



CURRICULUM FOCUS ON EMPLOYABILITY/ ENTREPRENEURSHIP/SKILL DEVELOPMENT

***DEPARTMENT OF CHEMISTRY & BIOCHEMISTRY
GOVT. M. H. COLLEGE OF HOME SCIENCE AND SCIENCE FOR WOMEN, JABALPUR
SESSION FROM 2019 -20 TO 2023-24***



Title: Focus on employability/ Entrepreneurship/Skill Development

Department of Chemistry

S. No.	Course Name	Course Code	Employability	Entrepreneurship	Skill Development
1	Fundamentals of Chemistry (Major)	S1-CHEM1T	<p>Various theories and principles applied to reveal atomic structure. Significance of quantum numbers. Concept of periodic properties of elements. Theories related to chemical bonding. Acid-base concept, pH, buffer. Factors responsible for reactivity of organic molecules. Basics and mechanism of chemical kinetics. Properties of electrolytes.</p>	<p>Various theories and principles applied to reveal atomic structure. Significance of quantum numbers. Concept of periodic properties of elements. Theories related to chemical bonding. Acid-base concept, pH, buffer. Factors responsible for reactivity of organic molecules. Basics and mechanism of chemical kinetics. Properties of electrolytes.</p>	

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2	Qualitative & Quantitative Chemical analysis(Major)	S1-CHEM1P	<p>Importance of chemical safety and lab safety while performing experiments in laboratory, Qualitative inorganic analysis, Elemental analysis of organic compounds (non-instrumental) Qualitative identification of functional group of organic compounds Techniques of pH measurements Preparation of buffer solutions</p>		<p>Importance of chemical safety and lab safety while performing experiments in laboratory, Qualitative inorganic analysis, Elemental analysis of organic compounds (non-instrumental) Qualitative identification of functional group of organic compounds Techniques of pH measurements Preparation of buffer solutions</p>
3	Analytical Chemistry (Minor)	S1-CHEM2T	<p>Basic concepts of Mathematics for Chemists. Fundamentals of analytical chemistry and steps involved in analysis. Basic knowledge of Computer for chemists. Basic Concepts of Chemical equilibrium. Principles of Chromatography and chromatographic techniques. Various techniques of Spectroscopic Analysis</p>	<p>Basic concepts of Mathematics for Chemists. Fundamentals of analytical chemistry and steps involved in analysis. Basic knowledge of Computer for chemists. Basic Concepts of Chemical equilibrium. Principles of Chromatography and chromatographic techniques. Various techniques of Spectroscopic Analysis</p>	

4	Analytical Processes and Techniques Core Course/ Minor/ Elective –	S1-CHEM2P	<p>Concepts and analytical methods in Chemistry. Preparation of solutions of different concentrations. Standardization of the solution. Identification of Organic compounds by chromatographic techniques. Analysis by Spectral Techniques.</p>		<p>Concepts and analytical methods in Chemistry. Preparation of solutions of different concentrations. Standardization of the solution. Identification of Organic compounds by chromatographic techniques. Analysis by Spectral Techniques.</p>
5	Chemistry in everyday life (Open Elective)	S1-CHEM3T	<p>Gain information about acids, bases and salts involved in our day to day life. Have an idea of food adulteration, its harmful effects, and methods to detect adulteration and the important constituents of our food. Student will be familiar with the chemical nomenclature of the commonly used materials in daily life including toiletries, kitchen and beverages. Have an Elementary idea of disinfectants, pesticides and cleaners.</p>	<p>Gain information about acids, bases and salts involved in our day to day life. Have an idea of food adulteration, its harmful effects, and methods to detect adulteration and the important constituents of our food. Student will be familiar with the chemical nomenclature of the commonly used materials in daily life including toiletries, kitchen and beverages. Have an Elementary idea of disinfectants, pesticides and cleaners.</p>	

6	Chemistry in Everyday life	S1-CHEM3P	<p>Concepts and analytical methods in Chemistry.</p> <p>Identification of acids, bases and salts involved in our day to day life. Methods to detect adulteration in commonly used food materials. Preparation of Natural indicator.</p>		<p>Concepts and analytical methods in chemistry. Identification of acids, bases and salts involved in our day to day life. Methods to detect adulteration in commonly used food materials. Preparation of Natural indicator.</p>
7	Reactions, Reagents and Mechanisms in Organic Chemistry (Major 1)	S2-CHEM1T	<p>Various organic reactions, reagents and their mechanisms, which will be helpful in understanding organic synthesis. Application of the reactions in the various industries. Like pharmaceutical, polymer, pesticides, textile, Dyes etc. Important key reactions used in Further study and Research work.</p>	<p>Various organic reactions, reagents and their mechanisms, which will be helpful in understanding organic synthesis. Application of the reactions in the various industries. like pharmaceutical, polymer, pesticides, textile, Dyes etc. Important key reactions used in further study and Research Work.</p>	

8	Organic Qualitative Analysis, Reactions and synthesis (Major)	S2-CHEM1P	To perform various reactions, which will be helpful in Understanding organic synthesis. To use reagents to perform organic reactions. To perform rearrangement reactions. To prepare various organic compounds. To use chromatographic technique to monitor organic reactions. Applications of the reactions in the industries, e.g., pharmaceutical, polymer, pesticides, textile, dyes, etc. industries. These experiments will also be useful in further study and research work.		To perform various reactions, which will be helpful in Understanding organic synthesis. To use reagents to perform organic reactions. To perform rearrangement reactions. To prepare various organic compounds. To use chromatographic technique to monitor organic reactions. Applications of the reactions in the industries, e.g., pharmaceutical, polymer, pesticides, textile, dyes, etc. industries. These experiments will also be useful in further study and research work.
9	Transition Elements, Chemi-energetics, Phase Equilibria (Core Course/ Minor/ Elective)	S2-CHEM2T	Chemistry of d- & f-block Elements, Basic Concepts of Coordination Chemistry. Stereochemistry of Transition Metal Complexes. Laws of Thermodynamics. Concepts of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, partially Miscible Liquids. Basic Concepts of Electrochemistry	Chemistry of d- & f-block Elements, Basic Concepts of Coordination Chemistry. Stereochemistry of Transition Metal Complexes. Laws of Thermodynamics. Concepts of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, partially Miscible Liquids. Basic Concepts of Electrochemistry	

10	Metal Complex Preparation, Thermochemical & Phase equilibria experiments	S2-CHEM2P	Chemistry of d- & f-block Elements, Basic Concepts of Coordination Chemistry. Stereochemistry of Transition Metal Complexes. Laws of Thermodynamics. Concepts of Phase Equilibrium with reference to Solid Solution, Liquid-Liquid Mixtures, partially Miscible Liquids. Basic Concepts of Electrochemistry		Preparation of inorganic complexes. Use of calorimeter for thermochemistry experiments. Determination of enthalpy of various system and reactions. Experiments on phase equilibria. Construction of phase diagrams. Study of reaction equilibrium
11	Generic Elective -Chemistry for Farmers	S2-CHEM3T	Pro cultivation crop improvement soil and crop management for sustainable organic agriculture production and development. Physical properties of soil and fertilizers types, Soil types and soil structure required for an agricultural field. Analysis and identification of complex agricultural problems and formulating ethical solutions. Innovative processes products and technology to meet the challenges in agriculture and farming practices. Fundamentals of horticulture modern farming and organic farming.	Pro cultivation crop improvement soil and crop management for sustainable organic agriculture production and development. Physical properties of soil and fertilizers types, Soil types and soil structure required for an agricultural field. Analysis and identification of complex agricultural problems and formulating ethical solutions. Innovative processes products and technology to meet the challenges in agriculture and farming practices. Fundamentals of horticulture modern farming and organic farming.	

12	Green and Agriculture Chemistry	S3-CHEM1D	Basic principle of green and sustainable chemistry. Understand stoichiometric calculation and relate them to green process metrics. Learn alternative solvent media green catalysis and energy sources of chemical processes. Understand the requirements of manures and fertilizers for various crops and their proper time of application. Understand to maintain soil fertility for better crop production.	Basic principle of green and sustainable chemistry. Understand stoichiometric calculation and relate them to green process metrics. Learn alternative solvent media green catalysis and energy sources of chemical processes. Understand the requirements of manures and fertilizers for various crops and their proper time of application. Understand to maintain soil fertility for better crop production.	
13	Green and Agriculture Chemistry	S3-CHEM1Q	To learn green synthesis of organic and inorganic compound. To learn to prepare green ionic liquids. To understand soil profile sampling and study minerals present in soil. To learn to estimate organic matter content of soil.		To learn green synthesis of organic and inorganic compound. To learn to prepare green ionic liquids. To understand soil profile sampling and study minerals present in soil. To learn to estimate organic matter content of soil.

14	Laboratory Skill, Techniques and Management	S3-CHEM2D	<p>Familiarized with the basic facilities available in laboratories. To adopt appropriate disposal procedures and safety method suitable for laboratories. Expected to gain knowledge of the basic skill of organisation and management of science laboratories. Unable to expertise in the procedures to procurement and storage of laboratory equipment and materials. Trained in the operation and maintenance of simple instruments used in Science laboratories. Unable to develop skills in common laboratory techniques. Trained to adopt appropriate disposal procedures and safety method suitable for la</p>	<p>Familiarized with the basic facilities available in laboratories. To adopt appropriate disposal procedures and safety method suitable for laboratories. Expected to gain knowledge of the basic skill of organisation and management of science laboratories. Unable to expertise in the procedures to procurement and storage of laboratory equipment and materials. Trained in the operation and maintenance of simple instruments used in Science laboratories. Unable to develop skills in common laboratory techniques. Trained to adopt appropriate disposal procedures and safety method suitable for la</p>	
15	Exercise for development of lab skills	S3-CHEM2Q	<p>Preparation of standard solution. Determination of concentration. Determination of MP pH conductivity. Preparation of a stock solution. Preparation of various reagents.</p>		<p>Preparation of standard solution. Determination of concentration. Determination of MP pH conductivity. Preparation of a stock solution. Preparation of various reagents.</p>

16	Instrumental Techniques in Chemistry	S3-CHEM3D	<p>Preparation of standard samples for analysis. Determination of concentration of solution spectrometrically. Determination of stoichiometry and stability constant and complexes.</p> <p>Potentiometric and conductometric titrations.</p> <p>Advance chromatography techniques.</p>	<p>Preparation of standard samples for analysis. Determination of concentration of solution spectrometrically. Determination of stoichiometry and stability constant and complexes.</p> <p>Potentiometric and conductometric titrations.</p> <p>Advance chromatography techniques.</p>	
17	Instrumental Techniques in Chemistry	S3-CHEM3Q	<p>Preparation of standard samples for analysis.</p> <p>Determination of concentration of solution spectrometrically.</p> <p>Determination of stoichiometry and stability constant and complexes.</p> <p>Potentiometric and conductometric titrations.</p> <p>Advance chromatography techniques.</p>		<p>Preparation of standard samples for analysis.</p> <p>Determination of concentration of solution spectrometrically.</p> <p>Determination of stoichiometry and stability constant and complexes.</p> <p>Potentiometric and conductometric titrations.</p> <p>Advance chromatography techniques.</p>



18	Bio Physical, Bio Inorganic and Organometallic Chemistry	S3-CHEM4D	Bio physical concepts like pHbiological oxidation bioenergetics. Magnetic properties and electronic spectra of transition metal complexes. Structure and bonding analysis of organometallic compounds using the MOtheory. Organometallic compounds of main group elements and their structure and bonding analysis. Bio Inorganic Chemistry and role of metal ions in biological systems	Bio physical concepts like pHbiological oxidation bioenergetics. Magnetic properties and electronic spectra of transition metal complexes. Structure and bonding analysis of organometallic compounds using the MOtheory. Organometallic compounds of main group elements and their structure and bonding analysis. Bio Inorganic Chemistry and role of metal ions in biological systems	
19	Synthesis and analytical techniques	S3-CHEM4Q	Synthesise of ferrocene from ferric chloride, potassium tries oxalate ferrate. Determine pH of bio sample; determine sugar in blood sample by photometry.		Synthesise of ferrocene from ferric chloride, potassium tries oxalate ferrate. Determine pH of bio sample; determine sugar in blood sample by photometry.

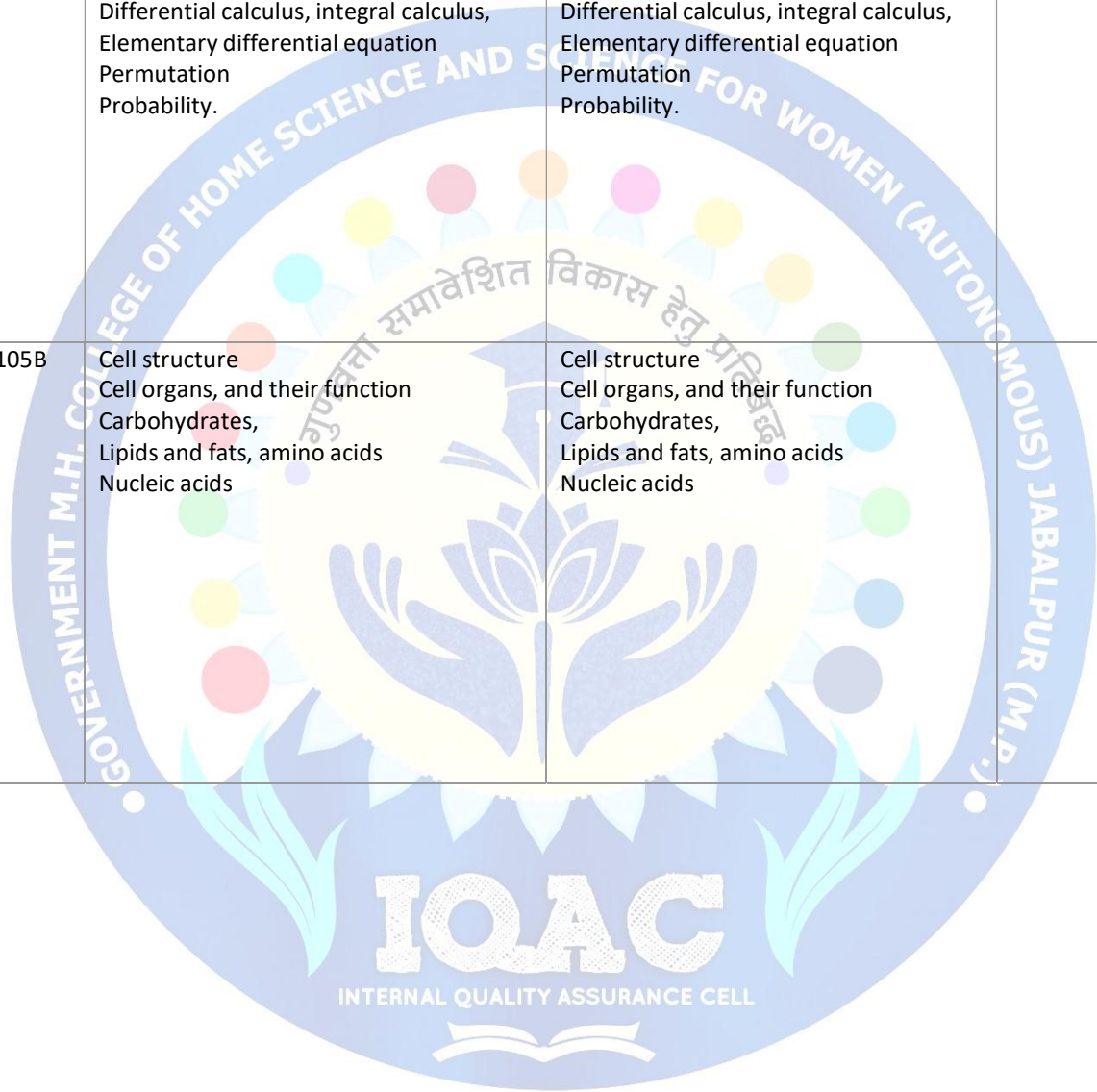
20	pharmaceutical and medicinal chemistry	S3-CHEM2T	<p>Understand importance of pharmaceutical chemistry and pharmacopoeia. Learn intellectual property rights patents trademark and copyright. Understand definition classification of the drug with example and structures. Describe the structure activity relation of some important class of drugs.</p> <p>Describe the over all process of drug discovery and the role played by medicinal chemistry in this process. Relate the structure and physical properties of drugs to their pharmacological activity. Explain you chemical properties related to QSAR.</p>	<p>Understand importance of pharmaceutical chemistry and pharmacopoeia. Learn intellectual property rights patents trademark and copyright. Understand definition classification of the drug with example and structures. Describe the structure activity relation of some important class of drugs.</p> <p>Describe the over all process of drug discovery and the role played by medicinal chemistry in this process. Relate the structure and physical properties of drugs to their pharmacological activity. Explain you chemical properties related to QSAR.</p>	
21	pharmaceutical and medicinal chemistry	S3-CHEM2T	<p>Preparation of acetanilide. Isolate the caffeine from the tea leaves. To learn about preparation of simple syrup as per IP and USP. Morphology of turmeric, Ginger and mentha. Preparation of suspension emulsion on it means in organic separations pharmaceutical buffer solutions.</p>	<p>Preparation of acetanilide. Isolate the caffeine from the tea leaves. To learn about preparation of simple syrup as per IP and USP. Morphology of turmeric, Ginger and mentha. Preparation of suspension emulsion on it means in organic separations pharmaceutical buffer solutions.</p>	

22	Processing of fats and oils (Generic elective)		<p>Gain knowledge about traditional Indian oil and traditional Indian oil processing methods.</p> <p>Gain the knowledge about importance type natural resources of fats and oils and their effect on health.</p> <p>Learn the method of refining and modification of fats and oils. Know about the nutritional aspects of fats and oils and their storage and handling.</p>	<p>Gain knowledge about traditional Indian oil and traditional Indian oil processing methods.</p> <p>Gain the knowledge about importance type natural resources of fats and oils and their effect on health.</p> <p>Learn the method of refining and modification of fats and oils. Know about the nutritional aspects of fats and oils and their storage and handling.</p>	
23	Environmental toxicology(Generic elective)		<p>Learn about definition and sources of toxicants.</p> <p>Learn about chemical toxicants biological toxicants and its assessment.Learn about different parts of ecotoxicology i.e. Immunotoxicology, Xenoviotics, neurotoxicology, bioaccumulation, biodegradation etc.Learn about the determination of acceptable risks and limits of environmental toxicants and utility of environmental benchmarks.Learn about environmental cytotoxicity and genotoxicity.</p> <p>Learn about what type of toxic chemicals affects in environment and solid West management.</p> <p>Learn about which factors influence the toxicity.</p>	<p>Learn about definition and sources of toxicants.</p> <p>Learn about chemical toxicants biological toxicants and its assessment.Learn about different parts of ecotoxicology i.e. Immunotoxicology, Xenoviotics, neurotoxicology, bioaccumulation, biodegradation etc.Learn about the determination of acceptable risks and limits of environmental toxicants and utility of environmental benchmarks.Learn about environmental cytotoxicity and genotoxicity.</p> <p>Learn about what type of toxic chemicals affects in environment and solid West management.</p> <p>Learn about which factors influence the toxicity.</p>	

24	Inorganic Chemistry	MCH 101	<p>Stereochemistry, bonding, VSEPR theory, MO treatment Reaction mechanism of Substitution inertness and lability Electronic spectra of transition metal complexes Metal carbonyls, Dioxygen Complexes Wilkinson's Catalyst, borane chemistry including topology, nomenclature, reactivity</p>	<p>Stereochemistry, bonding, VSEPR theory, MO treatment Reaction mechanism of Substitution inertness and lability Electronic spectra of transition metal complexes Metal carbonyls, Dioxygen Complexes Wilkinson's Catalyst, borane chemistry including topology, nomenclature, reactivity</p>	
25	Organic Chemistry	MCH 102	<p>Structure and bonding in organic molecules Aromaticity, antiaromaticity, homo aromaticity including weaker bonds. Stereochemistry, symmetry, chirality, optical activity and conformational analysis, Reaction mechanism, Hammett equation, SN1, SN2 and SET mechanism, UV-VIS, ORD & CD Spectroscopy</p>	<p>Structure and bonding in organic molecules Aromaticity, antiaromaticity, homo aromaticity including weaker bonds. Stereochemistry, symmetry, chirality, optical activity and conformational analysis, Reaction mechanism, Hammett equation, SN1, SN2 and SET mechanism, UV-VIS, ORD & CD Spectroscopy</p>	

26	Physical Chemistry	MCH 103	Schrodinger Wave equation, variation and perturbation theory, Classical thermodynamics, Phase rule, chemical dynamics, Arrhenius Equation, Theory of reaction rate and application of rate law on dynamic chain reaction Reaction catalyts	Schrodinger Wave equation, variation and perturbation theory, Classical thermodynamics, Phase rule, chemical dynamics, Arrhenius Equation, Theory of reaction rate and application of rate law on dynamic chain reaction Reaction catalyts	
27	Spectroscopy	MCH 104	Electromagnetic spectrum Microwave spectroscopy Infrared Spectroscopy Raman and Electronic spectroscopy. CARS (Coherent and Stokes Raman Spectroscopy) and application of these spectral techniques in structure determination of molecule.	Electromagnetic spectrum Microwave spectroscopy Infrared Spectroscopy Raman and Electronic spectroscopy. CARS (Coherent and Stokes Raman Spectroscopy) and application of these spectral techniques in structure determination of molecule.	

28	Mathematics for Chemist	MCH 105A	Basic concept of mathematical technique involved in Chemistry like Mathematics Algebra Differential calculus, integral calculus, Elementary differential equation Permutation Probability.	Basic concept of mathematical technique involved in Chemistry like Mathematics Algebra Differential calculus, integral calculus, Elementary differential equation Permutation Probability.	
29	Biology for Chemist	MCH 105B	Cell structure Cell organs, and their function Carbohydrates, Lipids and fats, amino acids Nucleic acids	Cell structure Cell organs, and their function Carbohydrates, Lipids and fats, amino acids Nucleic acids	



30	Inorganic Chemistry	MCH 106	<p>Qualitative and Quantitative Analysis Chromatography Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra.</p>	<p>Qualitative and Quantitative Analysis Chromatography Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra.</p>
31	Organic Chemistry	MCH 107	<p>Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis. Organic Synthesis- Purification of compounds by TLC and column chromatography. Aromatic electrophilic substitutions, Reduction reaction <i>Quantitative Analysis</i>-Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method</p>	<p>Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis. Organic Synthesis- Purification of compounds by TLC and column chromatography. Aromatic electrophilic substitutions, Reduction reaction <i>Quantitative Analysis</i>-Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method</p>

32	Physical Chemistry	MCH 108	Adsorption Phase Equilibria Chemical Kinetics Solutions		Adsorption Phase Equilibria Chemical Kinetics Solutions
33	Inorganic Chemistry	MCH201	Metal ligand equilibrium, reaction mechanism, base hydrolysis, conjugate base mechanism in octahedral and mechanism of square planar complexes. Metal-ligand bonding Calculations of Dq , B and beta parameters Preparation, properties, structure and applications of metal nitrosyls. Symmetry elements, symmetry operations and the principle involved in group theory	Metal ligand equilibrium, reaction mechanism, base hydrolysis, conjugate base mechanism in octahedral and mechanism of square planar complexes. Metal-ligand bonding Calculations of Dq , B and beta parameters Preparation, properties, structure and applications of metal nitrosyls. Symmetry elements, symmetry operations and the principle involved in group theory	

34	Organic Chemistry	MCH 202	<p>Mechanism- aromatic/aliphatic electrophilic substitution Free radical, allylic halogenation reaction, Addition to carbon-carbon and carbon-hetero atom multiple bond and aromatic nucleophilic substitution, SE1, SE2, SN1 SN2 & SRN1 reactions. ESR Spectroscopy IR and Raman spectra and their application in characterization of organic compounds</p>	<p>Mechanism- aromatic/aliphatic electrophilic substitution Free radical, allylic halogenation reaction, Addition to carbon-carbon and carbon-hetero atom multiple bond and aromatic nucleophilic substitution, SE1, SE2, SN1 SN2 & SRN1 reactions. ESR Spectroscopy IR and Raman spectra and their application in characterization of organic compounds</p>	
35	Physical Chemistry	MCH 203	<p>Chemical dynamics Adsorption and electrokinetic phenomenon, Micellization, DHO equation. Lipmann electro-capillary phenomenon including different models. Macromolecules and colloid including their types, emulsification, irreversible electrode phenomenon including decomposition voltage overlaps.</p>	<p>Chemical dynamics Adsorption and electrokinetic phenomenon, Micellization, DHO equation. Lipmann electro-capillary phenomenon including different models. Macromolecules and colloid including their types, emulsification, irreversible electrode phenomenon including decomposition voltage overlaps.</p>	

36	Spectroscopy & Diffraction Methods	MCH204	Photoelectron spectroscopy, photoacoustic spectroscopy, X ray Diffraction, Neutron Diffraction. Biological cell, constituents, Bioenergetics Thermodynamics of biopolymer solution and transport of ion through the cell membrane	Photoelectron spectroscopy, photoacoustic spectroscopy, X ray Diffraction, Neutron Diffraction. Biological cell, constituents, Bioenergetics Thermodynamics of biopolymer solution and transport of ion through the cell membrane	
37	Computer for Chemist	MCH205	Basic knowledge of computer and computing BASIC and FORTRAN based programming with especial reference to programming in chemistry. Rerunning of standard program in MS Word and MS Excel Search engines and various types of files like PDF, RTF, JPG OMR & Webcam.	Basic knowledge of computer and computing BASIC and FORTRAN based programming with especial reference to programming in chemistry. Rerunning of standard program in MS Word and MS Excel Search engines and various types of files like PDF, RTF, JPG OMR & Webcam.	

38	Inorganic Chemistry	MCH 206	<p>Chromatography Separation of cations and anions by Column Chromatography Estimation of Ni – Fe, Ni (Gravimetrically), Fe (Volumetrically) Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra. <i>Interpretation of TG and NMR spectra of some known compounds</i></p>	<p>Chromatography Separation of cations and anions by Column Chromatography Estimation of Ni – Fe, Ni (Gravimetrically), Fe (Volumetrically) Preparations- Preparation of selected inorganic complexes and their studies by measurements of decomposition temperature, molar conductance, IR and electronic spectra. <i>Interpretation of TG and NMR spectra of some known compounds</i></p>
39	Organic Chemistry	MCH 207	<p>Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis. Preparation of phenyl azo – β – naphthol from aniline. Aromatic electrophilic substitutions, Reduction reaction <i>Quantitative Analysis</i>-Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method</p>	<p>Qualitative Analysis: Separation, purification and identification of compounds of binary mixture. Emphasis should be placed on physical principles, reaction chemistry and the technique involved in analysis. Preparation of phenyl azo – β – naphthol from aniline. Aromatic electrophilic substitutions, Reduction reaction <i>Quantitative Analysis</i>-Determination of the percentage or number of hydroxyl groups in an organic compound by acetylation method</p>

40	Physical Chemistry	MCH 208	<i>Electrochemistry Conductometry Potentiometry/pH merry Polarimetry</i>		<i>Electrochemistry Conductometry Potentiometry/pH merry Polarimetry</i>
41	Inorganic Chemistry	MCH301	Group theory, Character tables, orthogonality theorem, applications for C _{2v} a Correlation of vibrational spectroscopy with group theory. They will also un levels and M.O. Diagrams, bonding of multidentate ligands, characterization Shift reagents in NMR spectroscopy Structure and functioning of metalloenzymes e.g., carboxypeptidase, carboni Structure and functioning of biomolecules like Hemoglobin	Group theory, Character tables, orthogonality theorem, applications for C _{2v} a Correlation of vibrational spectroscopy with group theory. They will also un levels and M.O. Diagrams, bonding of multidentate ligands, characterization Shift reagents in NMR spectroscopy Structure and functioning of metalloenzymes e.g., carboxypeptidase, carboni Structure and functioning of biomolecules like Hemoglobin	
42	Organic Chemistry	MCH302	Basic theory of NMR spectroscopy, applications to characterize organic comp Photochemical reactions. Mechanism of pericyclic reaction, Woodward Haffmann, FMO &PMO approach Sigma tropic rearrangements.	Basic theory of NMR spectroscopy, applications to characterize organic comp Photochemical reactions. Mechanism of pericyclic reaction, Woodward Haffmann, FMO &PMO approach Sigma tropic rearrangements.	
43	Physical Chemistry	MCH303	Atomic concepts, Russell-Saunders terms and coupling. Molecular Orbitals, systems like ethylene, butadiene Homo and heterogeneous catalysis. Crystal defects. Schottky and Frankel defects Solid state reactions. Metallic bond Conductors, semiconductors, insulators and superconductors	Atomic concepts, Russell-Saunders terms and coupling. Molecular Orbitals, systems like ethylene, butadiene Homo and heterogeneous catalysis. Crystal defects. Schottky and Frankel defects Solid state reactions. Metallic bond Conductors, semiconductors, insulators and superconductors	

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44	Analytical Chemistry	MCH304B	<p>Statistical Analysis., Sample Preparation for Chromatography. Chromatography. Theory of Chromatography, Gas Chromatography, HPTLC Chromatography, Capillary Electrophoresis.</p> <p>Ion Exchange, Solvent Extraction Atomic Absorption Spectrometry, Electrolytic Methods Acid-Base Titration, Complexometric Titrations,.</p>	<p>Statistical Analysis., Sample Preparation for Chromatography. Chromatography. Theory of Chromatography, Gas Chromatography, HPTLC Chromatography, Capillary Electrophoresis. Ion Exchange, Solvent Extraction Atomic Absorption Spectrometry, Electrolytic Methods Acid-Base Titration, Complexometric Titrations, Redox Titrations</p>	
45	Photochemistry	MCH304C	<p>Photochemical Reactions</p> <p>Determination of Reaction Mechanism</p> <p>Photochemistry of Alkene, Carbonyl</p> <p>Miscellaneous Photochemical Reactions, Photo degradation of polymers. Photochemistry of vision.</p>	<p>Photochemical Reactions</p> <p>Determination of Reaction Mechanism</p> <p>Photochemistry of Alkene, Carbonyl</p> <p>Miscellaneous Photochemical Reactions, Photo degradation of polymers. Photochemistry of vision.</p>	
46	Inorganic Chemistry	MCH306	<p>Synthesis of selected inorganic compounds and their studies by measurement temperatures and molar conductance, magnetic and IR electronic spectra. Qualitative test of suitable anion and determination of metal content gravimetrically compounds.</p> <p>Interpretation of ESR and mass spectra of some known coordination compounds.</p>		<p>Synthesis of selected inorganic compounds and their studies by measurement temperatures and molar conductance, magnetic and IR electronic spectra.</p> <p>Qualitative test of suitable anion and determination of metal content gravimetrically compounds.</p> <p>Interpretation of ESR and mass spectra of some known coordination compounds.</p>

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47	Organic Chemistry	MCH307	Qualitative Analysis, Separation, purification and systematic identification of the components of compounds (solids and liquids). Preparation of one derivative of each compound Use of TLC for ascertainment of purity of compounds, Multi-step Synthesis.		Qualitative Analysis, Separation, purification and systematic identification of the components of compounds (solids and liquids). Preparation of one derivative of each compound Use of TLC for ascertainment of purity of compounds, Multi-step Synthesis.
48	Physical Chemistry	MCH308	Potentiometry, Conductivity, Spectrophotometry Molecular Modeling.		Potentiometry, Conductivity, Spectrophotometry Molecular Modeling.
49	Inorganic Chemistry	MCH401	ESR Spectroscopy, Mossbauer, IR, Raman spectroscopy, Point groups and vibrational spectroscopy. Bio-inorganic chemistry, chlorophyll, photo systems one and two, Metalloprotein scytochromes, iron Sulphur protein, Nitrogen fixation.	ESR Spectroscopy, Mossbauer, IR, Raman spectroscopy, Point groups and vibrational spectroscopy. Bio-inorganic chemistry, chlorophyll, photo systems one and two, Metalloprotein scytochromes, iron Sulphur protein, Nitrogen fixation.	
50	Organic Chemistry	MCH402	¹³ C NMR Spectroscopy, Mass spectroscopy. Reaction mechanism of elimination, E1, E2 & E1CB type, Substitution reactions. Enzyme structure and functioning.	¹³ C NMR Spectroscopy, Mass spectroscopy. Reaction mechanism of elimination, E1, E2 & E1CB type, Substitution reactions. Enzyme structure and functioning.	
51	Physical Chemistry	MCH403	NMR, ESR spectroscopy. Laws of photochemistry, fluorescence, Steric and conformational properties of molecules, Winstein-Holmer and Curtin-Hammett Equations CO5: Electronic effects involved in SN1 and SN2 type of reactions, and curve crossing model.	NMR, ESR spectroscopy. Laws of photochemistry, fluorescence, Steric and conformational properties of molecules, Winstein-Holmer and Curtin-Hammett Equations CO5: Electronic effects involved in SN1 and SN2 type of reactions, and curve crossing model.	

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52	Polymer Chemistry	MCH404	Basic theory, classification of polymers Characterization, important properties of polymers, Commercial importance of polymers Processing to understand different types of casting like die-rotational, film Methods for designing variety of polymers.	Basic theory, classification of polymers Characterization, important properties of polymers, Commercial importance of polymers Processing to understand different types of casting like die-rotational, film Methods for designing variety of polymers.	
53	Chemistry of Natural Products	MCH405	Terpenoids, Alkaloids, Steroids Plant Pigments. Carotenoid, Flavonoids, Chlorophyll, Vitamins and Antibiotics,	Terpenoids, Alkaloids, Steroids Plant Pigments. Carotenoid, Flavonoids, Chlorophyll, Vitamins and Antibiotics,	
54	Inorganic Chemistry	MCH406	Spectrophotometric Determination Flame photometric determination. Model Experiments on Cyclic Voltammetry Interpretation of ESR, NMR and Thermogravimetric pre-recorded results of known compounds.	Spectrophotometric Determination. Flame photometric determination. Model Experiments on Cyclic Voltammetry Interpretation of ESR, NMR and Thermogravimetric pre-recorded results of known compounds.	Spectrophotometric Determination. Flame photometric determination. Model Experiments on Cyclic Voltammetry Interpretation of ESR, NMR and Thermogravimetric pre-recorded results of known compounds.
55	Organic Chemistry	MCH407	Multi-step Synthesis - Qualitative & Quantitative Quantitative Analysis Spectral Analysis: Interpretation of pre recorded UV-Vis, IR, NMR, Mass characterization of one organic compound.	Multi-step Synthesis - Qualitative & Quantitative Quantitative Analysis Spectral Analysis: Interpretation of pre recorded UV-Vis, IR, NMR, Mass characterization of one organic compound.	Multi-step Synthesis - Qualitative & Quantitative Quantitative Analysis Spectral Analysis: Interpretation of pre recorded UV-Vis, IR, NMR, Mass characterization of one organic compound.
56	Physical Chemistry	MCH408	Spectrophotometry Chemical Kinetics Electronics Molecular Modeling	Spectrophotometry Chemical Kinetics Electronics Molecular Modeling	Spectrophotometry Chemical Kinetics Electronics Molecular Modeling