PO-PSO-CO Attainment Calculation

Department: Chemistry

Programme Specific Outcome (PSO)

PSO 1: To gain knowledge of the fundamental concepts of Chemistry and applied chemistry through theory and practicals.

PSO 2: Building communication skills and critical thinking capacity to solve their problems methodically and share their idea/findings to others.

PSO 3: To receive analytical skill development knowledge and motivation for research.

PSO 4: To improvise social awareness towards green chemistry to make our planet suitable for living.

Programme Outcome (PO)

PO 1: To develop comprehensive subject understanding in both theoretical and practical knowledge.

PO 2: Capable of expressing the subject through technical writing/oral presentation.

PO 3: To develop an inquisitive characteristics among the students.

PO 4: To build the students to act as a team player via contributing in laboratory, field studies etc.

PO 5: To become a skilled project manager by acquiring knowledge about chemistry project management, writing proposals for scientific project operation.

PO 6: To develop ethical awareness.

PO 7: To understand the environmental awareness by following green routes.

PO 8: To improvise analytically skilled via using different instrumentation for characterising and analyse,

PO 9: To receive job opportunities in different area via obtaining skills practically and theoretically.

Mapping of COs with POs and PSOs

Degree of correlations on 3-point scale: Assign value examining the course content of each CO correlated with each POs and PSOs as follows: High-3, Medium-2, Low-1 and no correlation-put hyphen mark.

Paper Code: CHE-HC-1016

Paper Title: Inorganic Chemistry

Course Learning Outcomes:

CO-1: To know extra nuclear structure of atom including wave mechanics.
CO-2: To understand periodicity of elements.
CO-3: To know different types of chemical bonding including weak chemical forces and basic concept of redox reactions.
CO-4: To learn experimentally about the Titrimetric analysis of acid-base and oxidation-reduction titration

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	-	-
CO2	3	1	2	-	-	-	-	-	-	3	2	-	-
CO3	3	1	1	-	-	-	-	-	-	3	2	-	-
CO4	2	3	2	2	1	-	1	2	2	2	2	2	2
Aver.	2.75	1.5	1.75	0.5	0.25	-	0.25	0.5	0.5	2.75	2	0.5	0.5

Paper Code: CHE-HC-1026

Paper Title: Physical Chemistry

Course Learning Outcomes:

CO-1: To understand the basic concept of kinetic theory of gases and know how to solve numerical problems related to that topic.
CO-2: To learn the structural and physical properties of liquid.
CO-3: To understand elementary idea of molecular and crystal symmetry with symmetric operation along with basic concept of solid state crystallography.
CO-4: To understand about Ionic behavior of solution, salt hydrolysis, buffer solution and multistage equilibria in polyelectrolyte system.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	-	-
CO2	3	1	2	-	-	-	-	-	-	3	2	-	-
CO3	3	1	2	-	-	-	-	1	-	3	2	-	-
CO4	2	3	2	2	-	-	-	1	1	2	2	2	-
Aver.	2.75	1.5	2	0.5	-	-	-	0.5	0.25	2.75	2	0.5	-

Paper Code: CHE-HC-2016

Paper Title: Organic Chemistry

Course Learning Outcomes:

CO-1: To learn the basic concept of organic chemistry including reaction intermediates and introduction of types of organic reactions.
CO-2: To learn the stereochemistry of chiral compounds arises due to presence of stereo-axis and optical activity of chiral compounds.
CO-3: To understand chemistry of aliphatic and aromatic hydrocarbons with their different types of isomerism and to study the reaction mechanism
CO-4: To learn experimentally the purification and how to synthesize, calculate the yield and determine the melting point of pure organic compounds in the laboratory.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	2	-
CO2	3	1	2	-	-	-	-	-	-	3	2	2	-
CO3	3	1	2	-	-	-	-	-	-	3	2	2	-
CO4	2	2	2	2	1	-	2	2	2	2	2	2	1
Aver.	2.75	1.25	2	0.5	0.25	-	0.5	0.5	0.5	2.75	2	2	0.25

Paper Code: CHE-HC-2026

Paper Title: Physical Chemistry

Course Learning Outcomes:

CO-1: To learn about the basic concepts of thermodynamics including thermochemistry and system of variable composition.
CO-2: To study the Chemical equilibrium including its thermodynamic concept
CO-3: To study the colligative properties of solutions.
CO-4: To know experimentally how to determine heat capacity of a calorimeter and enthalpy of neutralization, ionization of acid and enthalpy of solution.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	2	-
CO2	3	1	2	-	-	-	-	-	-	3	2	2	-
CO3	3	1	2	-	-	-	-	-	-	3	2	2	-
CO4	2	2	2	1	1	-	-	2	1	2	2	2	-
Aver.	2.75	1.25	2	0.25	0.25	-	-	0.5	0.25	2.75	2	2	-

Paper Code: CHE-HC-3016

Paper Title: Inorganic Chemistry

Course Learning Outcomes:

CO-1: To learn General Principle of Metallurgy: extraction and refining methods of different metals.
CO-2: To learn the chemistry of s, p-block, noble gas elements and their compounds along with acid base theory.
CO-3: To learn about Inorganic polymer and comparative study with organic polymers.
CO-4: Experimental study of Iodo- and Iodimetric titration and inorganic preparation.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	2	-
CO2	3	1	2	-	-	-	-	-	-	3	2	2	-
CO3	3	1	2	-	-	-	-	-	-	3	2	2	-
CO4	2	2	2	1	1	-	2	2	1	2	2	2	1
Aver.	2.75	1.25	2	0.25	0.25	-	0.5	0.5	0.25	2.75	2	2	0.25

Paper Code: CHE-HC-3026

Paper Title: Organic Chemistry

Course Learning Outcomes:

CO-1: To study in detail the chemistry of halogenated hydrocarbons, their specific reactions and synthesis.
CO-2: To study the chemistry of Alcohols, Phenols, Ethers and Epoxides, Carbonyl compounds, Carboxylic acids and their derivatives comprising preparation, properties and specific reactions.
CO-3: To study the preliminary reactions and reactions of Sulphur compounds.
CO-4: To learn how to determine the presence of functional groups in organic compounds and preparation of organic compounds.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	2	-
CO2	3	1	2	-	-	-	-	-	-	3	2	2	-
CO3	3	1	2	-	-	-	-	-	-	3	2	2	-
CO4	2	2	2	1	1	-	2	2	1	2	2	2	1
Aver.	2.75	1.25	2	0.25	0.25	-	0.5	0.5	0.25	2.75	2	2	0.25

Paper Code: CHE-HC-3036

Paper Title: Physical Chemistry

Course Learning Outcomes:

CO-1: To learn about the Phase Equilibria
CO-2: To learn about Chemical kinetics of various types of reactions.
CO-3: To study Catalysis process, properties and function of catalysts and surface chemistry.
CO-4: To study experimentally the kinetics of chemical reactions.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	-	-
CO2	3	1	2	-	-	-	-	-	-	3	2	-	-
CO3	3	1	2	-	-	-	-	-	-	3	2	-	-
CO4	2	2	2	2	1	-	-	1	1	2	2	2	-
Aver.	2.75	1.25	2	0.5	0.25	-	-	0.25	0.25	2.75	2	0.5	-

Paper Code: CHE-HC-3034

Paper Title: Basic Analytical Chemistry (SEC)

Course Learning Outcomes:

CO-1: To familiarize students with different micro and semi micro analytical techniques
CO-2: To develop the ability to use modern instrumental methods for chemical analysis of food, soil, air and water..
CO-3: To learn how to use the theoretical knowledge in practical field with project works.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	2	-	-	2	1	3	2	2	-
CO2	3	1	2	-	2	-	-	2	1	3	2	2	-
CO3	2	1	2	-	2	-	-	3	2	2	2	2	-
Aver.	2.66	1	2	-	2	-	-	2.33	1.33	2.66	2	2	-

Paper Code: CHE-HC-4016

Paper Title: Inorganic Chemistry

Course Learning Outcomes:

CO-1: To learn the Coordination chemistry with various aspects like nomenclature, structure, bonding, variety and reactivity of the coordination compounds.
CO-2: To study the Transition elements and Inner transition elements with their various aspects.
CO-3: To learn about Bioinorganic chemistry to acquaint students on the useful and harmful aspects of metals in biological system.
CO-4: To learn experimentally the Gravimetric estimation of metal ion and preparation of some inorganic complexes.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	3	1	2	-	-	-	1	-	-	3	1	1	1
CO4	2	2	2	2	-	-	1	1	1	2	1	2	1
Aver.	2.75	1.25	2	0.5	-	-	0.5	0.25	0.25	2.75	1	1.25	0.5

Paper Code: CHE-HC-4026

Paper Title: Organic Chemistry

Course Learning Outcomes:

CO-1: To study of different N-based compounds, including alkaloids and terpenoids and their potential application as well as their structures, synthesis and reactivities.
CO-2: To study the chemistry of polynuclear hydrocarbons
CO-3: To study heterocyclic compounds with their structure and reactions.
CO-4: To learn experimentally to detect the important elements and functional groups in organic compounds.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	2	1	-
CO2	3	1	2	-	-	-	-	-	-	3	2	1	-
CO3	3	1	2	-	-	-	-	-	-	3	2	1	-
CO4	2	2	2	2	1	-	2	2	1	2	2	2	1
Aver.	2.75	1.25	2	0.5	0.25	-	0.5	0.5	0.25	2.75	2	1.25	0.25

Paper Code: CHE-HC-4036

Paper Title: Physical Chemistry

Course Learning Outcomes:

CO-1: To study electrochemistry, one primary area of physical chemistry
CO-2: To study electrical and magnetic properties of atoms and molecules.
CO-3: To learn experimentally to determine the cell constant, equivalent conductance and its application and potentiometric titration.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	2	2	2	1	-	-	-	2	-	2	2	2	-
Aver.	2.66	1.33	2	0.33	-	-	-	0.66	-	2.66	1.33	1.33	-

Paper Code: CHE-HC-4034

Paper Title: Pharmaceutical Chemistry (SEC)

Course Learning Outcomes:

CO-1: To understand about the drug discovery, design and development of representative drugs of the following classes: Antipyretic, Analgesics, Anti-inflammatory, Anti-bacterial, Antifungal, Antiviral, Antibiotics, Anti-leprosy, Central Nervous System agents, HIV-AIDS related drugs

CO-2: To know about aerobic and anaerobic fermentation, importance of Vitamins and Amino acids, synthesis of Penicillin, Cephalosporin, Chloromycetin, Streptomycin and their role as an antibiotic.

CO-3: To learn experimentally how to prepare aspirin in the laboratory and how to analyze it.

CO-4: To learn experimentally how to prepare magnesium bisilicate in the laboratory.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	2	2	2	2	-	-	2	2	2	2	1	2	-
CO4	2	2	2	2	-	-	2	2	2	2	1	2	-
Aver.	2.75	1.5	2	1	-	-	1	1	1	2.75	1	1.5	-

Paper Code: CHE-HC-4054

Paper Title: Pesticide Chemistry (SEC)

Course Learning Outcomes:

CO-1: To help to understand about the preparation, structures, properties, reactions, benefits and adverse effects of pesticide compounds

CO-2: To help to understand how to calculate acidity/alkalinity in a given sample of pesticide formulations as per BIS specifications.

CO-3: To learn experimentally how to prepare organophosphates, phosphonates and thiophosphates.

CO-4: To study how to prepare inorganic complexes in the laboratory and to determine the coordination numbers of the co-ordination compounds by spectroscopic method.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	2	2	2	2	-	-	2	2	2	2	1	2	-
CO4	2	2	2	2	-	-	2	2	2	2	1	2	-
Aver.	2.75	1.5	2	1	-	-	1	1	1	2.75	1	1.5	-

Paper Code: CHE-HC-4064

Paper Title: Fuel Chemistry (SEC)

Course Learning Outcomes:

CO-1: To learn about the composition of coal and petroleum products, their extraction, purification methods and usage.
CO-2: To learn about classification and applications of natural and synthetic lubricants.
CO-3: To learn about the determination and significance of various industrially relevant physical parameters for different fuels and lubricants.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	2	2	2	2	-	-	1	1	1	2	1	2	-
Aver.	2.66	1.33	2	0.66	-	-	0.33	0.33	0.33	2.66	1	1.33	-

Paper Code: CHE-HC-5016

Paper Title: Organic Chemistry

Course Learning Outcomes:

CO-1: To be familiarized with the importance of nucleic acids, amino acids and
CO-2: To develop basic understanding of enzymes, bioenergetics and pharmaceutical compounds.
CO-3: To learn some basic experiments for the determination of some biological parameters like glycine, protein, salivary amylase DNA etc.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	-	-	3	1	1	-
CO2	3	1	2	-	-	-	-	-	-	3	1	1	-
CO3	2	2	2	2	-	-	1	1	1	2	1	2	-
Aver.	2.66	1.33	2	0.66	-	-	0.33	0.33	0.33	2.66	1	1.33	-

Paper Code: CHE-HC-5026

Paper Title: Physical Chemistry

Course Learning Outcomes:

CO-1: To introduce a student with Quantum chemistry, which will, comprises the postulates of quantum mechanics and the application of quantum mechanical ideas in some simple systems such as particle in a box, rigid rotator, simple harmonic oscillator etc.
CO-2: To give idea of spectroscopy viz. rotational, vibrational Raman, electronic, spin resonance and electronic spectroscopy.
CO-3: Experimentally to introduce with UV/Visible spectroscopy and Colorimetric experiments.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	1	1	3	1	1	-
CO2	3	1	2	-	-	-	-	1	1	3	1	1	-
CO3	2	2	2	1	1	-	-	2	1	2	1	2	-
Aver.	2.66	1.33	2	0.33	0.33	-	-	1.33	1	2.66	1	1.33	-

Paper Code: CHE-HE-5026

Paper Title: Analytical methods in Chemistry (DSE 1)

Course Learning Outcomes:

CO-1: To help to learn more about the qualitative/quantitative characterization and separation techniques.
CO-2: To cover some of the widely used instrumental techniques for characterization of samples.
CO-3: To familiarize with the experiments using different instrumental techniques and chemical analysis.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	1	1	3	1	1	-
CO2	3	1	2	-	-	-	-	1	1	3	1	1	-
CO3	3	1	2	1	-	-	-	1	1	3	1	1	-
Aver.	3	1	2	0.33	-	-	-	1	1	3	1	1	-

Paper Code: CHE-HC-5056

Paper Title: Novel inorganic solids (DSE 2)

Course Learning Outcomes:

CO-1: To learn about the synthesis and modification of inorganic solids and their technological importance
CO-2: To study the overview of nanostructures and nanomaterials; to know the preparation, classification, control of self-assembly and use of nanomaterials as bio-nanocomposite, nanotube, nanowire and other bio-functional materials.
CO-3: To learn about the engineering materials especially composite materials for mechanical construction and manufacturing, properties, classification and application of conducting polymer materials.
CO-4: To understand how to synthesize hydro-gel by co-precipitation method and silver and gold nanoparticles and to determination of ions by cation exchange method and total difference of solids in a composite material.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	1	-	-	-	1	3	1	1	-
CO2	3	1	2	-	1	-	-	-	1	3	1	1	-
CO3	3	1	2	-	1	-	-	-	1	2	1	2	-
CO4	2	2	2	2	1	-	-	2	1	2	1	2	-
Aver.	2.75	1.25	2	0.5	1	-	-	0.5	1	2.5	1	1.5	-

Paper Code: CHE-HC-6016

Paper Title: Inorganic Chemistry

Course Learning Outcomes:

CO-1: To learn about the kinetic and thermodynamic factors governing the reaction path and stability of inorganic compounds.
CO-2: To study Organometallic compounds to apprise students about the importance of metal carbon bond to form complexes and their application as catalysts
CO-3: To give an idea about the differential reactivity under different condition of pH and to learn factors leading to stability of organometallic compounds, their synthesis, reactivity and uses.
CO-4: To study experimentally the qualitative detection of known and unknown radicals and insoluble materials in a mixture and to prepare different coordination compounds.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	1	1	3	1	1	-
CO2	3	1	2	-	-	-	-	1	1	3	1	1	-
CO3	3	1	2	-	-	-	-	1	1	2	1	2	-
CO4	2	2	2	2	-	-	2	2	1	2	1	2	-
Aver.	2.75	1.25	2	0.5	-	-	0.5	1.25	1	2.5	1	1.5	-

Paper Code: CHE-HC-6026

Paper Title: Organic Chemistry

Course Learning Outcomes:

CO-1: To learn in detail about molecular spectroscopy.
CO-2: To understand about the carbohydrates in detail including monosaccharides, disaccharides and polysaccharides
CO-3: To know details about different types of dyes, different polymers and polymerization reactions.
CO-4: Aim to give experimental idea about the synthesis and extraction of polymers from raw materials and identification of organic compounds by spectroscopy.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	-	-	-	-	1	1	3	1	1	-
CO2	3	1	2	-	-	-	-	1	1	3	1	1	-
CO3	3	1	2	-	-	-	-	1	1	2	1	2	-
CO4	2	2	2	2	-	-	2	2	1	2	1	2	-
Aver.	2.75	1.25	2	0.5	-	-	0.5	1.25	1	2.5	1	1.5	-

Paper Code: CHE-HE-6026

Paper Title: Industrial Chemical and Environment

Course Learning Outcomes:

CO-1: To provide an introduction to the various industrial gases and inorganic chemicals, their manufacturing processes, applications, storage and the hazards of handling them.
CO-2: To study the contribution of the industrial chemicals towards air and water pollution and their effects on living organisms and the environment has also been covered.
CO-3: To study biocatalysis and importance in Green chemistry and Chemical industry.
CO-4: To give an experimental idea about the determination of different particles and gases in air and water.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	3	1	2	1	-	-	2	-	1	3	1	1	2
CO2	3	1	2	1	-	-	2	-	1	3	1	1	2
CO3	2	1	2	1	-	-	1	-	1	2	1	2	3
CO4	2	1	2	2	1	-	2	2	2	2	1	2	1
Aver.	2.5	1	2	1.25	0.25	-	1.75	0.5	1.25	2.5	1	1.5	2

Paper Code: CHE-HC-6056

Paper Title: Dissertation

Course Learning Outcomes:

CO-1: To know how to carry out a project work
CO-2: To write a review article on a particular field/topic as assigned by the teacher.
CO-3: To prepare a presentation and to present in front of a panel as set by the institution.

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PSO1	PSO2	PSO3	PSO4
CO1	2	3	2	3	3	2	2	2	2	2	2	2	2
CO2	2	2	2	1	3	2	2	1	1	2	1	2	2
CO3	2	2	2	2	2	1	1	1	1	2	1	2	2
Aver.	2	2.33	2	2	2.66	1.66	1.66	1.33	1.33	2	1.33	2	2