Programme Name: B.Sc. in Chemistry (FYUGP)

PROGRAMME OUTCOMES (POs)

After completing the Four-Year Undergraduate Programme in Chemistry, Students are expected to achieve the following Programme Outcomes:

PO1. Strong grip on fundamental and practical Chemistry knowledge

- Exhibit knowledge of the discipline
- Identify and explain seminal pieces of work in the area
- Conduct guided academic inquiries in various areas of interest in the chosen discipline
- Apply theoretical notions into practice in different forms

PO2. Creative and critical thinking, and problem-solving:

- Recognize the social structures underlying our society
- Identify the implications of the same in our existence
- Analyse and engage with their social surroundings, problematize and raise questions based on academic inquiry
- Take informed actions

PO3: Interest in research-based problem:

- Tools and techniques of research
- Methodology of research

PO4: Digital Fluency:

- Develop skill on programming languages
- Effective communication through e-learning

PO5: Teamwork and communication skills:

- Development of entrepreneurial mind-set, leadership skills and emotional intelligence to face the evolving marketplace.

PO6. Professionalism and leadership readiness:

- Act with an informed awareness of issues
- Engage in initiatives that encourage equity and growth for all

PO7. Social Responsibility:

- Function as a collaborating member in teams in multidisciplinary settings

PO8. Appreciation and adherence to Ethical integrity:

- Recognize and respect different value systems including one's own
- Follow the norms of academic integrity
- Take cognizance of the moral implications of our decisions

PROGRAMME SPECIFIC OUTCOMES

Programme Name: **B.Sc. in Chemistry (FYUGP)**

By the end of the B.Sc. in Chemistry (FYUGP) programme students should be able to:

PSO1: Understand the basics of Chemistry

- Develop the basic knowledge of chemistry in relation to atomic structure, bonding, periodicity etc.
- Emphasize on different states of matter & their mechanical treatment.

PSO2: Applications of Chemistry in day to day Life

- Apply the comprehensive understanding of chemical principles to solve practical problems in various fields such as pharmaceuticals, environmental science, and materials science.
- Understand Foundations of chemistry

PSO3: Development of Analytical and experimental skills

- Analyse the issues to solve them with the design, conduct, and interpretation of experiments
- Enabling students with analysing data critically, and presenting their findings effectively

COURSE OUTCOMES (COs)

Paper title: **Core Course -1**

Paper Code: **CHMC1**

Nature of Course: CHEMISTRY MAJOR

Total Credits: **4**

After the end of the course, students will be able to

- **CO1:** Understand the periodic properties of elements, bonding in various molecules.
- **CO2:** Know about properties of gaseous and liquid states of matter, basic organic chemistry and stereochemistry, etc.
- **CO3:** Handle the viscometer for determining the viscosity and different compounds which have immense applications in industry and day to day life.
- **CO4:** Learn the stalagometer for determining the surface tension and different compounds which have immense applications in industry and day-to-day life.
- **CO5:** Purify the various organic compounds through recrystallizations and melting point determinations.

Paper title: **Fundamentals of Chemistry - 1**

Paper Code: **MINCHM1**

Nature of Course: MINOR COURSE 1

Total Credits: **4**

After the end of the course, students will be able to

- **CO1:** Explain the sign of wave function, counter boundary and probability diagrams, different types of bonds and its application.
- **CO2:** Understand the kinetic molecular model of a gas, behaviour of real gases.
- **CO3:** Explain the basic organic chemistry and its importance with reaction mechanism
- **CO4:** Analyse the inorganic salt mixture qualitatively.
- **CO5:** Understand the vander waals equation, viscosity of gases.

Paper title: **Chemistry in Daily Life- I**
Paper Code: **GECCHM1**
Nature of Course: NATURAL SCIENCE
Total Credits: 3

After the end of the course, students will be able to-

- **CO1:** Understand the composition, processing and analysis of dairy products
- **CO2:** Learn about the various food preservatives.
- **CO3:** Learn about artificial food colorants
- **CO4:** Understand about different types of food additive
- **CO5:** Aware the adverse effects of food adulterants in human health

Paper title: **Core Course -2**
Paper Code: **CHMC2**
Nature of Course: CHEMISTRY MAJOR
Total Credits: **4**

After the end of the course, students will be able to-

- **CO1:** Understand the preparation, structure and uses of nontransition elements; extraction techniques of metals.
- **CO2:** Understand the various terms and laws of thermodynamics; crystal structure and crystal defects.
- **CO3:** Carry out the preparation & properties of alkanes, alkenes and alkynes etc.
- **CO4:** Estimate iron and oxalic acid indifferent stock solutions provided to the learners which have applications in industry.
- **CO5:** Detect elements and functional groups indifferent organic samples.

Paper title: **Fundamentals of Chemistry - 2**
Paper Code: **MINCHM2**
Nature of Course: MINOR COURSE
Total Credits: **4**

After the end of the course, students will be able to-

- **CO1:** Understand VBT, CFT and applications of some complexes in various fields.
- **CO2:** Understand VBT, CFT and applications of some complexes in various fields.

CO3: Illustrate the applications of solubility and solubility product principle.

CO4: Understand the stereochemistry and conformational analysis.

CO5: Handle pH meter, viscometer and stallagometer for determination of pH, viscosity and surface tension of liquids.

Paper title: **Chemistry in Daily Life- II**

Paper Code: **GECCHM2**

Nature of Course: NATURAL SCIENCE

Total Credits: 3

After the end of the course, students will be able to-

CO1: Understand structure of biomolecules.

CO2: Understand relationship between reactivity of biomolecules and biological functions.

CO3: Demonstrate how structure of biomolecules determines their reactivity and biological functions.

CO4: Explain the various types of vitamins.

CO5: Explain the roles/functions of various types of vitamins.

Paper title: Core Course -3

Paper Code: **CHMC3**

Nature of Course: CHEMISTRY MAJOR

Total Credits: **4**

After the end of the course, students will be able to-

CO1: Elucidate inorganic reaction mechanism, stability of complexes, substition reactions

CO2 : Learn about coordination compounds – ligands, theories, d-orbital splitting, electronic spectra, etc

CO3: Understand second and third laws of thermodynamics, ionic equilibria – electrolyte, ionization, dissociation

CO4: Learn about cycloalkanes and conformational analysis, chemistry of halogenated alkyl halides

CO5: Carry out experimental works on inorganic preparation and pH-metry

Paper title: Core Course -4

Paper Code: **CHMC4**

Nature of Course: CHEMISTRY MAJOR

Total Credits: **4**

After the end of the course, students will be able to-

CO1: Understand the principle involved and application of redox reactions.

CO2: Acquire knowledge on acids and bases; understand the chemistry of lanthanide and actinide.

CO3: Learn various laws of electrochemistry, measurements of conductance, applications of electrolysis in industry, electrochemical cells, etc.

CO4: Understand the chemistry of aromatic hydrocarbons and alcohols containing C-O bond.

CO5: Carry out experimental works on conductometry, thermochemistry and qualitative analysis of organic compounds

Paper title: **Fundamentals of Chemistry - 3**

Paper Code: **MINCHM3**

Nature of Course: MINOR COURSE

Total Credits: **4**

After the end of the course, students will be able to-

CO1: Learn chemistry of non-metals such as Boron, Silicon. Nitrogen, Phosphorus.

CO2: Understand the general principles of metallurgy.

CO3: Gain concept of chemical thermodynamics; First and second law of thermodynamics

CO4: Understand the chemistry of Aromatic Hydrocarbons, Alkyl and Aryl halides.

CO5: Carry out Organic Qualitative Analysis practical.

Paper title: **Chemistry in Daily Life- III**
Paper Code: **GECCHM3**
Nature of Course: NATURAL SCIENCE
Total Credits: 3

After the end of the course, students will be able to-

CO1: Gain knowledge on Chemical and Renewable Energy Sources.

CO2: Understand the basic concept of polymers, classification, characteristics and application of polymers.

CO3: Know the chemistry of Cosmetics & Perfumes.

CO4: Learn different types of fertilizers, manufacture and applications of fertilizers.

CO5: Build strategies for the development of environment friendly polymers.

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