DEPARTMENT OF CHEMISTRY

B.Sc. Chemistry

PROGRAMME OUTCOMES:

After completing B.Sc. Chemistry programme, students will be able to:

Knowledge Outcomes:

Students are expected to

PO1: Demonstrate and apply the fundamental knowledge of the basic principles in the fields of Chemistry

PO2: Create awareness and sense of responsibilities towards environment and apply knowledge to solve the issues related to Environmental pollution.

PO3: Apply fundamental knowledge for doing qualitative and quantitative analyses in various fields.

Skill Outcomes: It would help students to learn to

PO4: collaborate effectively on team-oriented projects in the field of Chemistry and life sciences.

PO5: communicate scientific information in a clear and concise manner both orally and in writing

PO6: Explain environmental pollution issues and the remedies thereof.

PO7: know the importance of chemistry in everyday life. They will be able to relate physical and chemical phenomena around us with chemical point of view.

PO8: apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.

Generic Outcomes:

PO10: Have developed their critical reasoning, judgment and communication skills.

PO11: acquired a basic knowledge and skillset for becoming employable.

PO12: will enhance the scientific temper among the students so as to develop a research interest.

COURSE OUTCOMES:

F. Y. B Sc.

Course: 71310 Semester I

Course Name: Physical and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: Know the difference in behaviour of ideal gas and real gas.

CO2: Difference in properties of gases and liquids and its applications in various fields.

CO3: Properties of adsorption, colloids and emulsions in daily use.

Course: 71320 Semester II

Course Name: Physical and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: explain different theories of atomic models

CO2: understand colloids, their properties and stability.

CO3: know the meaning of terms catalyst, catalysis, positive catalysis and negative catalysis, different characteristics of catalytic reactions

CO4: understand definition of hybridization, its types and able to explain the hybridization of simple compounds.

CO5: know the electronic configuration of elements, definition of different types of bonds

(ionic, covalent, coordinate) with example and metallic bonds and theories related to it.

Course: 71320 Semester I

Course Name: Organic and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: Know about types of bonds, reactivity, different effects and hybridization concept

CO2: understand basic structure of organic compound their IUPAC name

CO3: know about reactions and preparation methods of different functional organic molecule

CO4: learn properties of s- block elements

Course: 71320 Semester II

Course Name: Organic and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: know basics of stereochemistry.

CO2: be well acquainted with different functional groups and their reactions in organic Chemistry

CO3: distinguish p-block elements, their trends in properties and applications.

Course: Chemistry Practical – I (71330)

After successfully completing this course, students will be able to:

CO1: prepare normal and molar solution.

CO2: calculate molecular weight, equivalent weight, normality, and molarity.

S.Y. B. Sc. Chemistry (2014 Pattern)

Course: 81311 Semester I

Course Name: Physical and Analytical Chemistry

After successfully completing this course, students will be able to:

CO1: know about Kinetics

CO2: know about Photochemistry

CO3: know about the Chemical analysis

Course : 81312 Semester II

Course: Physical and Analytical Chemistry

After successfully completing this course, students will be able to:

CO1: understand Thermodynamical phenomena of free energy and equillibria

CO2: know P-N, T-N diagrams

CO3: know liquid solution miscibility features.

CO4: understand basics of Volumetric Analysis and titration curves.

Course: 81321 Semester I

Course: Organic and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: Know about the stereochemistry (chirality, optical activity, enantiomers,etc.) of cyclohexane and other organic compounds.

CO2: understand Addition, Elimination, substitution (aliphatic electrophilic and nucleophilic, aromatic Electrophilic) and rearrangement reactions.

CO3: know about General Principles of Metallurgy in metal extraction e.g. Al.

CO5: understand Corrosion and Passivity in metals.

Course: 81322 Semester II

Course: Organic and Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: know about general oxidizing and reducing reagents.
CO2: know the structure, properties, synthesis and reactions five and six member heterocyclic compounds.
CO3: know the properties of different biomolecules.
CO4: understand the uses of organometallic compounds.
CO5: know toxic chemicals in the environment.

Course: Practical Chemistry (81332)

After successfully completing this course, students will be able to:

CO1: Know about the technique Inorganic Qualitative as well as Quantative analysis
CO2: Know about the technique Organic Qualitative analysis

T. Y. **B. Sc. Chemistry (2014 Pattern)**

Course: 91313 Semester I

Course Name: Physical Chemistry

After successfully completing this course, students will be able to:

CO1: identify the molecularity of chemical reactions and experimentally determine the order of the reaction.
CO2: calculate the rate of reaction and factors which can alter the rate.
CO3: predict the strong and weak electrolytes based on dissociation constant by conductance measurements.
CO4: know how the phases of substances change with change in pressure and temperature.
CO5: know how molecular spectroscopy used to identify structure of molecules

Course: 91314 Semester II

Course Name: Physical Chemistry

After successfully completing this course, students will be able to:

CO1: identify Radioactive nuclides and write the nuclear reactions after decay of specific particles and also calculate the decay constant, half life of radioactive nuclides.

CO2: Know the applications of various tracers used in medicines and other fields of research.

CO3: Can draw the different crystal structures and explain different elements of symmetry. Calculate the d spacing in crystal structure and theta values in XRD analysis.

CO4: calculate the degeneracy of molecules, energy change during excitations and bond length of molecules. Uncertainty of position and momentum in microscopic particles.

CO5: know Nernst equation for electrochemical cells, calculate the E-cell of different cells and identify the oxidation and reduction half cells in the given cells

Course: 91323 Semester I

Course Name: Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: know IUPAC nomenclature of coordinate complexes.

CO2: know application of VBT, CFT, MOT in coordination chemistry.

CO3: know about MOT diagrams of homodiatomic molecules from H_2 to Ne_2.

CO4: know of isomerism in coordinate complexes.

Course: 91324 Semester II

Course Name: Inorganic Chemistry

After successfully completing this course, students will be able to:

CO1: A student should be able to explain the meaning of the terms f-block elements, inner transition elements, lanthanides, actinides.

CO2: The difference between metal, semiconductor and insulator.

CO3: .Draw the cubic, BCC and FCC structures.

CO4: Homogeneous heterogeneous catalysis with examples.

CO5: Metalloproteins, Haemoglobin and Myoglobin.

Course: 91333 Semester I

Course Name: Organic Chemistry

After successfully completing this course, students will be able to:

CO1: understand importance of IUPAC nomenclature of organic compounds and will be able to draw their structures and name them.

CO2: Compare acidity and basicity of organic compounds and can predict factors like inductive, resonance, hyper-conjugation and tautomerism effects affecting pk_a with examples.

CO3: understand about nucleophilic substitutions, addition and elimination reactions and will be able to predict products in such reactions.

CO4: know the Stereochemistry of di-substituted cyclohexane and the relative stabilities

Course: 91334 Semester II

Course Name: Organic Chemistry

After successfully completing this course, students will be able to:

CO1: understand the concept of retrosynthetic analysis of a target molecule and how to strategically plan synthesis of any given target.

CO2: understand structure, reactivity of carbanions and rearrangements useful in designing organic syntheses.

CO3: learn basic principles of organic spectroscopy and can deduce structures of molecules by exploring the given spectral data of UV, IR and PMR.

CO4: learn basics of natural products alkaloids and terpenoids and general methods for determination of their structure.

CO5: be familiar to basic synthetic methods and use of spectral data in organic chemistry

Course : 91343 Semester I

Course: Analytical Chemistry

After successfully completing this course, students will be able to:

CO1: Know about the technique of Gravimetric analysis

CO2: Know about the technique of Electrogravimetric analysis

CO3: Know about the technique of Polarography

CO4: Know about the technique of Spectrophotometric analysis

CO5: Know about the applications of above techniques

Course : 91344 Semester II

Course: Analytical Chemistry

After successfully completing this course, students will be able to:

CO1: learn basics of Chromatography and types.

CO2: understand techniques of Solvent Extraction and Electrophoresis.

CO3: know about techniques of Nephelometry and Turbidimetry.

Course : 91353 Semester I

Course: Industrial Chemistry

After successfully completing this course, students will be able to:

CO1: understand various methods of preparation of various important chemicals.

CO2: understand synthesis and applications of Agrochemicals.

CO3: understand functioning of industry and safety measures in industry.

CO4: know how industries synthesize chemicals on large scale and industrial processes.

Course : 91354 Semester II

Course: Industrial Chemistry

After successfully completing this course, students will be able to:

CO1: know polymer chemistry, their synthetic methods and utilization in real life.

CO2: understand synthetic process of sugar and fermentation process

CO3: know the synthesis of dyes and paints.

CO4: understand pollution prevention and waste management.

.**Course : 913D3 Semester I**

Course: Environmental and Green Chemistry

After successfully completing this course, students will be able to:

CO1: understand various methods of creating pollution.

CO2: get awareness of environmental problems occurring due to pollution and other man made activities.

CO3: understand the problems and their solution to reduce the environmental current issues.

CO4: develop interest in making new methodologies for reducing pollution or harm caused by man made activities to the environment.

CO5: apply Green chemistry rules for various synthetic routes of chemicals and to reduce the use of non-renewable sources of energy.

Course : 913D4 Semester II

Course: Environmental and Green Chemistry

After successfully completing this course, students will be able to:

CO1: understand various types of soil and their nature and also the fertility of soil.

CO2: understand different methods of water treatment and effluent management.

CO3: learn various instrumentation methods in environmental analysis.

CO4: understand energy relations and how the water is used as solvent in various organic and inorganic reaction (Universal solvent).

Course: Physical Chemistry Practical (91374)

After successfully completing this course, students will be able to:

CO1: identify the molecularity of chemical reactions and to calculate the rate of reaction experimentally and determine the order of the reaction.

CO2: measure different physical parameters and monitor chemical reactions based on any physical parameters

CO3: prepare solutions of molarity, normality, molality and density by using specific gravity

bottle, etc.

CO4: Plot graph and calculate the values necessary for different experiments.

Course: Inorganic Chemistry Practical (91384)

After successfully completing this course, students will be able to:

CO1: identify the basic radicals and acidic radicals present in binary inorganic mixture.

CO2: use column chromatography to analyse binary cationic mixture.

CO3: know the techniques of gravimetry and colorimetry for quantitative analysis

CO4: to prepare inorganic coordination complexes

Course: Organic Chemistry Practical (91394)

After successfully completing this course, students will be able to:

CO1: identify, separate and analyze qualitatively mixtures of organic compounds effectively.

CO2: carry out syntheses of small organic molecules on micro scale.

CO3: carry out quantitative estimation of organic compounds.

CO4: learn the basic techniques and their use for analyses, syntheses, and research and also basic

computer skills.. It would develop analytical independent thinking required for academics,

research and industrial work.

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