions – unimolecular and bimolecular reactions, catalysis by semiconductor oxides (n-type and p-type). Mechanism of heterogeneous catalytic reactions, Langmuir and Rideal-Eley mechanism-adsorption co-efficient and its significance.	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
5	Complex reactions- definition with examples, kinetics of reversible, consecutive and parallel reaction, Fast reactions - relaxation methods - pressure and temperature jump methods	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT

6	Chain reactions - types of chain reaction (Stationary and non-stationary, General treatment of chain reactions – chain length – explosion limits.	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
7	Rice Herzfeld mechanism – order of reactions of unity, one-half and three-halves for photolysis of acetaldehyde, Stopped flow and flash photolysis methods.	Chemical kinetics by Laidler Chemical kinetics by Rajaram Kuriocose	Google meet Online PPT
8	Photochemistry - Introduction, Absorption and emission of radiation – intensity distribution in the electronic, vibrational species - Franck Condon Principle, Jablonski diagram- radiative and non-radiative processes- fluorescence and phosphorescence	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
9	E-type and P- type delayed fluorescence - spin forbidden radiative transition - internal conversion and intersystem crossing, E-type and P- type delayed fluorescence - spin forbidden radiative transition - internal conversion and intersystem crossing	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
10	Decay of electronically excited states, Dissociation and predissociation of diatomic molecules - energy transfer process. Photophysical processes - kinetics of unimolecular and bimolecular photophysical processes- kinetic treatment of excimer and exciplex formation.	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
11	Quenching - static and dynamic quenching- Stern-Volmer equation, Photochemical reactions - Photo assisted mechanism, hydrogen and halogen reactions	Fundamentals of photochemistry by Mukherjee	Google meet Online

		Photochemistry by Singh Photochemistry by Gurdeep Raj	PPT
12	Kinetics of photochemical reaction, photoredox, photosubstitution, photoisomerization and photosensitized reactions.	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
13	Photovoltaic and photogalvanic cells, photo assisted electrolysis of water, application of solar energy conversion, G value - radiolysis of water – hydrated electron, Ion pair yield.	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
14	Radiation chemistry – Interaction of high-energy radiation with matter -primary and secondary processes**.**	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT
15	Photocatalysis – applications of TiO_2 photocatalyst for oxidation of organic pollutants – photochemical reaction of vision.	Fundamentals of photochemistry by Mukherjee Photochemistry by Singh Photochemistry by Gurdeep Raj	Google meet Online PPT

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Lesson Plan for the year 2020 – 2021

ODD SEMESTER

PCCHL19 - ELECTROCHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
1	Fuel cells - efficiency, Types of fuel cells	Electrochemistry by Bockris and Reddy	Google meet Online PPT
2	Alkaline fuel cell, phosphoric acid fuel cell	Electrochemistry by Bockris and Reddy	Google meet Online PPT
3	High temperature and solid polymer electrolyte fuel cell	Electrochemistry by Bockris and Reddy	Google meet Online PPT
4	Kinetics of fuel cell	Electrochemistry by Bockris and Reddy	Google meet Online PPT
5	general development of fuel cell technology	Electrochemistry by Bockris and Reddy	Google meet Online PPT
6	Electrochemical sensors- ion selective electrodes	Electrochemistry by D.R. Crow	Google meet Online PPT
7	Problems with ion selective electrode	Electrochemistry by D.R. Crow	Google meet Online PPT
8	Chemically modified electrodes – gas sensing electrodes	Electrochemistry by D.R. Crow	Google meet Online PPT
9	Principle and working of Enzyme electrodes	Electrochemistry by D.R. Crow	Google meet Online PPT
10	Sensors based on modified metal oxide field effect transistors (MOSFET)	Electrochemistry by D.R. Crow	Google meet Online PPT
11	The wall jet ring disc electrodes (WJRDE).	Electrochemistry by	Google meet

		D.R. Crow	Online PPT
12	Debye Huckel Limiting law - derivation	Physical chemistry by Puri and Sharma	Google meet Online PPT
13	Quantitative verification of Debye Huckel limiting law	Physical chemistry by Puri and Sharma	Google meet Online PPT
14	Qualitative verification of Debye Huckel limiting law	Physical chemistry by Puri and Sharma	Google meet Online PPT
15	Debye Huckel limiting law at appreciable concentration	Physical chemistry by Puri and Sharma	Google meet Online PPT

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EVEN SEMESTER

UACHB20- ALLIED CHEMISTRY

Week / Date	No of Hours	Units	Topics	Teaching Methodology & Student Centric Methods *	Learning Resources *
I week	2	III	Ionic equilibria, strong and weak electrolytes, common ion effect,	Participative Learning	Allied chemistry by Gopalan and sundaram.
II Week	2	III	Definition of pH, buffer solution.		Electrochemistry by M.S.Yadav.
III Week	2	III	Electrochemical cells- construction		
IV Week	2	III	Definition of emf, standard electrode potential,		Electrochemistry by Samuel
V Week	2	III	Types of cells- primary and secondary, standard hydrogen electrode, calomel electrode.		Electrochemistry by M.S.Yadav.
VI Week	2	III	Electrophoresis, electrodialysis, and electro-osmosis.	Participative Learning	Electrochemistry by M.S.Yadav.
VII Week	2	IV	Photochemistry – laws of light absorption – Lamberts law and Lambert-Beer's Law.		Allied chemistry by Gopalan and sundaram.
VIII	2	IV	Grotthus – Draper law and Stark – Einstein law.		Photochemistry by Mukherjee.
IX Week	2	IV	Quantum yield – examples of photochemical reaction – kinetics of hydrogen – halogen reaction.		

X Week	2	IV	Jablonski diagram – fluorescence, phosphorescence, photosensitization, and chemiluminescence.		Allied chemistry by Gopalan and sundaram.
XI Week	2	V	Causes and treatment of Cancer, AIDS.		General reference from net.
XII Week	2	V	Causes and treatment of Diabetes.		

PNHRA 19 - HUMAN RIGHTS

week / Date	No of Hours	Units	Topics	Teaching Methodology & Student Centric	Learning Resources *

				Methods *	
I – V	5	2	Indian Constitution, Federalism characteristics, Directive principles, Constitutional remedies	Participative learning	College book and reference from net
VI – X	5	4	Universal declaration of Human Rights, Organs of UDHR		College book and reference from net
XI-XIV	4	5	Human trafficking, problems of children POCSO act, National children policy		College book and reference from net

PCCHO19 - THERMODYNAMICS

Week / Date	**No of Hours**	**Units**	**Topics**	**Teaching Methodology & Student Centric Methods** *	**Learning Resources** *
I Week	4	I	Partial molar properties - Partial molar free energy (Chemical potential) - Partial molar volume and Partial molar heat content-their significance.	Participative Learning	Thermodynamics by Rajaram Kuriocose.
II Week	4		Variation of chemical potential with temperature and pressure, Duhem Margules equation - Determination of partial molar properties by general method, method of intercept.		Thermodynamics for students Samuel Glasstone.
III Week	4		Determination of partial molar properties by Direct		Physical Chemistry by Puri and Sharma.

IV Week	4		method, Apparent molar properties. Definition of fugacity-Variation of fugacity with temperature and pressure. Concept of activity and activity co-efficient. Determination of standard free energies - Choice of standard states -determination of activity and activity co-efficient of non-electrolytes.		Physical Chemistry by Puri and Sharma.
V Week VI Week VII Week	2 4 4	III	Factorization of molecular partition function, Mixture of gases. Evaluation of the independent molecular partition function-Translational, Rotational, Vibrational, Electronic and Nuclear partition function Law of equi partition of energies.Heat capacity of solids - Einstein model and Debye model.	Participative Learning Problem Based Learning (PBL)	Thermodynamics by Rajaram Curiocose. Thermodynamics for students by Samuel Glasstone. Physical Chemistry by Puri and Sharma
VIII Week	4	IV	Nuclear spin statistics – ortho - para nuclear states - ortho para hydrogen Nuclear spin statistics of Deuterium, Application of statistical thermodynamics Electron gas in metals, Black		Thermodynamics by Rajaram Curiocose. Thermodynamics for students by Samuel Glasstone. Physical Chemistry

IX Week X Week	4		body radiation - Planck's distribution law, Stefan-Boltzmann law, Wein's law Uses of spectroscopic and structural data to calculate thermodynamic functions	Participative Learning Problem Based Learning (PBL)	by Puri and Sharma
XI Week XII Week XIII Week XIV Week	4 4 4 4	V	Non equilibrium thermodynamics: Postulates of non equilibrium thermodynamics - conservation of mass and energy - entropy production entropy Production in chemical reactions - entropy flow in open systems. Transformation properties of rates and affinities - linear laws relative to fluxes and forces. Curie's theorem, Onsagar's reciprocity relation, Relaxation phenomenon.		Thermodynamics by Rajaram Curiocose. Thermodynamics for students by Samuel Glasstone. Physical Chemistry by Puri and Sharma Thermodynamics by Rajaram Curiocose.

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ODD SEMESTER

SKILL-BASED ELECTIVE

II B.Sc. CHEMISTRY

USCHB319 - MEDICINAL CHEMISTRY

Week	Unit	Portions to be covered	Reference	Teaching Methodology
1	I	First Aid - important rules of first aid, first aid box, cuts and abrasion.	A Textbook of Pharmaceutical Chemistry Dr. Jayashree Ghosh	Chalk and board
2	I	Bruises, bleeding, fractures, burns and poisonous bites.	A Textbook of Pharmaceutical Chemistry Dr. Jayashree Ghosh	Chalk and board

3	I	Detection of hallucinogens, poisons and antidotes for poisoning.	A Textbook of Pharmaceutical Chemistry Dr. Jayashree Ghosh	Chalk and board
4	II	Common Medicines - analgesics, antipyretics and anti-inflammatory agents.	Fundamental Concepts of Applied Chemistry Dr. Jayashree Ghosh	Chalk and board
5	II	Antiseptics, antibiotics and antidepressants.	Fundamental Concepts of Applied Chemistry Dr. Jayashree Ghosh	Chalk and board
6	II	Disinfectants, sedatives, anesthetics – definition, examples, uses and side effects.	Fundamental Concepts of Applied Chemistry Dr. Jayashree Ghosh	Chalk and board
7	III	Indian medicinal plants - medicinal properties of neem, keezhanelli, sembaruthy, thulsi and thoothuvalai.	Indian Medicinal plants An Illustrated Dictionary C. P. Khare	Chalk and board

8	III	Nithya kalyani, rose, turmeric, garlic, senavu, nerunji and curry leaves	Indian Medicinal plants An Illustrated Dictionary C. P. Khare	Chalk and board
9	III	Perandai, thipili, vallarai, karunjeeragam and flax seeds.	Indian Medicinal plants An Illustrated Dictionary C. P. Khare	Chalk and board
10	IV	Medicaments in formulations - aerosol inhalations, capsules, creams and emulsions.	Practical Pharmaceutical Chemistry A.H.Beckett and J.B.Stenlake	Chalk and board
11	IV	Eye drops, injections, ointments and suppositories.	Practical Pharmaceutical Chemistry A.H.Beckett and J.B.Stenlake	Chalk and board
12	IV	Tablets, tonic, syrup and hydrogels – definition, examples and uses.	Practical Pharmaceutical Chemistry A.H.Beckett and J.B.Stenlake	Chalk and board
13	V	Medical applications of polymers – biomaterials - definition and characteristics, ceramic	Biomaterials Sujatha V. Bhat	Chalk and board

		implants and metallic implants.		
14	V	Biomedical applications of polyurethane, polydimethylsiloxane, polyalkylsulphone and polymethylmethacrylate.	Biomaterials Sujatha V. Bhat	Chalk and board
15	V	Acrylic hydro gels, poly vinyl chloride, polypropylene, polyethylene and polylactic acid.	Biomaterials Sujatha V. Bhat	Chalk and board

PCCHB20 – STRUCTURAL INORGANIC CHEMISTRY

Week	**Unit**	**Portions to be covered**	**Reference**	**Teaching Methodology**
1	I	Acids and bases, proton transfer equilibria in water – solvent leveling effects, aqua acids, periodic trends in aqua acids – simple oxo acids – anhydrous oxides – polyoxo compound formation.	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board
2	I	Lewis acid - base concepts, Hard and soft acids and bases - group	Inorganic Chemistry	Chalk and board

		characteristics of Lewis acids, Lux - Flood theory of acids and bases and Usanovich acids and bases.	D.F.Shrivers, P.W.Atkins and C.H. Langford	
3	I	Super acids and superbases, nonaqueous solvents, classification, protic and aprotic solvents, heterogeneous acids and bases - symbiosis and proton sponges.	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board
4	II	Structure of complex solids -layered structures, conducting ionic solids, graphite - solids held together by covalent bonding, Diamond – Madelung constants, Imperfections in crystals – stoichiometric defects - Schottky, controlled valency, F-center and Frenkel defect.	Inorganic Chemistry, Principles, Structure and Reactivity J.E. Huheey	Chalk and board
5	II	Non-stoichiometric defects - metal excess defect, metal deficient defect, impurity defect.	Inorganic Chemistry, Principles,	Chalk and board

		Band theory of solids, Intrinsic and extrinsic semiconductors, piezoelectric and pyroelectric crystals, Superconductivity – Meissner effect, critical temperature and Critical magnetic Field.	Structure and Reactivity J.E. Huheey	
6	II	BCS theory, Type I and Type II superconductor, ternary Oxides, structure of 123 oxides (YBa-Cu-O) and applications of high temperature superconducting materials.	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board
7	III	Structure of simple solids, unit cell and crystal structures, close packing of spheres and holes in closed packed structures.	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board

8	III	Structure of metals and alloys, non closed packed structures, atomic radii of metals, polytypism, polymorphism of metals.	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board
9	III	Alloys - substitutional solid solutions, interstitial solid solutions of non metals , intermetallic compounds, characteristic and structure of ionic solids, binary phases (AX and AX_2), ternary phases (ABO_3 and AB_2O_4).	Inorganic Chemistry D.F.Shrivers, P.W.Atkins and C.H. Langford	Chalk and board
10	IV	Structure and bonding I - polyacids - isopolyacids and heteropolyacids of molybdenum and tungsten, Dawson and Keggins structure of poly acids, heteropolyanions and heteropoly blues.	Advanced Inorganic Chemistry F.A. Cotton and G. Wilkinson	Chalk and board

11	IV	Inorganic polymers - Silicates, structures, properties, correlation and applications, molecular sieves, feldspar, zeolites and ultramarines and its application.	Inorganic Chemistry, Principles, Structure and Reactivity J.E. Huheey	Chalk and board
12	IV	Polysulphur – nitrogen compounds, structure and bonding in tetrasulphur tetranitride, polythiazyl and S_xS_y compounds, and polyorgano phosphazenes.	Inorganic Chemistry, Principles, Structure and Reactivity J.E. Huheey	Chalk and board
13	V	Structure and Bonding II - boron hydrides, introduction, classification of boranes, diborane, tetra borane, pentaborane, hexaborane and decaborane, polyhedral boranes - Wade's rule - closo, nido and arachno structures and hydroboration.	Advanced Inorganic Chemistry F.A. Cotton and G. Wilkinson	Chalk and board

14	V	Carboranes - closo, nido and arachno structures of carboranes, metallocarboranes closo, nido and arachno, structures of carboranes.	Advanced Inorganic Chemistry F.A. Cotton and G. Wilkinson	Chalk and board
15	V	Structure and bonding of boronitrides and metal clusters- chemistry of low molecularity metal clusters (upto trinuclear metal clusters).	Advanced Inorganic Chemistry F.A. Cotton and G. Wilkinson	Chalk and board

EVEN SEMESTER

PCCHD20 – ORGANIC REACTIONS AND MECHANISMS

Week	Portions to be covered	Reference	Teaching Methodology
1	Unit I Oxidation by quinones, selenium dioxide, osmium tetroxide,	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board
2	Unit I Oxidation by lead tetraacetate, formation of C-C bond in phenol coupling, acetylenic coupling.	Reactions, Rearrangements and Reagents By S. N. Sanyal	Chalk and Board
3	Unit I Oxidation by chromic acid (Jones reagent), chromium trioxide – pyridine (Sarett's reagent), DMSO-DCC (Pfitzer-Moffatt reagent).	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board
4	Unit I Oppenauer oxidation, Dakin reaction and Swern oxidation.	Reactions, Rearrangements and Reagents By S. N. Sanyal	Chalk and Board
5	Unit III Wagner-Meerwein, Demjanov, Dienone – Phenol earrangement.	Advanced Organic Chemistry Reactions, Mechanisms and Structure By Jerry March	PPT

6	Unit III Favorski, Baeyer-Villiger, Wolf, rearrangements.	Reactions, Rearrangements and Reagents By S. N. Sanyal	PPT
7	Unit III Curtius, Lossen and Von-Richter rearrangements.	Reactions, Rearrangements and Reagents By S. N. Sanyal	PPT
8	Unit III Schmidt rearrangement. Nitrenes – Singlet and triplet nitrenes. Methods of generating nitrenes and their reactions.	Advanced Organic Chemistry Reactions, Mechanisms and Structure By Jerry March	Chalk and Board
9	Unit IV Reaction mechanisms and applications of Michael addition, Skraup and Ullmann reactions.	Reactions, Rearrangements and Reagents By S. N. Sanyal	Chalk and Board
10	Unit IV Reaction mechanisms and applications of Hunsdicker, Nef and HVZ.	Reactions, Rearrangements and Reagents By S. N. Sanyal	Chalk and Board
11	Unit V Photochemical excitation - fate of the excited molecules - study of photo chemical reaction of ketone. Norrish type I and Norrish type II reaction.	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board

12	Unit V Photocyclo addition – Paterno - Buchi reduction - photo cycloaddition of α-β unsaturated ketones- di-pi methane rearrangement.	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board
13	Unit V Pericyclic reactions - classification, orbital symmetry - Woodward Hoffmann rules. Analysis of electrocyclic reaction -Types - 4n and 4n + 2 systems	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board
14	Unit V Cyclo addition – Types – [2+2] and [4+2] cycloaddition reactions. Sigmatropic reactions- 1, n Hydrogen shift, Cope rearrangement and Claisen rearrangement.	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board
15	Unit V Correlation diagrams for butadiene - cyclobutene system.	Reaction Mechanism in Organic Chemistry By S. M. Mukherji S. P. Singh	Chalk and Board

USCHD616 – SBE: FOOD CHEMISTRY

Week	Unit	Portions to be covered	Reference	Teaching methodology
1	I	Food and food adulteration, food types, advantages and disadvantages.	Food Science By B.Srilakshmi	Chalk and board
2	I	Food adulteration- adulteration in food grains, milk, butter, ghee, ice creams and cakes, pepper, turmeric,	Food Science By B.Srilakshmi	Chalk and board
3	I	Food adulteration in chilli powder, edible oils, coffee and tea powder, fruits and vegetables. Detection of adulterants by simple analytical techniques.	Food Science By B.Srilakshmi	Chalk and board
4	II	Food additives - definition, structure , advantages and disadvantages of artificial sweeteners -saccharin, cyclamate and aspartate	Food Chemistry By Lillian Hoagland Meyer	PPT

5	II	Food flavours-esters, aldehydes and heterocyclic compounds Food colours, emulsifying agents, preservatives and leavening agents- baking powder, baking soda and yeast	Food Chemistry By Lillian Hoagland Meyer	PPT
6	II	Antioxidants- propyl gallate, butylated hydroxyl anisole and butylated hydroxyl toluene.	Food Chemistry By Lillian Hoagland Meyer	Chalk and board
7	III	Food poison and beverages - food poisons- pesticides and chemical poisons.	Food Chemistry By Seema Yadav	Chalk and board
8	III	First aid for poison consumed victims. Beverages - soft drinks- soda, carbonated drinks, fruit juices,	Food Chemistry By Seema Yadav	Chalk and board
9	III	Alcoholic beverages- examples and composition. Addiction to alcohol- diseases of liver. Deaddiction measures.	Food Science By B.Srilakshmi	Chalk and board
10	IV	Edible oils - fats, oils, sources of oils, saturated and unsaturated fats, importance of MUFA and PUFA,	Food Science By B.Srilakshmi	Chalk and board

11	IV	Iodine value, RM value, harmful effects of trans fat, saponification values and their significance.	Food Science By B.Srilakshmi	Chalk and board
12	IV	Rancidity- types, hydrolytic and oxidative, test for rancidity, prevention of rancidity.	Food Science By B.Srilakshmi	Chalk and board
13	V	Vegetables and Fruits - classification, composition, nutritive value of green leafy vegetables, roots and tubers, other vegetables.	Food Science By B.Srilakshmi	Chalk and board
14	V	Pigments- water insoluble and water soluble pigments. Vegetable cookery- preparation, changes during cooking, loss of nutrients during cooking.	Food Science By B.Srilakshmi	Chalk and board
15	V	Fruits- classification, composition, ripening of fruits, chemical fruit ripening, storage of fruits	Food Science By B.Srilakshmi	Chalk and board

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PCCHQ19 – Practical – V: Inorganic Chemistry -II

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**Estimation** Estimation of Copper and Nickel.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 2	Estimation of Copper and Zinc.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 3	Estimation of Iron and Nickel.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 4	Estimation of Iron and Magnesium.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 5	Estimation of Iron and Zinc.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 6	**Preparation** Hexaamminenickel(II) chloride. & Bis(acetylacetonato)copper(II) complex.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom

Week 7	Hexaamminecobalt(III) chloride. & Pentamminechlorocobalt(III) chloride.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 8	Tris(thiourea)copper(I) sulphate. & Potassium tetrachlorocuprate(II).	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 9	Potassium tris(oxalato)aluminate(III) trihydrate.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 10	**Analysis of Alloys** Determination of percentage of Copper and Zinc in Brass.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 11	Determination of percentage of Chromium and Nickel in Stainless Steel.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 12	**Analysis of Ores** Determination of percentage of Calcium and Magnesium in Dolomite.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 13	Determination of percentage of MnO_2 in pyrolusite.	1. G. Svehla, B.Sivasankar, Vogel's Qualitative Inorganic Analysis - Pearson Publication, 7th Edition, 2012. 2. PG Lab Manual, Department of Chemistry, Auxilium College.	(Online) Google meet (Offline) Google classroom
Week 14	Interpretation of spectra for 5 inorganic compounds.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018.	(Online) Google meet

		2. R.M. Silverstein, G.D. Bassler and Monsu - Spectrometric Identification of Organic Compounds - John Wiley and Sons, New York, 6th Edition, 2005.	(Offline) Google classroom
Week 15	Interpretation of spectra for 5 inorganic compounds.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. R.M. Silverstein, G.D. Bassler and Monsu - Spectrometric Identification of Organic Compounds - John Wiley and Sons, New York, 6th Edition, 2005.	(Online) Google meet (Offline) Google classroom

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Lesson Plan for the year 2020 – 2021

PCCHK19- MOLECULAR SPECTROSCOPY

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	Ultra violet spectroscopy - Woodward-Fieser rules for conjugated dienes, polyenes and alpha, beta unsaturated carbonyl compound. The effect of steric hindrance to coplanarity – charge transfer spectral absorption.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. Y.R.Sharma, Elementary Organic Spectroscopy Principles and Chemical Applications, S.Chand & Company Pvt.Ltd. 2013.	Google Classroom
Week 2	Transitions in transition metal complexes – selection rules for electronic transitions – band widths – nature of electronic transitions in complexes. Auxochrome – types – chromophore concept – types.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. Y.R.Sharma, Elementary Organic Spectroscopy Principles and Chemical Applications, S.Chand & Company Pvt.Ltd. 2013.	Google Classroom
Week 3	Applications of UV Spectroscopy.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018.	Google Classroom
Week 4	Applications of IR spectroscopy to identify alkane, alkene, alkyne, aromatic compounds, nitrile and aromatic residues. Identification of alcohols, ethers, phenols, amines and carbonyl compounds such as ketones, aldehydes, esters, amides, acids, hetero aromatic compounds, halogen compounds, sulphur compounds, thiocyanates and isothiocynates, amino	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. Y.R.Sharma, Elementary Organic Spectroscopy Principles and Chemical Applications, S.Chand & Company Pvt.Ltd. 2013.	Google Classroom

	acids and amines.		
Week 5	Metal-ligand stretching vibrations for metal carbonyls, sulphates, thiocyanides, nitro and nitrito complexes.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018.	Google Classroom
Week 6	Applications of IR Spectroscopy – quantitative analysis, qualitative analysis, coordination compounds, hydrogen bonding studies, calculation of force constants and determination of aromaticity.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018.	Google Classroom
Week 7	Mass spectroscopy –Ionization techniques such as Chemical ionization, Electron ionization, (ESI, FD, FAB, SIMS, MALDI).	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2.Donald L. Pavia, Gary M. Lampman, George S. Kriz, James R. Vyvyan, Introduction to Spectroscopy, Brooks/Cole, Cengage Learning,2009.	Google Classroom
Week 8	Molecular ions, isotope ions, meta stable peak, secondary ion mass spectroscopy. Nitrogen rule and ring rule, fragment ions of odd and even electron types.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2.Donald L. Pavia, Gary M. Lampman, George S. Kriz, James R. Vyvyan, Introduction to Spectroscopy, Brooks/Cole, Cengage Learning,2009.	Google Classroom
Week 9	Rearrangement ions - cleavage patterns – simple and multi center fragmentation.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2.Donald L. Pavia, Gary M. Lampman, George S. Kriz, James R. Vyvyan, Introduction to Spectroscopy, Brooks/Cole, Cengage Learning,2009.	Google Classroom
Week 10	Applications of mass spectra to elucidate molecular formula and structure.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. L.D.S.Yadav, Organic Spectroscopy,	Google Classroom

		Kluwer Academic Publishers, 2005.	
Week 11	McLafferty rearrangement- Interpretation of fragmentation pattern of phenols, aldehydes, lactones, nitro compounds, esters, acetals and ketals, hetero aromatic compounds and sulphides.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. L.D.S.Yadav, Organic Spectroscopy, Kluwer Academic Publishers, 2005.	Google Classroom
Week 12	Introduction to GC-MS- and its advantages over MS.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018.	Google Classroom
Week 13	NMR spectroscopy – introduction – nuclear spin – Larmor frequency, precesssional frequency– relaxation process – chemical shift – shielding constants – ring current and aromaticity – shifts for ^{1}H and ^{13}C.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. R.M. Silverstein, G.D. Bassler and Monsu - Spectrometric Identification of Organic Compounds - John Wiley and Sons, New York, 6th Edition, 2005.	Google Classroom
Week 14	Spin-spin interaction – nuclear magnetic double resonance – nuclear overhauser effect (NOE)	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. R.M. Silverstein, G.D. Bassler and Monsu - Spectrometric Identification of Organic Compounds - John Wiley and Sons, New York, 6th Edition, 2005.	Google Classroom
Week 15	Applications of ^{1}H NMR, ^{13}C NMR, ^{31}P NMR (HPF_2, H_3PO_2, H_3PO_3, H_3PO_4 and P_4S_3), ^{19}F NMR (ClF_3, ClF_5, SF_4 and BrF_5) and their applications to inorganic systems.	1. Dr.H.Kaur – Spectroscopy - Pragati prakashan, Meerut, 14th Edition 2018. 2. R.M. Silverstein, G.D. Bassler and Monsu - Spectrometric Identification of Organic Compounds - John Wiley and Sons, New York, 6th Edition, 2005.	Google Classroom

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Lesson Plan for the year 2020 – 2021

SKILL BASED ELECTIVE

(For B.Sc. Chemistry)

USCHC520 – SMALL SCALE CHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT-1:** Objectives and characteristics of small-scale industries – types of SSI, role of SSI in Indian economy.	Dr. V. Balu, Entrepreneurship and Small Business Promotion, First Edition, Sri Venkateswara Publications, 2004.	Google Classroom
Week 2	Problems of SSI, steps in starting SSI, laws for SSI, finance management.	Dr. V. Balu, Entrepreneurship and Small Business Promotion, First Edition, Sri Venkateswara Publications, 2004.	Google Classroom
Week 3	Quality control – definition and advantages. Marketing and branding. Advertising - definition, objectives, advertising media.	Dr. V. Balu, Entrepreneurship and Small Business Promotion, First Edition, Sri Venkateswara Publications, 2004.	Google Classroom
Week 4	**UNIT-2:** Soaps- definition, fatty and non- fatty raw materials, types of soaps, manufacture of laundry soap and bathing soap.	H.Panda, Herbal soaps detergents Hand Book, National institute of industrial research, 2011.	Google Classroom
Week 5	Mechanism of cleansing action of soap. Composition, preparation and advantages of herbal soaps.	H.Panda, Herbal soaps detergents Hand Book, National institute of industrial research, 2011.	Google Classroom
Week 6	Detergents – classification of surfactive agents (LABSA), manufacture of detergents. Shampoo – composition and manufacture of egg and herbal shampoo, anti dandruff and conditioners.	H.Panda, Herbal soaps detergents Hand Book, National institute of industrial research, 2011.	Google Classroom
Week 7	**UNIT-3:** Cosmetics – definition, history, kinds of cosmetics.	A Hand book of cosmetics by B.M.Mithal & R.N.Sharma Poucher's perfumes, Cometics and Soaps 10th edition.	Google Classroom
Week 8	Preparation of face powder, face	A Hand book of cosmetics by	Google Classroom

	cream and lipstick.	B.M.Mithal & R.N.Sharma Poucher's perfumes, Cometics and Soaps 10th edition.	
Week 9	Perfumes – definition, essential ingredients in perfumes. Classification of essential oils – preparation of perfumes.	A Hand book of cosmetics by B.M.Mithal & R.N.Sharma Poucher's perfumes, Cometics and Soaps 10th edition.	Google Classroom
Week 10	**UNIT-4:** Camphor – production, biosynthesis and applications. Bleaching powder – preparation, properties and uses. Biogas-composition, production and uses.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom
Week 11	Handmade paper from bagasse-composition of bagasse and uses. Asofoetida – composition, cultivation, manufactures and uses.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom
Week 12	Composition and manufacture of safety matches and agarbattis.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom
Week 13	**UNIT-5:** Recycling of synthetic organic polymers – applications of PET, PVC, HDPE, and polystyrene.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom
Week 14	Reverse osmosis of water – production and applications. Coconut oil – manufacture by dry and wet processes and uses.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom
Week 15	Vulcanization of rubber, making an eraser. Pencils – forms of graphite, adhesion and lengthwise graphitization method and uses.	B.K.Sharma, Industrial Chemistry, Goel Publishing House, 2008.	Google Classroom

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Lesson Plan for the year 2020 – 2021

UGCHA520 - FOOD AND NUTRITION CHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT-1:** Nutrition and Health - concept, classification of foods. Nutrients - macro and micro nutrients.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 2	Carbohydrates - sources, classification, functions, deficiency diseases, energy requirements, blood sugar level.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 3	Carbohydrates metabolism - Glycolysis, Glyconeogenesis, Glycogenolysis.	AmbigaShanmugam, Fundamentals of Biochemistry for Medical Students, 8th Edition, 2016.	Google Classroom
Week 4	**UNIT-2:** Proteins-sources, classification, functions.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 5	Proteins - deficiency diseases, energy requirements and metabolism.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 6	Fats - Sources, classification, functions, deficiency diseases, energy requirements and metabolism.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 7	**UNIT-3:** Vitamins– classification, difference between fat soluble and water soluble vitamins. Fat soluble vitamins (A, D, E and K),	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom

Week 8	Water soluble vitamins (Thiamine, Riboflavin, Niacin Pyridoxine, Pantothenic acid,) sources, functions, deficiency diseases and daily requirements.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 9	Water soluble vitamins (Foliate, Choline, Biotin Cyanocobalamin, Ascorbic acid) sources, functions, deficiency diseases and daily requirements.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 10	**UNIT-4:** Minerals – classification, major elements (Ca, P, Na, K, Fe, Mg, I and F)	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 11	Trace elements (Zn, Cu, Co, Se, Mo) - sources, functions, deficiency diseases and recommended requirements.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 12	Balanced diet - Recommended diet for adult - Indian men and women. Diet in pregnancy and lactation.	Shrinandan Bansal, Food and Nutrition, 2nd Edition, AI.T.B.S Publishers, India, 2010.	Google Classroom
Week 13	**UNIT-5:** Vegetables – Nutritive value of green leafy vegetables, roots and tubers. Vegetable cookery (preliminary preparation, changes during cooking, loss of nutrients during cooking).	B.Srilakshmi, Food Sciences, 5th Edition, New Age International Publishers, 2010.	Google Classroom
Week 14	Fruits – Nutritive value of fruits, pigments, water, cellulose and pectic substances, flavour constituents, polyphenols, bitterness in fruits.	B.Srilakshmi, Food Sciences, 5th Edition, New Age International Publishers, 2010.	Google Classroom
Week 15	Ripening of fruits – chemical ripening. Storage of fruits. Antioxidants - antioxidant properties of vegetables and fruits.	B.Srilakshmi, Food Sciences, 5th Edition, New Age International Publishers, 2010.	Google Classroom

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Lesson Plan for the year 2020 – 2021

UCCHA20 - GENERAL CHEMISTRY – I

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	Periodicity of properties – definition.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 2	Factors affecting and periodicity of atomic radii.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 3	Factors affecting and periodicity of ionic radii.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 4	Factors affecting and periodicity of ionization potential.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 5	Factors affecting and periodicity of electron affinity.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 6	Factors affecting and periodicity of electronegativity.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 7	Determination of electronegativity – Pauling's scale and Mulliken's scale.	R.D.Madan, Modern Inorganic Chemistry, 3rd revised edition, S. Chand & Co, Reprint 2016.	Google Classroom
Week 8	IUPAC system of nomenclature of organic compounds- Introduction- Rules of IUPAC System of Nomenclatuire of organic compounds.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 9	IUPAC System nomenclature for complex organic compounds - alkanes, substituted alkanes, alkyl halides.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 10	IUPAC System nomenclature for complex organic compounds - alkenes, alkynes.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 11	IUPAC System nomenclature for complex organic compounds - alkyl substituents-Cycloalkanes.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand	Google Classroom

		and Co., Ltd, Reprint 2016.	
Week 12	Compounds having functional groups - alcohols, ethers, aldehydes.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 13	Compounds having functional groups - ketones, carboxylic acids, esters, nitro compounds.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 14	Compounds having functional groups - aromatic compounds and substituted aromatic compounds, poly functional and heterocyclic compounds.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom
Week 15	Compounds having functional groups - Bicyclic and Spiro compounds.	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd, Reprint 2016.	Google Classroom

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Programme	M.Sc. Chemistry
Programme Code	P14
Semester	I
Course	Stereochemistry and conformational analysis
Course Code	PCCHA20
Hours	5
Credits	5
Total Hours	75
Max Marks	100
Course Instructor/ Coordinator	Ms. Revathy T

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Unit 1: Chirality and optical activity - symmetry elements, asymmetric and dissymmetric molecule. Projection formula - Sawhorse, Newmann and Fischer projections and its interconversions.	• Advanced Organic Stereochemistry by N.Tewari • Stereochemistry – Conformation and Mechanism by P.S.Kalsi	Google meet
2	Unit 1: Nomenclature - Absolute configuration - R/S and D/L, Relative configurations - threo/erythro and syn/anti. Dissymmetry of allenes, biphenyls - atropisomerism, spiro compounds, transcyclooctene, cyclononene and molecules with helical structures.	• Advanced Organic Stereochemistry byN.Tewari • Stereochemistry – Conformation and Mechanism by P.S.Kalsi	Google meet& Google classroom
3	Unit 1:	• Advanced Organic	Google meet

	Stereo specific and stereo selective reactions - definition and examples. Asymmetric synthesis - Cram's rule. Geometrical isomerism - E/Z nomenclature of olefins, Geometrical and optical isomerism of disubstituted cyclopropane, cyclobutane and cyclopentanes.	Stereochemistry byN.Tewari • Stereochemistry – Conformation and Mechanism by P.S.Kalsi	
4	Unit 2: Conformational analysis of di-substituted cyclohexanes and their stereo chemical features - Geometric and optical isomerism of these derivatives.Conformation and reactivity of cyclohexene - Allylic 1,2 and 1,3 strain and related compound alkyldiene cyclohexane.	• Advanced Organic Stereochemistry by N.Tewari • Stereochemistry – Conformation and Mechanism byP.S.Kalsi • Stereochemistry of Organic CompoundsbyD. Nasipuri	Google meet& Google classroom
5	Unit 2: Conformation of cyclohexanone-2-alkyl and 3-alkyl ketone effect and reactivity of cyclohexanone in comparison with cyclopentanones. Conformations of six membered rings containing hetero atoms.	• Stereochemistry – Conformation and Mechanism by P.S.Kalsi • Stereochemistry of Organic Compoundsby D. Nasipuri • Stereochemistry of Carbon Compoundsby Ernest L. Eliel	Google meet
6	Unit 2: Conformation and stereochemistry of cis and trans decalin and 9-methyl decalin.Quantitative correlation between conformation and reactivity - Curtin-Hammett principle.	• Stereochemistry – Conformation and Mechanism byP.S.Kalsi • Stereochemistry of Organic CompoundsbyD. Nasipuri • Stereochemistry of Carbon Compounds by Ernest L. Eliel	Google meet
7	Unit 3: S_N2 reaction - kinetics, mechanism and factors influencing the reaction. S_N1 reaction - kinetics, mechanism, factors influencing the reactions, Rearrangement reaction.	• Stereochemistry – Conformation and Mechanismby P.S.Kalsi • Stereochemistry of	Google meet& Google classroom

		Carbon Compounds by Ernest L. Eliel	
8	Unit 3: Mixed S_N1 and S_N2 reactions – competition between S_N1 and S_N2 mechanism.Substitution by ambident nucleophiles, substitution at allylic, vinylic, benzylic and aryl halides	• Stereochemistry – Conformation and Mechanism by P.S.Kalsi • Stereochemistry of Organic CompoundsbyD. Nasipuri	Google meet
9	Unit 3: SET (single electron transfer)- Types of electron transfer reactions - photoinduced and chemically induced electron transfer. Neighbouring group participation – introduction of an acyclic open chain system, Π systems of aromatic rings, cyclic system, double bond and σ bond.	• Stereochemistry – Conformation and Mechanism by P.S.Kalsi • Stereochemistry of Organic Compoundsby D. Nasipuri	Google meet& Google classroom
10	Unit 4: E_1, E_2, E_1CB reaction – kinetics, mechanism and evidences.E_1, E_2 and E_1CB variables-mechanistic spectrum, competition between elimination and substitution.	• Stereochemistry – Conformation and Mechanism byP.S.Kalsi • Stereochemistry of Organic Compoundsby D. Nasipuri	Google meet
11	Unit 4: Stereochemistry of E_2 - syn and anti elimination reaction, orientation of the double bond.Regiochemistry of E_1, E_2 and E_1CB reactions with examples.	• Stereochemistry – Conformation and Mechanism by P.S.Kalsi • Stereochemistry of Organic CompoundsbyD. Nasipuri	Google meet
12	Unit 4: Pyrolytic eliminations - acyclic and alicyclic systems, Molecular rearrangements during elimination.Grob's fragmentations - Incorporation of fragmentation - Mechanism of fragmentation - Mechanism allied to E_1 and E_2 elimination.	• Stereochemistry – Conformation and Mechanism by P.S.Kalsi • Stereochemistry of Organic CompoundsbyD. Nasipuri	Google meet& Google classroom
13	Unit 5: Optical Rotatory Dispersion and Circular Dichroism- terminology- optical rotation, circular birefringence, circular dichroism and	• Stereochemistry of Carbon Compounds by Ernest L. Eliel	Google meet& Google classroom

	cotton effect.Plain curves – Application of plain curves – determination of structure, configuration, conformation and optical activity.	• Stereochemistry of Organic CompoundsbyD. Nasipuri	
14	Unit 5: Rotatory dispersion of ketones - structure, configuration, conformation of unsaturated ketones. Emperical and semiempirical rules-The Axial haloketone rule, the Octant rule (Configuration and Conformation)	• Stereochemistry of Carbon Compounds by Ernest L. Eliel • Stereochemistry of Organic CompoundsbyD. Nasipuri	Google meet& Google classroom
15	Unit 5: Absolute configuration and ketal formation.Stereochemical analysis – polarimetry, chiral GC & HPLC and NMR techniques.	• Stereochemistry of Carbon Compounds by Ernest L. Eliel • Stereochemistry of Organic Compoundsby D. Nasipuri	Google meet

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Programme	M.Sc. Chemistry
Programme Code	P14
Semester	III
Course	Molecular Spectroscopy
Course Code	PCCHK19
Hours	1
Credits	3
Total Hours	60
Max Marks	100
Course Instructor/ Coordinator	Ms. Revathy T

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Rotational spectroscopy: Classification of molecules, rigid rotor model, selection rules.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
2	Intensity of spectral lines, effect of isotopic substitution.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Fundamentals of molecular spectroscopy – P.S. Sindhu	Google meet

3	Non rigid rotator and significance of D value.	• Fundamentals of Molecular spectroscopy – C.N. Banwell	Google meet
4	Microwave spectra of polyatomic molecules.	• Fundamentals of Molecular spectroscopy – C.N. Banwell	Google meet
5	Vibrational spectroscopy: Harmonic oscillator, selection rules.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Fundamentals of molecular spectroscopy – P.S. Sindhu	Google meet
6	Vibrational energy of diatomic molecules, zero point energy, force constant and bond strength.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Fundamentals of molecular spectroscopy – P.S. Sindhu	Google meet
7	Anharmonicity, Morse potential energy diagram, Franck Condon principle.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
8	Vibrational spectra of poly atomic molecules.	• Fundamentals of Molecular spectroscopy – C.N. Banwell Molecular structure and spectroscopy – G. Aruldhas	Google meet
9	Vibration-rotation spectroscopy, P, Q, R, branches	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy –	Google meet

		G. Aruldhas	
10	Breakdown of Born-Oppenheimer approximation,	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
11	Vibration of polyatomic molecules, normal modes of vibration, overtones, hot bands, Fermi resonance.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
12	Raman spectroscopy: Classical and quantum theories of Raman effect.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
13	Pure rotational, spectra, selection rules, stokes and anti-stokes lines.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
14	Vibrational Ramanspectra, selection rules, stokes and anti-stokes lines.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet
15	Vibrational-rotational Raman spectra, selection rules, stokes and anti-stokes lines,mutual exclusion principle.	• Fundamentals of Molecular spectroscopy – C.N. Banwell • Molecular structure and spectroscopy – G. Aruldhas	Google meet

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Lesson Plan for the year 2020 – 2021

Programme	B.Sc. Chemistry
Programme Code	U17
Semester	III
Course	General Chemistry III
Course Code	UCCHD19
Hours	3
Credits	5
Total Hours	45
Max Marks	100
Course Instructor/ Coordinator	Ms. Revathy T

Week	Portions to be covered	Reference	Platform (LMS)
1	Unit II: Alkaline earth metals - Be, Mg, Ca, Sr, Ba - occurrence, comparative study of elements and compounds- oxides, halides.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
2	Unit II: Comparative study of elements and compounds-hydroxides, sulphates and carbonates.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
3	Unit II:	• Modern Inorganic	Google meet

	Exceptional properties of Beryllium – Diagonal relationship between Be and Al, extraction of magnesium.	Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	
4	Unit II: p block elements -Boron family- comparative study of elements and compounds- oxides, hydroxides, halides and hydrides.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet & Google classroom
5	Unit II: Preparation, properties, uses and structures of $LiAlH_4$, $NaBH_4$ and Borozole.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
6	Unit II: Preparation, properties, uses and structures of Diborane. Carbon family - comparative study of elements and compounds- hydrides, oxides and halides.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
7	Unit II: Classification of silicates, chemistry of silicones and their applications.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet & Google classroom
8	Unit III: Cycloalkanes – preparation using Wurtz's reaction, Dieckmann's ring closure and reduction of aromatic hydrocarbons, Substitution and ring opening reactions.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet
9	Unit III: Baeyer's strain theory, theory of strainless rings. Carbonyl compounds- preparation from alcohols, alkene, alkyne, acid chloride, Grignard reagent.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic	Google meet & Google classroom

		Chemistry-M.K Jain and S.C Sharma	
10	Unit III: Chemical reactions, relative reactivities of aldehydes and ketones, acidity of α hydrogen.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet
11	Unit III: Nucleophilic addition reactions of carbonyl compounds (bisulphate, HCN, Grignard and alcohol). Carboxylic acid- ionization of carboxylic acids, acidity constants.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet
12	Unit III: Comparison of acid strengths of substituted haloacids, acid strengths of substituted benzoic acids.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet
13	Unit III: Conversion of acids to their derivatives. Dicarboxylic acids- preparation and properties of oxalic and malonic acids.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet & Google classroom
14	Unit III: Dicarboxylic acids- preparation and properties of succinic and glutaric acids.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet & Google classroom
15	Unit III: Dicarboxylic acids- preparation and properties of adipic acids and phthalic acids.	• Advanced Organic Chemistry-B.S Bahl, and Arun Bahl • Modern Organic Chemistry-M.K Jain and S.C Sharma	Google meet

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Programme	M.Sc. Chemistry
Programme Code	P14
Semester	II
Course	Advanced Coordination Chemistry
Course Code	PCCHE20
Hours	4
Credits	4
Total Hours	60
Max Marks	100
Course Instructor/ Coordinator	Ms. T. Revathy

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Unit 1: Thermodynamic and kinetic stability-stepwise and overall stability constant- Relationship between both the constants. Trend in K-value - Irrving-Williams series – classification of metals	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Google meet
2	Unit 1: Detection of complex formation. Factors affecting the stability of complexes	• Essentials of Coordination Chemistry by Vasishtabhatt • Inorganic Chemistry by Purcell and Kotz	Google meet & Google classroom
3	Unit 1: Determination of stability constants by	• Concise Coordination	Google meet

	spectrophotometric, polarographic and potentiometric methods. Optical rotatory dispersion and circular dichroism- application to complexes.	Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	
4	Unit 1: Macrocyclic Ligands: Thermodynamic and kinetic template effect- structure, stability and applications of porphyrins, corrins, Schiff bases, Crown ethers and crypts.	• Coordination Chemistry of Macrocyclic Compounds by Gordon A Melson The chemistry of macrocyclic ligand complexes by Leonard F. Lindoy	Google meet & Google classroom
5	Unit 3: Types of absorption spectra – ligand spectra, counter - ion spectra, CT spectra, ligand field spectra –R-S coupling- Microstates –Hund's rule - Term states for 'd' – ions	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Classroom
6	Unit 3: Selection Rules–Laporte's and spin selection rule, Splitting of terms in oh and td complexes. Correlation diagrams –Orgel diagrams	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Classroom
7	Unit 3: Correlation diagrams - Tanabe-Sugano diagrams- Spectra of different d systems – Racah parameters-nephelauxetic effect. Charge Transfer spectra- Classification-Ligand to Metal, Metal to Ligand, Intervalence and Intra Ligand Charge transfer	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Classroom& Google classroom
8	Unit 3: Magnetic characteristics of transition metal complexes - types- determination of magnetic susceptibility - Guoy and Faraday's method - magnetic criterion of bond type in complex and orbital contribution to magnetic moment.	• Physical Inorganic Chemistry- A Coordination Chemistry Approach by S. F. A. Kettle • Concise Coordination Chemistry by R. Gopalan	Classroom
9	Unit 4: Electron transfer reactions (redox reactions):	• Concise Coordination	Classroom& Google

	Outer Sphere Mechanism- characteristics, factors influencing OSM.	Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	classroom
10	Unit 4: Cross reactions – Marcus-Hush principle. Inner Sphere Mechanism – characteristics. Inner Sphere Mechanism - factors influencing ISM, OSM versus ISM	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Classroom
11	Unit 4: Two electron transfers, Non-complementary electron transfer reactions, Reactions of the coordinated ligands, geometrical and optical isomerization reactions. Electron transfer reactions in biological systems – Cytochromes	• Concise Coordination Chemistry by R. Gopalan • Coordination Chemistry by Ajay Kumar	Classroom
12	Unit 4: Electron transfer reactions in biological systems – Rubredoxins and Ferredoxins. Ligand substitution reactions in square-planar complexes – mechanism – influences of entering, leaving and central metal ion on the reactivity of square planar complexes of Pt	• Inorganic Chemistry by Purcell and Kotz • Concise Coordination Chemistry by R. Gopalan	Classroom& Google classroom
13	Unit 5: Trans effect – Trans effect series – theories and applications, cis effect. Mechanisms of substitutions in octahedral complexes- Dissociative, Associative and Interchange (I_a and I_d) mechanisms.	• Inorganic Chemistry by Purcell and Kotz • Advance Inorganic Chemistry by Gurdeep Raj	Classroom& Google classroom
14	Unit 5: Hydrolysis reactions –acid and base hydrolysis reactions of six-coordinated Co(III) ammine complexes – mechanisms – evidences. Replacement of coordinated water – mechanisms – evidences	• Advance Inorganic Chemistry by Gurdeep Raj • Inorganic Chemistry by Purcell and Kotz	Classroom& Google classroom
15	Unit 5: Rates of water replacement - orbital occupation effects. Synthesis of Pt and Co compounds- Metal complexes in medicinal chemistry, industrial processes and agriculture.	• Inorganic Chemistry by Purcell and Kotz • Descriptive inorganic, Coordination, and Solid-state chemistry by Glen E. Rodgers	Classroom

		• Concise Coordination Chemistry by R. Gopalan	

Auxilium College (Autonomous), Gandhi Nagar, Vellore – 632 006.

Programme	M.Sc. Chemistry
Programme Code	P14
Semester	II
Course	Solid State chemistry and Nuclear chemistry
Course Code	PCCHN19
Hours	4
Credits	4
Total Hours	60
Max Marks	100
Course Instructor/ Coordinator	Ms. T. Revathy

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Structure of solids- Comparison of X-ray and Neutron diffraction- Structure of Cadmium iodide and Nickel arsenide	• Structural Inorganic Chemistry by A. F. Wells • E-Resources (wwwchem.uwimona.edu.jm)	Google meet
2	Structure of Perovskite and spinels and inverse spinels, Formation of spinels	• Structural Inorganic Chemistry by A. F. Wells • Understanding Solids by Richard Tilley • E-Resources	Google meet

		(wwwchem.uwimona.edu.jm)	
3	Hall effect and its applications, Pyroelectricity, piezo electricity and ferro electricity	• Solid State Chemistry and its Applications by Anthony R. West • Solid State Chemistry- An Introduction by Smart and Moore	Google meet
4	Magnetic properties of solids- Hysteresis loss and loops Types of magnetic behaviour- Dia, Para, Ferro, Anti Ferro, Ferri magnetism- Ferrites, Garnets.	• Solid State Chemistry and its Applications by Anthony R. West • Understanding solid state physics by Sharon Ann Holgate	Google meet
5	Solid state electrolyte-β-alumina-application of solid state electrolytes.	• Solid State Chemistry and its Applications by Anthony R. West • Solid State Electrochemistry by Peter G Bruce	Google meet
6	Reactions in solid state- Formation of spinel, co-precipitation and sol-gel method. Diffusion, Diffusion co-efficient,	• Solid State Chemistry and its Applications by Anthony R. West • Solid State Chemistry by D K Chakrabarty	Google meet
7	Diffusion mechanisms- Vacancy and interstitial diffusion. Growing single crystals – crystal growth from solution, growth from melt and vapour deposition technique.	• Solid State Chemistry and its Applications by Anthony R. West • Solid State Chemistry by D K Chakrabarty	Google meet
8	Quark theory, The magnetic properties of the Nucleus-Bohr magneton, Nuclear magneton, the neutron magnetic moment and the structure of the nucleon.	• Essentials of Nuclear Chemistry by H.J.Arnikar	Google meet
9	The net magnetic moments of the nuclei -the spin I, the magnetic moment μ_I and Nordheim rules, Salient feature of the Liquid drop model with derivations	• Essentials of Nuclear Chemistry by H.J.Arnikar	Google meet
10	Salient feature of the Fermi –Gas model and Collective model.	• Essentials of Nuclear Chemistry by	Google meet

		H.J.Arnikar	
11	Nuclear reaction cross-section, Q value, Threshold energy and compound nucleus theory	• Essentials of Nuclear Chemistry by H.J.Arnikar	Google meet
12	Hot atom Chemistry and chemical effect of radioactive decay. Fast breeder reactors-Reprocessing of spent fuel: Recovery of uranium and Plutonium.	• Nuclear Chemistry by Maheshwar Sharon and Madhuri Sharon • Instrumentation in Applied Nuclear Chemistry – Jan Krugers	Google meet
13	Detectors: Cloud chamber, Bubble chamber, Geiger-Muller counter, Scintillation and Cherenkov counters	• Nuclear Chemistry by Maheshwar Sharon and Madhuri Sharon • Physics and Engineering of Radiation Detection-Syed Ahmed	Google meet
14	Particle accelerators, Linear accelerators types and application, Construction and working of Cyclotron and Synchrotron	• Nuclear Chemistry by Maheshwar Sharon and Madhuri Sharon • Physics and Engineering of Radiation Detection-Syed Ahmed	Google meet
15	Nuclear Waste Management – low level, intermediate level, high level wastes and ultimate disposal	• Essentials of Nuclear Chemistry by H.J.Arnikar	Google meet

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Programme	M.Sc. Chemistry
Programme Code	P14
Semester	III
Course	Practical VI: Physical Chemistry II
Course Code	PCCHR19
Hours	4
Credits	3
Total Hours	60
Max Marks	100
Course Instructor/ Coordinator	Ms. Revathy T

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Introduction about basic terms related to potentiometric titrations.(Online) Assignment on types of electrodes with neat sketch diagram. (offline)	• Physical Chemistry – Puri and sharma	Google meet & Google classroom
2	Determination of strength of weak acid vs strong base by potentiometric method. (online) Model data points to be given and find strength of weak acid by plotting graph.	• Practical Physical Chemistry – B.Viswanathan, P.S. Raghavan • Basic Principles of Practical Physical Chemistry - V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu	Google meet & Google classroom

3	Introduction about basic terms related to conductometric titrations.(Online) Assignment on mobility of different ions, strong electrolyte, weak electrolyte, dissociation constant, infinite dilution and common ion effect.	• Physical Chemistry – Puri and sharma	Google meet & Google classroom
4	Determination of strength of weak acid vs strong base by conductometric titration. (online) Model data points to be given and find strength of weak acid by plotting graph.	• Practical Physical Chemistry – B.Viswanathan, P.S. Raghavan • Basic Principles of Practical Physical Chemistry - V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu	Google meet & Google classroom
5	Determination of strength of strong acid vs strong base by potentiometric method. (online) Model data points to be given and find strength of strong acid by plotting graph.	• Practical Physical Chemistry – B.Viswanathan, P.S. Raghavan • Basic Principles of Practical Physical Chemistry - V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu	Google meet & Google classroom
6	Determination of strength of strong acid vs strong base by conductometric titration. (online) Model data points to be given and find strength of strong acid by plotting graph.	• Practical Physical Chemistry – B.Viswanathan, P.S. Raghavan • Basic Principles of Practical Physical Chemistry - V. Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu	Google meet & Google classroom
7	Determination of strength of strong acid and weak acid vs strong base by conductometric titration. (online) Model data points to be given and find strength of strong acid and weak acid by plotting graph.	• Practical Physical Chemistry – B.Viswanathan, P.S. Raghavan • Basic Principles of Practical Physical Chemistry - V.	Google meet & Google classroom

		Venkateswaran, R. Veeraswamy, A. R. Kulandaivelu	
8	Clarifying doubts regarding the experiments discussed.(online) Viva test for all the 5 experiments(offline)	-	Google meet & Google classroom
9	Introduction to basics of UV spectroscopy and formulas and concepts required to interpret UV Spectrum.(online) Assignment on different types of transition in UV spectra.(offline)	• Spectrometric Identification of Organic Compounds - R.M. Silverstein, G.C. Bassler and T.C. Morril	Google meet & Google classroom
10	Interpretation of two sample UV spectra for the calculation of molecular data and identification of functional group.(online) Assignment on examples of chromophores, auxochromes and its effect in UV spectra.	• Introduction to spectroscopy – Pavia, Lampman, Kriz	Google meet & Google classroom
11	Interpretation of two sample UV spectra for the calculation of molecular data and identification of functional group.(online) Assignment on different types of transition observed in the sample spectra given.(offline)	• Introduction to spectroscopy – Pavia, Lampman, Kriz	Google meet & Google classroom
12	Interpretation of two sample UV spectra for the calculation of molecular data and identification of functional group.(online) Assignment on calculation of λmax and εmax theoretically by woodward fieser rules in the sample spectra given.(offline)	• Introduction to spectroscopy – Pavia, Lampman, Kriz	Google meet & Google classroom
13	Introduction to basics of IR spectroscopy and formulas and concepts required to interpret IR Spectrum.(online) Poster on different functional groups and its corresponding absorption frequency (offline)	• Vibrational Spectroscopy: Theory and Applications – D.N.Sathyanarayana	Google meet & Google classroom
14	Introduction to physical concept behind Vibrational spectroscopy (IR spectroscopy). (online) Assignment on simple problems related to	• Vibrational Spectroscopy: Theory and Applications – D.N.Sathyanarayana	Google meet & Google classroom

	vibrational spectroscopy. (offline)		
15	Interpretation of two sample IR spectra for the calculation of force constant, zero point energy, different modes of vibration possible and its frequency .(online) Assignment on different modes of vibration in a molecule.(offline)	• Vibrational Spectroscopy: Theory and Applications – D.N.Sathyanarayana • Inverse Problems of Vibrational spectroscopy- A.G.Yagola, I.V. Kochikov, G.M. Kuramshina.	Google meet & Google classroom

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Programme	B.Sc Chemistry
Programme Code	U17
Semester	IV
Course	GENERAL CHEMISTRY – IV
Course Code	UCCHE19
Hours	2
Credits	5
Total Hours	30
Max Marks	100
Course Instructor/ Coordinator	Ms. T. Revathy

Lesson Plan for the year 2020 – 2021

Week	Portions to be covered	Reference	Platform (LMS)
1	Nitrogen family - preparations, properties and uses of hydrazine. Structure of N_2O, NO and N_2O_5	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
2	Structure of H_3PO_4, H_3PO_3, PCl_3, PCl_5	• Modern Inorganic Chemistry - R.D.Madan	Google meet

		• Textbook of Inorganic Chemistry- P.L Soni	
3	Oxygen Family - comparative study of compounds- halides- Hexafluorides, Tetrahalides, Dihalides, Dimeric monohalides.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
4	Oxygen Family - comparative study of compounds- Oxides- Monooxides, Dioxides, Trioxides andHeptoxides,oxyacids.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet& Google classroom
5	Halogens - Comparative study of elements and compounds of halogens- hydracids, oxyacids.	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
6	Inter halogen compounds,Pseudohalogens- comparison of halogens and pseudo halogens	• Modern Inorganic Chemistry - R.D.Madan • Textbook of Inorganic Chemistry- P.L Soni	Google meet
7	Noble gases - Position in the periodic table, Clathrates and its applications, Hybridisation and geometry of XeF_2,XeF_4, XeF_6 and $XeOF_4$	• Modern Inorganic Chemistry - R.D.Madan	Google meet& Google classroom

		• Textbook of Inorganic Chemistry- P.L Soni	
8	Aliphatic Nucleophilic Substitution - mechanism of S_N1 and $S_N2$reactions	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet
9	Mechanism of S_Ni reactions. Effect of structure of substrate, solvent, nucleophile and the leaving group	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet& Google classroom
10	Aromatic nucleophilic substitution - benzyneand intermediate complex mechanism	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet

11	Effect of substituents on reactivity,Orientation and reactivity in substituted benzenes	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet
12	Aromatic electrophilic substitution reaction in benzene and substituted benzenes- nitration and halogenation	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet
13	Sulphonation, Friedel-Craft's acylation and alkylation reaction mechanism	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet& Google classroom
14	Elimination reaction: Types, orientation of double bond- Hoffmann and Saytzeff's rules, Cis and trans eliminations- mechanisms.	• Advanced Organic Chemistry- B.SBahl,	Google meet& Google classroom

		and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	
15	Mechanisms of E1 and E2 reactions and evidences.Elimination vs Substitution.	• Advanced Organic Chemistry- B.SBahl, and Arun Bahl • Modern Organic Chemistry- M.K Jain and S.C Sharma	Google meet

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Lesson Plan for the year 2020 – 2021 (ODD SEMESTER)

UCCHD20-GENERAL CHEMISTRY- III

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT – 1**: Calculation of Formula weight or Molecular weight and Mole concept. Relationship between Molar Mass, Mole and Avagadro Number	**Chemistry 2e** by Paul Flowers, Klaus Theopold, Richard Langley &William Robinson	Google Classroom
Week 2	**UNIT – 1**: Solutions- definition and properties, concentration terms, Molarity, Formality and Normality – definition, mathematical expression and Comparison.	**1. Chemistry 2e** by Paul Flowers, Klaus Theopold, Richard Langley &William Robinson. **Modern Analytical Chemistry** by David Harvey	Google Classroom
Week 3	**UNIT – 1** : Equivalent weight calculation – for an acid, base, oxidizing agent. Volumetric Analysis- principle. Definition of Titrant, Titrand and Indicator.	**Chemistry 2e** by Paul Flowers, Klaus Theopold, Richard Langley &William Robinson. **Modern Analytical Chemistry** by David Harvey	Google Classroom
Week 4	**UNIT – 1:** Preparation of Solutions and Standardization of Commercial acids. Primary and Secondary standards – Characteristics with Examples.	**Modern Analytical Chemistry** by David Harvey	Google Classroom
Week 5	**UNIT – 1:** Theory of Acid-base titrations. Theory of acid-base indicators.	**Analytical Chemistry** by Gary Christian	Google Classroom
Week 6	**UNIT – 1:** Theory of Redox titrations. Theory of Redox indicators.	**Analytical Chemistry** by Gary Christian	Google Classroom
Week 7	**UNIT – 1:** Theory of Complexometric titrations and	**Analytical Chemistry** by Gary Christian	Google Classroom

	their indicators.		
Week 8	**UNIT – 1:** Theory of Iodometry and Iodimetry titrations and their indicators.	**Analytical Chemistry** by Gary Christian	Google Classroom
Week 9	**UNIT – 1:**Theory of Precipitation titrations and adsorption indicators.	**Analytical Chemistry** by Gary Christian	Google Classroom
Week 10	**UNIT – 1:** Types of errors, minimizing the errors, accuracy and precision, significant figures.	**Modern Analytical Chemistry** by David Harvey	Google Classroom
Week 11	**UNIT – V:** Three-dimensional close packing of spheres – ccp and hcp – characteristics of hcp, ccp and bcc structures.	**Principles of Physical Chemistry** by B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
Week 12	**UNIT – V:** interstitial sites in closely packed arrangement of atoms – triangular, tetrahedral and octahedral sites, radius ratio rule and its effect on the shapes of ionic crystals	**Principles of Physical Chemistry** by B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
Week 13	**UNIT – V:** structures of ionic crystals-NaCl, CsCl, ZnS, Wurtzite, Fluorite and Rutile.	**Principles of Physical Chemistry** by B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
Week 14	**UNIT – V:** Imperfections in crystal systems – Schottky and Frenkel defects, metal excess and metal deficiency defects.	**Principles of Physical Chemistry** by B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom
Week 15	**UNIT – V:** Semiconductors - band theory of solids, intrinsic semiconductors, extrinsic semiconductors -n-type and p-type semiconductors.	**Principles of Physical Chemistry** by B. R. Puri, L. R Sharma and M.S Pathania	Google Classroom

UGCHB520: NON MAJOR ELECTIVE: COSMETICS AND DYES

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT – 1**: Cosmetics Definition and Classification.	**Chemistry in Daily life** by Kirpal Singh	Google Classroom
Week 2	**UNIT – 1**: Components of Cosmetics. Deodrants and Antiperspirants – definition and differences.	**Chemistry in Daily life** by Kirpal Singh	Google Classroom
Week 3	**UNIT – 1**: Aerosols, Perfumes and Fragrances with examples. Pros and Cons of synthetic cosmetics.	**Chemistry in Daily life** by Kirpal Singh	Google Classroom
Week 4	**UNIT – 2:** Basic Concept of Cosmetic Safety.	**Handbook of Cosmetic science and Technology** by Marc Paye, Andre´ O. Barel, and Howard I. Maibach	Google Classroom
Week 5	**UNIT – 2:** Safety test items and Evaluation methods.	**Handbook of Cosmetic science and Technology** by Marc Paye, Andre´ O. Barel, and Howard I. Maibach	Google Classroom
Week 6	**UNIT – 2:** Testing on human – Patch test and Usage Test.	**Handbook of Cosmetic science and Technology** by Marc Paye, Andre´ O. Barel, and Howard I. Maibach	Google Classroom
Week 7	**UNIT – 3:** Herbal cosmetics – fruits and vegetables as haircare and skin care (apple, apricot, banana, carrot, cucumber, honey, lemon, tomato).	**Herbal Principles and Cosmetics** by Roland Hardman	Google Classroom
Week 8	**UNIT – 3:** Perfumes and fragrances, skin care herbs – olive oil, sesame oil, black pepper, amla. Aromatherapy – various oils used in aromatherapy and their significance.	**Herbal Principles and Cosmetics** by Roland Hardman	Google Classroom

Week 9	**UNIT – 3:** Standardization of herbs – importance, methods employed for standardization of herbal extracts.	**Herbal Principles and Cosmetics** by Roland Hardman	Google Classroom
Week 10	**UNIT – 4:** Dyes - definition of dyes, requirements of a good dye i.e. Colour, chromophore and auxochrome, solubility, linearity, coplanarity, fastness, substantivity, definition of fastness and its properties and mordants with examples.	**Applied Chemistry** by Jayashree Ghosh	Google Classroom
Week 11	**UNIT – 4:** Natural and Synthetic Dyes - natural dyes - definition and limitations of natural dyes. Examples and uses of natural dyes with respect to henna, turmeric, saffron, indigo, chlorophyll –names of the chief dyeing material/s in each natural dye.	**Applied Chemistry** by Jayashree Ghosh	Google Classroom
Week 12	**UNIT – 4:** Synthetic dyes - definition of synthetic dyes, primaries and intermediates.	**Applied Chemistry** by Jayashree Ghosh. **The Chemistry of Synthetic Dyes and Pigments** by Lubs HA and Roberts E.	Google Classroom
Week 13	**UNIT – 5:** Textile uses of dyes - impact of the textile and leather dye Industry on the environment with special emphasis on water pollution.	**Fundamental Concepts of Environmental Chemistry** by Sodhi G S	Google Classroom
Week 14	**UNIT – 5:** biomedical uses – Tablets, syrups and capsules, DNA markers and therapeutics. Dyes in food and cosmetics.	**Colorants for Non-textile applications** by Freeman H S. & Peters A T.	Google Classroom
Week 15	**UNIT – 5:** Properties of dyes used in food and cosmetics, commonly used food colors and their limits. Dyes sensitized solar cells – A tool to overcome the future energy crisis.	**Natural Food colorants** by Hendry G A F and Houghton J D. **Colorants for Non-textile applications** by Freeman H S. & Peters A T.	Google Classroom

PECHE20: ELECTIVE IIIA: ANALYTICAL CHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT – 1**: Thermal Analysis – Introduction and types.	**Analytical Chemistry** by Usha Rani.	Google Classroom
Week 2	**UNIT – 1**: Thermo Gravimetric Analysis (TGA)- principle, instrumentation.	**Analytical Chemistry** by Usha Rani.	Google Classroom
Week 3	**UNIT – 1**: Thermogravimetric curves of $CaC_2O_4H_2O$, $MgCr_2O_4$, Hg_2CrO_4, Ag_2CrO_4, $AgNO_3$ and $Cu(NO_3)_2$.	**Instrumental Methods of Chemical Analysis** by A K Srivatasava	Google Classroom
Week 4	**UNIT – 1:** Factors affecting TGA, Applications of TGA.	**Instrumental Methods of Chemical Analysis** by A K Srivatasava. **Analytical Chemistry** by Usha Rani.	Google Classroom
Week 5	**UNIT – 1:** DTG – Principles, Comparison of DTG & TGA.	**Instrumental Methods of Chemical Analysis** by A K Srivatasava. **Analytical Chemistry** by Usha Rani.	Google Classroom
Week 6	**UNIT – 1:** Differential Thermal Analysis (DTA) - principle, instrumentation, simultaneous TGA and DTA curves and applications.	**Instrumental Methods of Chemical Analysis** by A K Srivatasava. **Analytical Chemistry** by Usha Rani.	Google Classroom
Week 7	**UNIT – 1:** Differential Scanning Calorimetry (DSC) principle, instrumentation and applications.	**DTA and DSC** Haines et al., Chapter 5; **Handbook of Thermal Analysis and Calorimetry; Vol.1 Principles and Practice, 1998.**	Google Classroom
Week 8	**UNIT – 1:** Thermometric titrations - principle, instrumentation and applications.	**Instrumental Methods of Chemical Analysis** by A K Srivatasava; **Practical Thermometric Titrimetry (A monograph)** by Thomas Smith	Google Classroom
Week 9	**UNIT – 4:** Computers in Chemistry - introduction to computers - hardware, software and programming languages.	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary	Google Classroom

Week 10	**UNIT – 4:** C – Programming: variables, constant, operators, input and output functions.	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary	Google Classroom
Week 11	**UNIT – 4:** C – Programming: control statement, loop.	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary	Google Classroom
Week 12	**UNIT – 4:** Go To statement – functions, arrays	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary	Google Classroom
Week 13	**UNIT – 4:** pointers. Calculation of pH & Solubility Product.	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary	Google Classroom
Week 14	**UNIT – 4:** calculation of bond energy using Born-Lande equation. Introduction to internet service provided in India.	**C Programming – The ultimate way to learn the fundamentals of C-Language** by Harry H. Chaudary; **Dictionary of Computer and Internet Terms** by Douglas A Downing, Michael Covington & Melody Mauldin Covington.	Google Classroom
Week 15	**UNIT – 4:** Terms used in internet, www, http, html, TCP/IP band width, dialup service. ISDN and Search Engines.	**Dictionary of Computer and Internet Terms** by Douglas A Downing, Michael Covington & Melody Mauldin Covington.	Google Classroom

Lesson Plan for the year 2020 – 2021 (EVEN SEMESTER)

ENVIRONMENTAL STUDIES

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT – 1**: Multidisciplinary nature of Environmental Studies, Scope and Importance	**UGC Syllabus book**	Google Classroom

Week 2	**UNIT – 1**: Natural resources: Overexploitation of Water, Land and Energy.	**UGC Syllabus book**	Google Classroom
Week 3	**UNIT – 1** : Natural Resources : Forest and Mineral	**UGC Syllabus book**	Google Classroom
Week 4	**UNIT – 2:** Ecosystem: Types, Structure & Function.	**UGC Syllabus book**	Google Classroom
Week 5	**UNIT – 2:** Ecosystem- Forest & Grassland.	**UGC Syllabus book**	Google Classroom
Week 6	**UNIT – 2:** Desert & acquatic Ecosystem.	**UGC Syllabus book**	Google Classroom
Week 7	**UNIT – 3:** Biodiversity & its values.	**UGC Syllabus book**	Google Classroom
Week 8	**UNIT – 3:** India as a nation of MEGA biodiversity.	**UGC Syllabus book**	Google Classroom
Week 9	**UNIT – 3:**Threats to Biodiversity & its conservation.	**UGC Syllabus book**	Google Classroom
Week 10	**UNIT – 4:** Types of Environmental Pollution.	**UGC Syllabus book**	Google Classroom
Week 11	**UNIT – 4:** Water, Air, Noise & Soil pollution – Causes, Effects.	**UGC Syllabus book**	Google Classroom
Week 12	**UNIT – 4:** Rain water Harvesting and Solid Waste Management.	**UGC Syllabus book**	Google Classroom
Week 13	**UNIT – 5:** Human Population & Environmental Pollution act.	**UGC Syllabus book**	Google Classroom
Week 14	**UNIT – 5:** Climate Change, Afforestation and Sustainable Development.	**UGC Syllabus book**	Google Classroom
Week 15	**UNIT – 5:** Environmental Protection Act.	**UGC Syllabus book**	Google Classroom

PECHC20: ELECTIVE IIA: PHARMACEUTICAL CHEMISTRY

Week	Portions to be covered	Reference	Platform (LMS)
Week 1	**UNIT – 3**: Drug discovery-introduction. Discovery of Penicillin	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 2	**UNIT – 3**: Discovery of Lead compounds	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation

Week 3	**UNIT – 3:** Lead modification – Modification of functional group. SAR	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 4	**UNIT – 3:** QSAR – Hammett Equation, Taft equation, Hansch Analysis	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 5	**UNIT – 3:** Craig Plot, Drug Design using QSAR	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 6	**UNIT – 3:** Computer Aided Drug Design (CADD).	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 7	**UNIT – 4:** Cancer Chemotherapy – Types of Neoplasm	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 8	**UNIT – 4:** Causes of Cancer, Tumor Formation, Mechanism and metastasis.	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 9	**UNIT – 4:** Determination of drug response; Cytotoxic anticancer drugs – Alkylating agents and its mode of action.	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 10	**UNIT – 4:** Antimetabolites, antitumor antibiotics, pyrimidine antagonist.	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 11	**UNIT – 4:** Treatment of Cancer – Radiation, Surgery and Chemotherapy.	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 12	**UNIT – 5:** Podophyllotoxins, mechanism of action, endochrine agents, taxol.	**Medicinal Chemistry** by V K Ahuwalia & Madhu Chopra	PPT Presentation
Week 13	**UNIT – 5:** Toxins and their medicinal value – Introduction and classification.	**Pharmaceutical, applied and Natural products Chemistry** by P S Kalsi & Sangeeta Jagtap	PPT Presentation
Week 14	**UNIT – 5:** Toxins from Microbes to reptiles.	**Pharmaceutical, applied and Natural products Chemistry** by P S Kalsi & Sangeeta Jagtap	PPT Presentation
Week 15	**UNIT – 5:** Anticoagulants – Coagulation pathway and anticoagulants therapy.	**Pharmaceutical, applied and Natural products Chemistry** by P S Kalsi & Sangeeta Jagtap	PPT Presentation

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Lesson Plan for the year 2020-2021

Odd Semester

UECHA 16 – Analytical Chemistry

Week	Portions to be covered	Reference	Platform
1	**Unit IV** Infrared Spectroscopy – Principle – types of stretching and bending vibrations – vibrational frequencies of CO2 and H2O.	Spectroscopy, Gurdeep R. Charwal, Sham K. Anand, Himalaya Publishing House, Fifth Revised and Enlarged Edition – 2001.	Google Meet
2	Instrumentation – block diagram – source-monochromator-sample cell- sampling techniques – detector and recorders	Instrumetal analysis, Skoog, Holler and Crouch, Cengage Learning, Eleventh Reprint 2012	Google Meet
3	Identification of simple organic molecules from characteristic absorption bands.	Elementary Organic Spectroscopy, Y.R. Sharma, S. Chand and Company limited, Reprint 2012.	Google Meet
4	**Unit V** Nuclear Magnetic Resonance Spectroscopy – Principle – Instrumentation with its different components Chemical shift, factors affecting chemical shift - shielding mechanism	Elementary Organic Spectroscopy, Y.R. Sharma, S. Chand and Company limited, Reprint 2012.	Google Meet
5	Number of signals, spin-spin coupling, coupling constants-splitting of signals. NMR spectrum of simple organic compounds – alcohols, aldehydes and ketones.	Elementary Organic Spectroscopy, Y.R. Sharma, S. Chand and Company limited, Reprint 2012.	Google Meet
6	Mass Spectrometry – Principle – Instrumentation. Mass spectrum of simple organic compounds – alcohols, aldehydes and ketones.	Elementary Organic Spectroscopy, Y.R. Sharma, S. Chand and Company limited, Reprint 2012.	Google Meet

7	**Unit I** Principle of gravimetric analysis, characteristic of precipitating agents – choice of precipitants and condition for precipitation.	R. Gopalan, P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sand, Reprint 2017.	Google Meet
8	Specific and selective precipitants –DMG-cupferron, salicylaldehyde, ethylene diamine – use of sequestering agents.	R. Gopalan, P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sand, Reprint 2017.	Google Meet
9	Co-precipitation – post precipitation – differences – reduction of error precipitation from homogeneous solution – Calculation in gravimetric methods. Data analysis – Precision and accuracy, types of errors, standard deviation.	R. Gopalan, P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sand, Reprint 2017.	Google Meet

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PECHE 19 – Analytical Chemistry

Week	Portions to be covered	Reference	Platform
1	**Unit III** Atomic absorption spectrometry – principle , terms involved, measurement of absorption, instrumentation with block diagram –radiation source, atomization unit, oxidizing agents, burners, monochromators, detectors, amplifier and recorder devices. Interferences in AAS: spectral, chemical, ionization, dissociation of metal compounds, difference between atomic absorption and emission method,	P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, R. Gopalan, Sultan chand & Sons, Reprint 2017. http://delloyd.50megs.com /moreinfo/AA.html https://www.sciencedirect.com /science/article/pii/0584854768800400	Google Meet

	advantages and disadvantages of AES, advantages of AAS over flame emission spectroscopy, disadvantage of AAS.		
2	Applications of AAS: Some typical analysis like determination of metal in biological system, lead in petrol.	Willard Merritt, Dean and Settle, Instrumental Methods of Analysis, CBS Publishers and Distributors Pvt. Ltd, Seventh Edition. https://www.sciencedirect.com/science/article/abs/pii/0039914086800650	Google Meet
3	Photo acoustic spectroscopy – instrumentation with block diagram and applications	Willard Merritt, Dean and Settle, Instrumental Methods of Analysis, CBS Publishers and Distributors Pvt. Ltd, Seventh Edition https://www.shimadzu.com/an/service-support/technical-support/analysis-basics/ftirtalk/talk7.html	Google Meet
4	**Unit II** Gas chromatography, principle, types of instrumentation with block diagram – carrier gas, sample injection system, column, thermal compartment, detectors, recorder and application.	Gary D. Christian, Analytical chemistry, Sixth edition, , Third Reprint 2007 https://microbenotes.com/gas-chromatography/	Google Meet
5	High Pressure Chromatography – principle, characteristic of HPLC, instrumentation, applications comparison of HPLC with GLC.	Gary D. Christian, Analytical chemistry, Sixth edition, , Third Reprint 2007 https://microbenotes.com/high-performance-liquid-chromatography-hplc	Google Meet
6	Super Critical Fluid Chromatography – principle, properties, instrumentation,	Skoog, Holler and Crouch, Instrumetal analysis, Cengage Learning, Eleventh Reprint 2012	Google Meet

	application with other types of chromatography, Supercritical fluid extraction and applications	https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Book%3A_Physical_Methods_in_Chemistry_and_Nano_Science	
7	**Unit V** Environmental Chemistry : Water quality standards BOD, COD- Analysis of waste water and its treatment – salinity of water and its treatment – Reverse Osmosis.	Nicholas P. Cheremisinoff, Handbook of water and wastewater treatment technologies, , N&P Limited, Reprint 2020 http://www.wepa-db.net/policies/law/laos/standards.htm	Google Meet
8	Toxic Chemicals in environment – Toxicity of Mercury, Lead, Cadmium and Arsenic.	M.S. Yadav, Instrumental Methods of Chemical analysis, Campus Books International 2006. https://academic.oup.com/labmed/articlepdf/42/12/735/24942624/labmed42-0735.pdf	Google Meet
9	Green Chemistry : Principle, conditions followed in green synthesis, Carbon –Carbon bond formation in aldol condensation like silyl enol ethers in aqueous media solid phase, Supercritical water and asymmetric aldol condensation.	M.M. Srivastava and Rashmi Sanghi, Chemistry for Green Environment, Publishing House, Third Reprint 2011. https://www.acs.org/content/acs/en/greenchemistry/principles/12-principles-of-green-chemistry.	Google Meet

UACHA2O – Allied Chemistry

Week	Portions to be covered	Reference	Platform
1	**Unit I** 1.1 Aromatic compounds- Introduction	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd., Reprint 2007.	Google Meet
2	Aromaticity - Huckel's rule. Application of Huckel's rule for benzenoid (benzene, naphthalene, anthracene, pyridine)	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd., Reprint 2007	Google Meet

3	1.2 Application of Huckel's rule for nonbenzenoid compounds and(Azulene and ferrocene . Preparation, properties and uses of naphthalene	B.S Bahl and Arun Bahl, Advanced Organic Chemistry, Sultan Chand and Co., Ltd., Reprint 2007.	Google Meet
4	**Unit III** 3.1 Polymer chemistry – classification of polymer.	M.G. Arora and M. Singh, Polymer Chemistry, Anmol Publications PVT LTD, Reprint 1996.	Google Meet
5	3.2 Natural and synthetic rubbers with examples	M.G. Arora and M. Singh, Polymer Chemistry, Anmol Publications PVT LTD, Reprint 1996.	Google Meet
6	3.3 Preparation and uses of nylon 6,6 and terylene	G.S. Misra, Introduction of Polymer Chemistry, New Age International Publisher, 2005.	Google Meet
7	**Unit V** 5.1 Industrial chemistry – Fuel gases – natural gas, water gas, semi water gas, carbureted water gas, oil gas and producer gas (composition and uses only)	V.Veeraiyan and A.N.S Vasudevan, Text Book of Allied Chemistry, High Mount Publishing House, 2003.	Google Meet
8	Industrial chemistry –Carbureted water gas, oil gas and producer gas(composition and uses only)	V.Veeraiyan and A.N.S Vasudevan, Text Book of Allied Chemistry, High Mount Publishing House, 2003.	Google Meet
9	5.2 Types of glasses	V.Veeraiyan and A.N.S Vasudevan, Text Book of Allied Chemistry, High Mount Publishing House, 2003.	Google Meet

Auxilium College(Autonomous), Gandhi Nagar, Vellore – 632 006.

Lesson Plan for the year 2020-2021 (EVEN SEMESTER)

UECHE 16 – ELECTIVE IIIA : PHARMACEUTICAL CHEMISTRY

Week	Portions to be covered	Reference	Platform(LMS)
Week 1	**UNIT-I:** Definition of the following terms: Pharmacy, Pharmacopoeia, pharmacology, pharmacophore, drug, bacteria, virus, vaccine, properties of drugs. Causes, symptoms and drugs for anaemia, jaundice and cholera.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 2	**UNIT-I:** Causes, symptoms and drugs for malaria, filarial, dengue fever, chikungunya, tyhoid. Diagnostic test for sugar, salt and cholesterol in blood and urine	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 3	**UNIT-I:** Indian medicinal plants - medicinal uses and chemical present in neem, keezhanelli, mango, adathoda, thoothuvalai, hibiscus, rose, tulsi, turmeric, curry leaves and ficus.	A Textbook of Pharmaceutical Chemistry by **Jaya Ghosh .**	Chalk and Board PPT Lectures
Week 4	**UNIT-II:** Sulphonamides – definition, synthesis and therapeutic uses of prontosil, sulphathiozole and sulphafurazole	Pharmaceutical Chemistry by **S. Lakshmi.**	Chalk and Board PPT Lectures
Week 5	**UNIT -II:** Antibiotics – definition, conditions, classifications. Properties, therapeutic uses and structure activity relationship of penicillin and streptomycin.	Pharmaceutical Chemistry by **S. Lakshmi.**	Chalk and Board PPT Lectures
Week 6	**UNIT -II:** Properties, therapeutic uses and structure activity relationship of chloramphenicol and tetracyclines. Antiseptics and disinfectants- definition and distinction, phenolic and chloro compounds.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 7	**UNIT-III:** 1 Analgesics – definition, narcotic and non narcotic - Morphine and its derivatives - pethidine, methodone. Antipyretic analgesics – salicylic derivatives – paracetamol and Ibuprofen.	Pharmaceutical Chemistry by **S. Lakshmi.**	Chalk and Board PPT Lectures
Week 8	**UNIT-III:** Anaesthetics – definition, characteristics -volatile – nitrous oxide, ether, chloroform and cyclopropane . Non-volatile - thiopental sodium, methohexitone and propanidid.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 9	**UNIT-III:** Toxicology of drugs : principle-dose/effect(LD, ED).	Pharmaceutical Chemistry by S. Lakshmi.	Chalk and Board PPT Lectures

Week 10	**UNIT-IV**: Cancer: definition, causes, treatment, drugs used (antineoplastics), alkylating agents, antimetabolites, plant products.	Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 11	**UNIT-IV**: AIDS - causes, symptoms, prevention, AZT, DDC. Hypoglycemic drugs, diabetes - types -causes, control, insulin- preparation, uses. Oral hypoglycemic agents.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 12	**UNIT-IV**: Anticonvulsant agents - definition, types. Barbiturates, hydantoins, oxazolidenediones, succinimides. Blood - grouping, composition, R h factor. Blood pressure - hypertension and hypotension, treatment.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lecture
Week 13	**UNIT-V**: Cardiovascular drugs – definition, action, cardiac glycosides, anti arrhythmic drugs-quinidine, propanol hydrochloride and uses. Anti hypertensive agents – aldomet, pentolinium tartrate, reserpine and uses.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board
Week 14	**UNIT-V:** Anti hypertensive agents – aldomet, pentolinium tartrate, reserpine. Anti anginal agents – nitrites, dipyridamole, vasodilator, tolazoline hydrochloride, isoxsuprine hydrochloride, sodium nitroprusside, hydrallazine hydrochloride and papaverine.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board
Week 15	**UNIT-V:** Organic pharmaceutical aids- preservatives, properties, common preservatives used - Colouring agents Sweetening agents- Flavouring agents.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures

PECHC 20 – ELECTIVE IIA : PHARMACEUTICAL CHEMISTRY

Week	Portions to be covered	Reference	Platform(LMS)
Week 1	**UNIT-I:** 1.1 Classification of drugs: biological, Chemical, commercial consideration, lay public.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	PPT Lectures
Week 2	**UNIT-I** 1.2 Mechanism of drug action and metabolism of Drugs: mechanism of action, drug receptors binding, biological responses - covalent bond, hydrogen bond, Van der Waal's forces.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	PPT Lectures
Week 3	**UNIT-I:** 1.3 Metabolism of drugs - chemical pathways - phase I and phase II reactions, Biotransformation.	A Textbook of Pharmaceutical Chemistry by **Jaya Ghosh.**	PPT Lectures

Week 4	**UNIT-I:** 1.4 Routes of administration of drugs.	Pharmaceutical Chemistry by **S. Lakshmi.**	PPT Lectures
Week 5	**UNIT -I:** 1.5 Absorption of drugs: factors affecting absorption.	Pharmaceutical Chemistry by **S. Lakshmi.**	PPT Lectures
Week 6	**UNIT -I:** 1.6 Digestion and absorption of proteins and fats.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 7	**UNIT-II:** 2.1 Assay of drugs - Chemical, biological and immunological assay.	Pharmaceutical Chemistry by **S. Lakshmi.**	Chalk and Board PPT Lectures
Week 8	**UNIT-II:** 2.2 Psychopharmacology- Antipsychotic drugs, phenothiazines, LSD, Marijuana.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 9	**UNIT-II:** 2.3 Barbiturates mechanism of action.	Pharmaceutical Chemistry by S. Lakshmi.	Chalk and Board PPT Lectures
Week 10	**UNIT-II:** 2.4 Biological role of some inorganic compounds - Sodium and their compounds, potassium and their compounds.	Pharmaceutical Chemistry by **Jayashree Ghos.h**	Chalk and Board PPT Lectures
Week 11	**UNIT-II:** 2.5 Calcium and their compounds, iodine and their compounds. hypoglycemic agents.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures
Week 12	**UNIT-II:** 2.6 Copper and their compounds, Zinc and their compounds.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lecture
Week 13	**UNIT-V:** 5.1 Nutraceuticals – Introduction.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh**	Chalk and Board
Week 14	**UNIT-V** 5.2 Types - plant sources, animal sources, microbial sources, derived from all sources.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board
Week 15	**UNIT-V:** 5.3 Role of antioxidants.	A Textbook of Pharmaceutical Chemistry by **Jayashree Ghosh.**	Chalk and Board PPT Lectures

PCCHM 19 – NATURAL PRODUCTS AND BIOORGANIC CHEMISTRY

Week	Portions to be covered	Reference	Platform(LMS)
Week 1	UNIT-V: Introduction of enzyme chemistry.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 2	UNIT-V: Terminology – Reactive site, catalytic activity and its mechanism.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 3	UNIT-V: Enzymatic mechanism of alpha chymotrypsin.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 4	UNIT-V:Immobilised enzyme chemistry.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 5	UNIT-V: Enzymes in synthetic organic chemistry.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 6	UNIT-V: Enzymes in synthetic organic chemistry.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 7	UNIT-V: Enzymes in synthetic organic chemistry.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 8	UNIT-V: Structure, biological and mechanism of coenzymes A.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 9	UNIT-V: Structure, biological and mechanism of TPP.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 10	UNIT-V: Structure, biological and mechanism of pyridoxal phosphate.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 11	UNIT-V: Structure and biological function of NAD^+.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 12	UNIT-V: Structure and biological function of NADP.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 13	UNIT-V: Structure and biological function of FAD.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 14	UNIT-V: Structure and biological function of lipoic acid.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board
Week 15	UNIT-V: Structure and biological function of vitamin B_{12}.	Enzymes chemistry by **Hermann Dugas.**	Chalk and Board

LESSON PLAN FOR - 2020 - 2021.

ODD SEMESTER

PAPER	CLASS
Allied chemistry - I	I. B.Sc. Biochemistry
Allied chemistry - III	II. B.Sc. physics
SBE : Agricultural chemistry	I. Bcom / I. B.Sc

LESSON PLAN FOR - 2020 - 2021

EVEN SEMESTER

PAPER	CLASS
Allied chemistry - II	I. B.Sc. Biochemistry
Allied chemistry - IV	II. B.Sc. physics
Allied practical	I. B.Sc. Biochemistry
	II. B.Sc. physics
SBE: Agricultural chemistry	I. B.com / I. B.Sc / IBBA / IBCA.
Environmental studies	II. B.Sc. Biochemistry

II. B.Sc. physics

UACHB419 - Allied - II : Chemistry - II

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FORM
1	Unit - I : 1.1 Co-ordination chemistry - definition of the terms - ligand, chelates, Chelation. 1.2 Nomenclature of mono nuclear complex.	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied chemistry - 2003.	Google meet
2	1.3 Werner's and pauling theory, Sidgwick's theory, Effective atomic Number rule	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied chemistry - 2003.	Google meet
3.	1.4 Chemistry of EDTA, haemoglobin and chlorophyll.	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied Chemistry - 2003.	Google meet.
4.	Unit - II : 2.1 Isomerism - types of Isomerism, Stereo isomerism optical isomerism - Cause of optical activity. 2.2 optical isomerism of lactic acid and tartaric acid, R-S notation (one asymmetric carbon atom). Racemisation and resolution.	1. R.D Madan Inorganic chemistry - 2004. 2. B.R puri L.R Sharma and kalra. K.C principle of Inorganic chemistry - 2004.	Google meet.
5.	2.3 Geomentrical isomerism of maleic acid and fumaric acid, E-Z notation	R.D Madan Inorganic chemistry - 2004.	Google meet

WEEK	PORTION TO BE COVERED	REFERENCES	MODE
6.	Tautomerism - keto-enol tautomerism	R.D. Madhan Inorganic chemistry -2004	Google meet.
7.	Unit - III 3.1 Ionic equilibria - Strong and weak electrolytes, common ion effect. Definition of pH, pK_a, pK_b and pK_w. Buffer solution - Henderson equations. 3.2 Electrochemical cells - Construction, definition of emf, standard electrode potentials.	1. B.R. puri L.R sharma and M.S pathania principle of physical chemistry - 2004. 2. V. Veeriyan and A.N.S Vasudevan, Textbook of Allied Chemistry - 2003	Google meet.
8.	3.3 Types of cells - primary and secondary, standard hydrogen electrode - calomel electrode.	B.R puri and L.R Sharma, M.S pathania principle of physical chemistry - 2004.	Google meet.
9.	3.4 Electrophoresis, electro-dialysis and electro osmosis. Unit - IV	B.R puri and L.R Sharma, M.S pathania principle of physical chemistry - 2004.	Google meet.
10.	4.1 photochemistry - Laws of light absorption - Lambert's law and Lambert-Beer's law. 4.2 Grotthus - Draper's law and stark - Einstein's law of photochemical equivalence.	1. B.R puri and L.R Sharma, M.S pathania principle of physical chemistry - 2004. 2. V. Veeriyan and A.N.S Vasudevan, Text book of Allied chemistry - 2004.	Google meet

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FORM
11.	4.3 Quantum yield - examples of photochemical reactions, kinetics of hydrogen and chlorine reaction.	B.R puri, L.R Sharma and M.S pathania, principle of physical chemistry - 2004	Google meet
12.	4.4 Jablonski diagram - fluorescence, phosphorescence, photosensitization and chemiluminescence (definition, examples and applications).	B.R puri, L.R Sharma and M.S pathania, principle of physical chemistry - 2004.	Google meet.
13.	Unit - V 5.1 Medicinal chemistry - definition and one example each for analgesics, antipyretics, antiseptics, tranquilizers, sedatives and hypnotics. 5.2 Local anesthetics and general anesthetics.	B.R puri, L.R Sharma and M.S pathania, principle of Inorganic chemistry - 2004. Jayashree Ghosh A Textbook of pharmaceutical chemistry - 2005	Google meet.
14.	5.3 Antibiotics - structure and uses of penicillin, streptomycin and chloramphenical.	Jayashree Ghosh A Text book of pharmaceutical chemistry - 2005	Google meet
15.	5.4 Causes and treatment of diabetes, Cancer and AIDS.	Jayashree Ghosh A Text book of pharmaceutical chemistry - 2005.	Google meet.

I. B. Sc. Biochemistry

UACHB20 - Allied chemistry - II

WEEK	PORTION TO BE COVERED	REFFERENCES	PLAT FORM
1.	Unit - I 1.1 Co-ordination Chemistry - definition of the terms - ligands, Chelate, chelation 1.2 Nomenclature of mononuclear compleaes.	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied Chemistry	Google meet
2	1.3 Werner's and pauling theory, Sidgwick's theory. 1.4 Effective atomic Number rule.	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied Chemistry	Google meet
3.	1.5 chemistry of EDTA 1.6 chemistry of haemoglobin and chlorophyll.	V. Veeraiyan and A.N.S Vasudevan, Text book of Allied Chemistry.	Google meet
4.	Unit - II 2.1 Isomerism - types of Isomerism. 2.2 Stereoisomerism - optical isomerism - Cause of optical activity.	R.D Madhan Inorganic chemistry - 2004	Google meet
5.	2.3 optical isomerism of lactic acid and tartaric acid, R-S notation (one asymmetric Carbon atom)	R.D Madhan Inorganic chemistry - 2004	Google meet
	2.4 Racemisation and Resolution	R.D Madhan Inorganic chemistry - 2004.	Google meet

WEEK	PORTION TO BE COVERED	REFFERENCES	PLATFORM
6.	2.5 Geometrical Isomerism of maleic and fumaric acids, E-Z notation. 2.6 Tautomerism - keto-enol tautomerism.	R.D Madhan Inorganic chemistry - 2004.	Google meet.
7.	Unit - III 3.1 Ionic equilibria - strong and weak electrolytes, common ion effect. 3.2 Definition of pH, pka, pkb and pkw. Buffer solution	B.R puri, L.R sharma and M.S pathania principle of physical chemistry	Google meet
8	3.3 Electrochemical cells- Construction, definition of emf, Standard electrode potential 3.4 Types of cells- primary and secondary.	B.R puri. L.R Sharma and M.S pathania principle of physical chemistry	Google meet
9	3.5 principle of standard hydrogen electrode and Calomel electrode. 3.6 principle of Electrophoresis electro-dialysis and electro-osmosis	B.R puri L.R sharma and M.S pathania principle of physical Chemistry	Google meet
10.	Unit - IV 4.1 photochemistry - Laws of light absorption - Lamberts law and Lambert-Beer's law 4.2 Grotthus - Draper's law and Stark - Einstein's law of photochemical equivalence.	B.R puri L.R sharma and M.S pathania principle of physical chemistry	Google meet

WEEK	PORTION TO BE COVERED	REFFERENCES	PLAT FORM
11.	4.3 Quantum yield (Definition) 4.4 photochemical reactions, kinetics of hydrogen and chlorine reaction	B.R puri, L.R Sharma and M.S pathania principle of physical chemistry	Groogle meet
12.	4.5 Jablonski diagram 4.6 Fluorescence, phosphorescence, photosensitization and chemiluminescence (definition, examples and applications).	B.R puri, L.R Sharma and M.S pathania principle of physical chemistry.	Groogle meet.
13.	Unit-V 5.1 Medicinal chemistry - definition and one example each for analgesics, antipyretics, antiseptics, tranquilizers, sedative and hypnotics 5.2 Local anesthetics and general anesthetics	Jayashree Ghosh A Text book of pharmaceutical chemistry	Groogle meet
14.	5.3 Antibiotics - Structure and use of penicillin, streptomycin and chloramphenicol. 5.4 Causes and treatment of diabetes.	Jayashree Ghosh A Text book of pharmaceutical Chemistry	Groogle meet
15	5.5 Causes and treatment of cancer. 5.6 Causes and treatment of AIDS	Jayashree Ghosh A Text book of pharmaceutical chemistry.	Groogle meet.

I. B.Com / I. B.Sc.

1. USCHA120 - SBE: Agricultural chemistry

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FORM
1.	Unit - I 1.1 Agriculture - Definition - Scope of agriculture in India and Tamil Nadu. 1.2 Branches of agriculture	Sankaran S and V.T Subbah mudaliar. principle of Agronomy.	Google meet
2.	1.3 Agronomy - Art, Science and business of crop production 1.4 Agronomical classification of crops - their importance.	Sankaran S and V. T Subbah Mudaliar. principle of Agronomy.	Google meet
3.	1.5 Major crops of India and Tamil Nadu, water resources in tamil Nadu. 1.6 Factors affecting crop production - Moisture, aeration light, temperature and nutrients.	Sankaran. S and V.T Subbiah mudaliar. principle of Agronomy.	Google meet
4.	Unit - II 2.1 Soil chemistry - Introduction, Soil classification and survey 2.2 properties of soil - Soil texture and soil water.	principles and practices of Agronomy, .	Google meet
5.	2.3 Soil temperature and soil colloids. 2.4 Soil minerals and soil pH.	Jayashree Ghosh Fundamental concepts of Applied Chemistry.	Google meet.
6.	2.5 Soil acidity - alkalinity and buffering soil 2.5 Soil fertility and soil formation		

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FAR...
7.	Unit - III		
	3.1 Farming - types - Subsistence farming 3.2 plantation farming, mixed farming and conventional farming.	principles and practice of Agronomy	Google meet
8	3.3 Organic farming, poultry farming and dairy farming. 3.4 Advantage of organic farming - limitation of organic farming.	principle and practice of Agronomy	Google meet
9	3.5 Certification of organic products - OFAI organic labeling system 3.6 Research findings on organic food.	principles and practice of Agronomy	Google meet
10.	Unit - IV		
	4.1 Insecticides, Fungicides and Herbicides - Introduction. 4.2 Methods of using pest controls.	Jayashree Ghosh Fundamental concepts of Applied chemistry.	Google meet
11	4.3 Insecticides - Arsenic compounds, fluorine compounds		
	4.4 Insecticides - mercury compounds - copper compounds and sulphur compounds	Jayashree Ghosh Fundamental concepts of Applied chemistry.	Google meet

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FARM
12	4.5 Modern Insecticides - Some important herbicides Rodenticides. 4.6 Benefits of pesticides, Adverse environmental effects of pesticides.	Jayashree Ghosh Fundamental Concepts of Applied Chemistry	Google meet
13	Unit - V 5.1 Fertilizers - classification Examples of fertilizers. 5.2 Nitrogenous fertilizers phosphate fertilizers - potash fertilizers	Jayashree Ghosh Fundamental Concepts of Applied Chemistry	Google meet
14	5.3 ILL effect of fertilizers 5.4 Manures, compost and saw dust.	Jayashree Ghosh Fundamental concepts of Applied Chemistry	Google meet
15	5.5 Farmyard manure, compost, reinforing manure and green manure. 5.6 Sewage and sludge - biogas production.		

II. B.Sc. Biochemistry

UNEVSITY - Environmental Studies

WEEK	PORTION TO BE COVERED	REFERENCES	PLAT FORM
	Unit - IV		
10	Environmental pollution: Air pollution, water pollution, Soil pollution and Noise polution - Causes, effects and control measures.	Environmental Studies UGC syllabus Dr. k. kumaraswamy M.Sc. ph.D edition - 2004	Google meet
11	Rain water harvesting	Environmental Studies UGC syllabus Dr. k. kumaraswamy M.Sc. ph.D edition - 2004.	Google meet
12	Water management - Soid waste management.		
	Unit - V		
13	Human pollution and environment, Environmental protection Act. 1986 Environment protection agencies (International and National) - Air (prevention and control of pollution) Act 1981, Water (prevention and control of polution) Act 1976.	Environmental Studies UGC syllabus Dr. k. kumaraswamy M.Sc. ph.D edition - 2004.	Google meet
14	Wild life protection Act, 1972 - Forest (conservation) Act, 1980 - wild life protection Act 1972. General environmental issues - Global warming - Climate change - ozone layer depletion.	Environmental Studies UGC Syllabus Dr. k. kumaraswamy M.Sc. ph.D editia - 2004	Google meet.
15	Acid rain - Sustainable development - population explosion - Role of Information Technology in Environmental conversation.		

Auxilium College (Autonomous), Gandhi Nagar, Vellore–632 006

Lesson plan for the year 2020 – 2021

Odd Semester

PECHA20- POLYMER CHEMISTRY

Week	Unit	Portions to be covered	Reference
1	I	Introduction - basic concepts of polymer science - definitions, degree of polymerization, molecular forces and chemical bonding in polymers	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
2	I	Classification of polymers - natural and synthetic - organic and inorganic - thermoplastic and thermosetting polymers - plastics, elastomers, fibres and liquid resins. Linear, branched and cross-linked polymers, addition polymers and condensation polymers	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
3	I	Polymerization techniques - bulk, suspension, solution and emulsion techniques, Mechanism and kinetics of addition polymerization - cationic and anionic polymerization	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
4	I	Mechanism and kinetics of free radical and condensation polymerization, Co-ordination polymerization - mechanism using Ziegler Natta catalyst	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
5	III	Polymer reactions - hydrolysis, acidolysis, hydrogenation, addition and substitution reactions, Cyclisation, cross-linking and vulcanization	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer

6	III	Graft and block copolymers - definition and reactions leading to the formation of graft and block copolymers	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
7	III	Types of degradation - chemical degradation, physical degradation, biodegradable polymers, and mechanism of degradation, Thermal oxidation, photooxidation, mechanical degradation, degradation by ionizing radiation, ozone attack	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
8	III	Degradation of special polymers: polyolefins, polyvinyl chloride (PVC) and polymethylmethaacrylate (PMMA)	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
9	IV	Physical properties, stress-strain behaviour, mechanical properties (tensile, flexural, impact, fatigue, hardness, creep, abrasion), Electrical properties (dielectric strength, surface resistivity, volume resistivity, power factor, arc resistance)	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
10	IV	Polymer processing - films sheets: moulding - compression, blow moulding, injection moulding and extrusion moulding, casting of films and calendaring, recycling of plastics, Elastomers - introduction, processing, rubber types, vulcanization, properties, reclaiming	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
11	IV	Fibers - introduction, production, fiber spinning, textile fibers, industrial fibers, recycling,	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
12	IV	Molecular weights of polymers - number average and weight average molecular weights, determination of molecular weight of polymers by viscometry, Gel Permeation Chromatography (GPC), membrane osmometry, vapour phase osmometry, ultracentrifugation, light scattering and Matrix-Assisted Laser Desorption Ionization (*MALDI*)	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer

13	V	Applications of polymers - industrially important polymers - synthesis, properties and uses of natural and synthetic polymers	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
14	V	Synthesis, properties and uses of polytetrafluoroethylene (Teflon), polystyrene, rayon, nylon, polyacrylates, polyvinyl chloride (PVA), polyacrylonitrile (PAN) and polystyrene-divinylbenzene	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer
15	V	Electrically conducting polymers - poly acetylene - poly aniline	Polymer Science By V.R. Gowariker, Textbook of Polymer Science By Fred W. Billmeyer

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PCCHJ19 – SYNTHETIC ORGANIC CHEMISTRY

Week	Unit	Portions to be covered	Reference
1	III	Organolithium compounds - preparation, reactions and uses (resemblance with Grignard reagent, difference from Grignard reagent)	Organic Reaction Mechanism By V. K. Ahluwalia
2	III	Organosilanes - synthetic applications of trimethyl silyl iodide, trimethyl silyl chloride, trimethyl silyl cyanide and trimethyl silyl triflate	Organic Reaction Mechanism By V. K. Ahluwalia, Organic Organic Chemistry By Jagadamba, Singh, Essential Reagents for Organic Synthesis By Philip L.Fuchs, Andre B. Charette

3	III	Uses of the following reagents - DCC, 1,3-dithiane (Umpolung), Lithium diisopropylamide (LDA)	Reactions, Rearrangements and Reagents By S. N. Sanyal, Organic Reactions and their Mechanisms By P. S. Kalsi, Organic ChemistryBy Jonathan Clayden, Nick Greeves and Stuart Warren
4	III	Uses of the following reagents - Diisobutylaluminium hydride (DIBAL), 9-borabicyclo[3.3.1]nonane] (9BBN), Gilman's reagent	Organic Reactions and their Mechanisms By P. S. Kalsi, Advanced Organic Chemistry, Part B By Francis A. Carey and Richard J. Sundberg
5	III	Preparation and uses of phosphorous ylides	Organic Reactions and their Mechanisms By P. S. Kalsi, Advanced Organic Chemistry, Part B By Francis A. Carey and Richard J. Sundberg
6	III	Preparation and uses of nitrogen and sulphur ylides	Organic Reactions and their Mechanisms By P. S. Kalsi, Advanced Organic Chemistry, Part B By Francis A. Carey and Richard J. Sundberg
7	IV	Principles and synthetic process involving phase transfer catalysis - nitriles from alkyl halides, benzoyl cyanides from benzoyl chlorides	Organic Synthesis: Special Techniques By V. K. Ahluwalia
8	IV	Preparation of alkyl fluorides from alkyl halides, alcohols from alkyl halides using PTC	Organic Synthesis: Special Techniques By V. K. Ahluwalia
9	IV	Preparation of azides from alkyl halides, sodium alkyl sulphonates from alkyl halides using PTC	Organic Synthesis: Special Techniques By V. K. Ahluwalia
10	IV	Preparation of alkyl nitrates, thiocyanates, cyanates and p-toluenesulphonates from alkyl halides using PTC	Organic Synthesis: Special Techniques By V. K. Ahluwalia
11	IV	Preparation of aryl ethers and thioethers, esterification using PTC	Organic Synthesis: Special Techniques By V. K. Ahluwalia

12	IV	Diazotransfer by phase transfer catalyst, dihalocarbenes	Organic Synthesis: Special Techniques By V. K. Ahluwalia
13	V	Transition metal catalyzed reactions - reaction and mechanism of Heck reaction and Suzuki cross coupling reaction	Organic Reactions and their Mechanisms By P. S. Kalsi, Advanced Organic Chemistry, Part B By Francis A. Carey and Richard J. Sundberg
14	V	Reaction and mechanism of carboxymethylation, hydro formylation and epoxide-allylic alcohol rearrangement	Organic Reactions and their Mechanisms By P. S. Kalsi, Advanced Organic Chemistry, Part B By Francis A. Carey and Richard J. Sundberg
15	V	Chemoselectivity - reduction and oxidation - examples, calculation	Comprehensive Organic Synthesis By D.Gelman, Comprehensive Heterocyclic Chemistry III By Katritzky

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UACHA20–ALLIED CHEMISTRY I

Week	Unit	Portions to be covered	Reference
1	I	Heterocyclic compounds - Preparation, properties and uses of furan	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl
2	I	Preparation, properties and uses of thiophene	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl
3	I	Preparation, properties and uses of pyrrole	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl
4	I	Electrophilic substitution in benzene-mechanism of nitration	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl

5	I	Mechanism of halogenation and sulphonation	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl
6	I	Electrophilic substitution in benzene- mechanism of alkylation and acylation	B.S.Bahl and Arun Bahl, Advanced Organic Chemistry
7	III	Preparation and uses of polyethylene	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar
8	III	Preparation and uses of PVC	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar
9	III	Protein fibres	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar, Introduction to Polymer Chemistry By G.S.Misra
10	III	Protein fibres – chemical composition	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar, Introduction to Polymer Chemistry By G.S.Misra
11	III	Properties of wool	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar, Introduction to Polymer Chemistry By G.S.Misra
12	III	Properties of silk	Polymer Science By V. R. Gowariker, N. V. Viswanathan and Jayadev Sridhar, Introduction to Polymer Chemistry By G.S.Misra
13	V	Dye chemistry- terms - chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic shift	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl
14	V	Azo and triphenylmethane dyes	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl

15	V	Preparation of methyl orange	Advanced Organic Chemistry By B.S.Bahl and Arun Bahl

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Even Semester

PCCHF20 - GROUP THEORY AND QUANTUM CHEMISTRY

Week	Unit	Portions to be covered	Reference
1	III	Introduction to quantum mechanics - black body radiation - distribution of energy in the black body radiation	Quantum Chemistry By R. K. Prasad
2	III	Rayleigh Jeans' and Planck's law of radiation	Quantum Chemistry By R. K. Prasad
3	III	Photoelectric effect, Bohr's quantum theory and subsequent developments - duality of electron	Quantum Chemistry By R. K. Prasad
4	III	Compton Effect	Fundamentals of Quantum Chemistry By R. Anantharaman
5	III	Quantum theory - quantum mechanical postulates – operators - definition, types of operators and Hermitian property	Quantum Chemistry By R. K. Prasad
6	III	Particle in a box model (one and two dimensional cases)	Quantum Chemistry By D. A. Mcquarrie
7	III	Particle in a box model (three dimensional case)	Quantum Chemistry By D. A. Mcquarrie
8	III	Schrodinger equation for hydrogen atom and He^+ ion	Quantum Chemistry By D. A. Mcquarrie

9	III	Origin of quantum numbers and their significance	Quantum Chemistry By R. K. Prasad
10	IV	One dimensional harmonic oscillator - classical treatment and quantum mechanical treatment	Quantum Chemistry By D. A. Mcquarrie
11	IV	Normalization and the characteristics of the Eigen functions of a harmonic oscillator	Quantum Chemistry By D. A. Mcquarrie
12	IV	The recursion formula for the Hermite polynomials, selection rules of the harmonic oscillator and space quantization of electronic orbitals	Quantum Chemistry By R. K. Prasad
13	IV	Rotation of diatomic molecules - wave equation and solution of the rigid rotor	Quantum Chemistry By D. A. Mcquarrie
14	IV	Schrodinger wave equation and solution of particle in a ring	Quantum Chemistry By D. A. Mcquarrie
15	IV	Calculation of rotational constants and bond lengths of diatomic molecules	Quantum Chemistry By R. K. Prasad

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PCCHN19 - SOLID STATE CHEMISTRY AND NUCLEAR CHEMISTRY

Week	Unit	Portions to be covered	Reference
1	III	Optical properties of solids (Luminescence and Phosphors)	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
2	III	Lasers (Ruby laser, Neodymium laser)	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore

3	III	Bethe's Notation, Types of nuclear reactions- Direct reactions	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
4	III	Photonuclear and thermo nuclear reactions	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
5	III	Modes of radioactive decay, nuclear isomerism and isomeric transition, Internal Conversion	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
6	III	Stellar energy, the nucleosynthesis of light and heavy elements	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
7	III	Hydrogen burning, Carbon burning, the e, s, r, p and x processes	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
8	III	Separation of isotopes- Boron isotope-isotope exchange and laser irradiation	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
9	III	Uranium isotope -ultracentrifugation	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
10	IV	Uranium isotope - laser irradiation	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
11	IV	Analytical applications of Radioisotopes as traces	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
12	IV	Isotope dilution analysis	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
13	IV	Neutron activation analysis	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore

14	IV	Age determination by tritium	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore
15	IV	Age determination by carbon-14 content	Solid State Chemistry and Its Application By A.R. West and An Introduction to Solid State Chemistry By Smart & Moore

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PECHG19 – ORGANOMETALLIC AND BIOINORGANIC CHEMISTRY

Week	Unit	Portions to be covered	Reference
1	III	Addition reactions - 1,2 addition to double bonds	Inorganic Chemistry By J. Huheey and Organometallic chemistry of transition metals By Robert H. Crabtree
2	III	Carbonylation	Inorganic Chemistry By J. Huheey and Organometallic chemistry of transition metals By Robert H. Crabtree
3	III	Decarbonylation	Inorganic Chemistry By J. Huheey and Organometallic chemistry of transition metals By Robert H. Crabtree
4	III	Oxidative addition reactions	Inorganic Chemistry By J. Huheey and Organometallic chemistry of transition metals By Robert H. Crabtree
5	III	Reductive elimination reactions	Inorganic Chemistry By J. Huheey and Organometallic chemistry of transition metals By Robert H. Crabtree
6	III	Substitution reactions of octahedral complexes and their mechanisms	Selected Topics in Inorganic Chemistry By Wahid U. Malik, G. D. Tuli, R. D. Madan

7	III	Insertion reaction	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson and Organometallic chemistry of transition metals By Robert H. Crabtree
8	III	Rearrangement reactions of aluminium and tin compounds and their mechanisms	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson and Organometallic chemistry of transition metals By Robert H. Crabtree
9	III	Fluxional isomerism - definition, examples and mechanism	Inorganic Chemistry By M. C. Shriver, P. W. Atkins, C. H. Langford
10	IV	Hydrogenation of olefins (Wilkinson's catalyst), modification of the original catalyst	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson, Inorganic Chemistry By J. Huheey
11	IV	Hydroformylation of olefins using cobalt and rhodium catalyst (oxo process)	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson, Inorganic Chemistry By J. Huheey
12	IV	Oxidation of olefins to aldehydes and ketones (Wacker process)	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson, Inorganic Chemistry By J. Huheey
13	IV	Cyclo oligomerisation of acetylene using Nickel catalyst (Reppe's catalyst)	Advanced Inorganic Chemistry By F. A. Cotton and G. Wilkinson, Inorganic Chemistry By J. Huheey
14	IV	Olefin isomerization and its mechanism	Inorganic Chemistry By M. C. Shriver, P. W. Atkins, C. H. Langford
15	IV	Olefin metathesis and Polymer bound catalyst	Inorganic Chemistry By M. C. Shriver, P. W. Atkins, C. H. Langford

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UACHB20–ALLIED CHEMISTRY II

Week	Unit	Portions to be covered	Reference
1	I	Co-ordination chemistry – definition of the terms - ligands, chelate, chelation	Modern Inorganic Chemistry By R.D.Madan
2	I	Nomenclature of mononuclear complexes	Modern Inorganic Chemistry By R.D.Madan
3	I	Werner's and Pauling theory, Sidgwick's theory	Modern Inorganic Chemistry By R.D.Madan
4	I	Effective Atomic Number rule	Modern Inorganic Chemistry By R.D.Madan
5	I	Chemistry of EDTA	Modern Inorganic Chemistry By R.D.Madan
6	I	Chemistry of haemoglobin and chlorophyll	Modern Inorganic Chemistry By R.D.Madan
7	II	Isomerism- types of isomerism	Modern Inorganic Chemistry By R.D.Madan
8	II	Stereoisomerism-optical isomerism - cause of optical activity	Modern Inorganic Chemistry By R.D.Madan
9	II	Optical isomerism of lactic acid and tartaric acid, R- S notation (one asymmetric carbon atom)	Advanced Organic Chemistry By B.S.Bahl and ArunBahl
10	II	Racemisation and resolution	Advanced Organic Chemistry By B.S.Bahl and ArunBahl
11	II	Geometrical isomerism of maleic and fumaric acids, E-Z notation	Advanced Organic Chemistry By B.S.Bahl and ArunBahl

12	II	Tautomerism – keto-enol tautomerism	Advanced Organic Chemistry By B.S.Bahl and ArunBahl
13	V	Medicinal chemistry - definition and one example each for analgesics, antipyretics antiseptics, tranquilizers, sedatives and hypnotics	A Textbook of Pharmaceutical Chemistry By Jayashree Ghosh
14	V	Local anesthetics and general anesthetics	A Textbook of Pharmaceutical Chemistry By Jayashree Ghosh
15	V	Antibiotics – structure and uses of Penicillin, Streptomycin and Chloramphenicol	A Textbook of Pharmaceutical Chemistry By Jayashree Ghosh