

**Anandibai Raorane Arts, Commerce and Science College,
Vaibhavwadi**

Department of Chemistry

Programme Outcomes (POs) & Course Outcomes (COs)

❖ Course Outcomes (COs):

Sr. No.	Course Code	Course Outcomes
1	USCH101	<ol style="list-style-type: none">1. Students can understand the thermodynamic terms and its applications and Compute Concentration in various forms2. They can understand the atomic structure evolution and basic Explain Periodic Properties3. Elaborate IUPAC rules of naming of organic compounds and discuss reaction mechanism
2	USCH102	<ol style="list-style-type: none">1. They can learn how to count the rate of reaction and also they understood properties of liquids2. Outline the properties of main group elements a, also state environmental properties of Oxides and Oxyacids of N & S3. To understand the basic stereochemistry such as different projection formulae, its interconversion and optical activity.
3	USCH201	<ol style="list-style-type: none">1. Discuss the laws of gases and determine Equilibrium and thermodynamic parameters

		<ol style="list-style-type: none"> 2. To learn what are the concepts of qualitative analysis as well as to learn basic theories of Acid. 3. Carbon-Carbon sigma and pi bonding and reactions of alkene and alkynes
4	USCH202	<ol style="list-style-type: none"> 1. To understand the different types of buffer solutions, its pH. Also to understand the electromagnetic spectrum 2. Outline chemical bonding and reactivity and Describe redox chemistry 3. To understand aromaticity and three dimensional model of molecules
5	USCHP1	<ol style="list-style-type: none"> 1. Estimate strength of commercial acid 2. Examine percentage composition of mixtures 3. Design double indicator titration 4. Infer purification technique 5. Apply chromatographic technique 6. Operate qualitative identification technique of organic compounds
6	USCH301	<ol style="list-style-type: none"> 1. To learn the partial molal properties as well as conductivity and resistivity 2. To learn MOT and non-directional and directional bonding 3. To study the synthetic methods and applications of alcohol, phenol, epoxide and halogenated compounds (Aromatic halides)
7	USCH302	<ol style="list-style-type: none"> 1. They can understand theories of reaction kinetics 2. They are Understand chemistry of p block elements and classification of silicon and germanium w.r.t their reactivity 3. Generalise nucleophilic addition reaction mechanism and examine reactivity of active methylene compounds

8	USCH303	<ol style="list-style-type: none"> 1. Discuss the role of analytical chemistry in various fields and apply method of sampling and statistical treatment of data 2. Demonstrate classical methods of analysis and identify suitable gravimetric or volumetric method 3. Appreciate basic terms in spectroscopy and summarises various instrumental methods of analysis
9	USCH401	<ol style="list-style-type: none"> 1. Understand phase equilibrium and distinguish between reversible and irreversible cell 2. Compare transition metal chemistry and properties of coordination compounds 3. Explain reactivity of carboxylic and sulphonic acids
10	USCH402	<ol style="list-style-type: none"> 1. Appreciate terms in crystallography and explain the concepts of catalysis 2. Demonstrate uses of environmental chemistry 3. Show the chemistry of nitrogen containing heterocycles and preparation and uses of diazonium salt. 4. Prepare and use of diazonium salts
11	USCH403	<ol style="list-style-type: none"> 1. They understood the types of separation methods and also utilise statistical method of data analysis 2. Appreciate nature need and importance of pH 3. Computation of confidence limit and confidence interval
12	USCHP2	<ol style="list-style-type: none"> 1. Judge the Ostwald's dilution law 2. Estimate hardness of water 3. Prepare organic compounds 4. Use of pH to locate the end point of acid base titration 5. Analyse inorganic salts qualitatively by semi micro method 6. Operate conductometer and potentiometer
13	USCH501	<ol style="list-style-type: none"> 1. Students became familiar with rotational and vibrational spectrum for diatomic molecules and concept of Raman Spectroscopy.

		<ol style="list-style-type: none"> 2. They can learn about colligative property, and their determination methods. They also understand the concept of collision theory, study of kinetics of fast reaction. 3. They can know the concept of radioactivity, detection and measurement of radioactivity using counters, applications of radioisotopes, nuclear reactions, construction and working of nuclear reactors. 4. Idea about surface chemistry and colloidal state.
14	USCH502	<ol style="list-style-type: none"> 1. Student can learn about molecular symmetry and chemical bonding. They also know the concept of point group. 2. Can understand crystal lattice, lattice point, unit cell and lattice constants. Further, understands defects in solids and concept of superconductors. 3. They can learn about various properties and applications of inner transition elements. 4. They can learn the classification and characteristics of non-aqueous solvents, comparative chemistry of Group-16 and 17.
15	USCH503	<ol style="list-style-type: none"> 1. Students can draw the mechanism of reaction, pericyclic reaction and photochemical reaction. 2. They know about stereochemistry of organic compounds, agrochemicals and heterocyclic chemistry. 3. They can write the IUPAC nomenclature of bicyclic and spiro compounds. Further, they can learn about green chemistry. 4. Student can familiarize with the general introduction of spectroscopy and natural product.
16	USCH504	<ol style="list-style-type: none"> 1. Students can understand the concept of quality control, quality assurance and sampling 2. They can know the concept of Redox and Complexometric titrations 3. To learn instrumentation technique like AAS, Turbidimetry, Nephelometry etc 4. They understand the separation methods such as solvent extraction, HPLC and HPTLC

17	USCHP05	<ol style="list-style-type: none"> 1. Student can able to determine the molecular weight of compound by Rastmethod. 2. They can determine the order of reaction by fractional change method. 3. Learners can understand the adsorption of acetic acid on charcoal. 4. Students can able to handle the analytical instruments such as conductometer, Potentiometer, pH meter etc. 5. Thorough knowledge regarding inorganic preparations. 6. They also able to determine the percentage purity of water soluble salts
18	USCHP06	<ol style="list-style-type: none"> 1. Student can acquire experimental skill in the separation of organic binary mixture containing twosolid components. 2. Develop thepractical skill in the determination of melting point 3. Students can able to handle the analytical instruments such as spectrophotometer, flame photometer, turbidimeter etc. 4. They can determine the Chemical Oxygen Demands (COD) of water sample
19	USCH601	<ol style="list-style-type: none"> 1. Student can understand the concept of electrochemical cells, classification of electrochemical cells, decomposition potential and overvoltage. 2. They can knowthe basic terms, classification, molar massof polymer and its uses in light emitting polymers, antioxidants and stabilizers. 3. Student can understand the basic knowledge of quantum chemistry and renewable energy sources. 4. They learn the principles and instrumentations of NMR and ESR spectroscopy.
20	USCH602	<ol style="list-style-type: none"> 1. Student can understand the concept of Crystal Field Theory (CFT), Splitting of d-orbitals, calculation of CFSE and limitation of CFT. 2. They can learn the molecular orbital theory of co-ordination compounds, stability and reactivity of metal complexes. Introduction about electronic spectra.

		<ol style="list-style-type: none"> Students can know the characteristics, synthetic methods, chemical reactions of organometallic compounds. Further, introduction of concept of metallocenes and catalysis. They learn the types and general steps in metallurgy and chemistry of group 18. Also know the biological importance of metal ions (Na, K, Fe, Cu).
21	USCH603	<ol style="list-style-type: none"> They can know the structure of amino acid and proteins. Student can learn about mechanism of various rearrangement reactions. Further, they also get the knowledge about carbohydrates. They can understand different types of spectroscopy and their applications to organic compounds. Moreover, they know the basic structure DNA/RNA. They get familiarize the classification and preparation of polymers, applications of catalyst and reagents.
22	USCH604	<ol style="list-style-type: none"> Student can understand the basic principles of Polarography, DC Polarogram, quantification, applications, advantages and limitations. Principle, advantages and limitations of amperometric titrations. They can learn the chromatographic techniques such as Gas and Ion exchange chromatography. Students acquire the knowledge about analysis of food products and detection of adulterants. Study of cosmetic products. Students can know the instrumentation, application of TGA, DTA. Thermometric titrations and analytical method validation.
23	USCHP07	<ol style="list-style-type: none"> They acquired skill for handling instruments like potentiometer, conductometer and colorimeter. Student can determine the molecular weight of polymer using viscometer. Can interpret the order of reaction graphically from given experimental data. Thorough knowledge regarding inorganic preparations. They also able to determine the percentage purity of water soluble salts.

24	USCHP08	<ol style="list-style-type: none"> 1. Student can acquire experimental skill in the separation of organic binary mixture containing two solid components. 2. Develop the practical skill in the determination of melting and boiling point. 3. They acquired skill for handling instruments like Spectrophotometer, potentiometer and pH meter. 4. Analysis of commercial sample and Ion exchange separation. 5. They understand the principle of titrimetric analysis
25	USCHDD1	<ol style="list-style-type: none"> 1. Student can learn general introduction about drugs, routes for drug administration and dosage form and CNS drugs. 2. They can know about the analgesic, antipyretics and anti-inflammatory drugs. 3. Student familiarize with the general knowledge of dye-stuff industry, different dyeing methods and classification of dyes. 4. Learner can understand the color and chemical constitution of dyes, unit processes and dyes intermediates.
26	USCHDDP1	<ol style="list-style-type: none"> 1. Student can get thorough knowledge regarding the preparations and estimation of drug and dyes. 2. Student can get project knowledge of dyes
27	USCHDD1	<ol style="list-style-type: none"> 1. Student get familiarize with the drugs discovery, drug design and its developments. 2. They can know about chemotherapeutic agents such as Anti-amoebic, anti-tubercular, anti-neoplastic, anti-HIV and nano particles in medicinal chemistry. 3. Student can learn about classification of dyes and environmental hazardous of synthetic dyes. 4. They can understand the non-textile uses of dyes such as biomedical, food and cosmetics. Further, paper, leather, hair, laser and indicator dyes.
28	USCHDDP2	<ol style="list-style-type: none"> 1. Student can get thorough knowledge regarding the preparations of drug and dyes. 2. Student can get knowledge of TLC of mixture of dyes and student can prepare the monograph of drugs

M.Sc. in Organic Chemistry

❖ Course Outcomes (COs):

Sr. No.	Course Code	Course Outcomes
1	PSCH 101 & PSCH 201	<ol style="list-style-type: none">1. Outline fundamental principles of Physical Chemistry.2. Explain basic concept of thermodynamics theories and Principles3. Describe basic concepts and applications of third law of thermodynamics4. Describe basic concepts quantum chemistry and applications5. Describe basic concepts of chemical kinetics, polymerization reactions, enzyme catalysed reactions, solids and gas phase reactions6. Explain concept of real solutions, fugacity of real gases, surface chemistry and their application to life processes.7. Explain concept of phase rule and its application to two phase and three phase system.8. Describe basic concepts electrochemistry and applications to batteries and biological processes. of third law of thermodynamics9. Explain concept of phase rule and its application to two phase and three phase system.
2	PSCHP 101 & PSCHP 201	<ol style="list-style-type: none">1. Illustrate applications of techniques such as pH metry, Conductometry, Potentiometry, Colorimetr and Spectrophotometry.

		2. Study correlation of theoretical principles of quantum mechanics, chemical thermodynamics and kinetics by performing hands on experiments.
3	PSCH 102 & PSCH 202	<ol style="list-style-type: none"> 1. Outline fundamental principles of Inorganic Chemistry 2. Explain basic concept chemical bonding, hybridisation and different attractive processes. 3. Describe basic concepts molecular symmetry and applications of group theory 4. Describe basic concepts solid state chemistry and material science. 5. Explain concept of spectral and magnetic properties of d and f block elements. 6. Explain basic principles of inorganic reaction mechanism, substitution, redox reactions with stereochemistry 7. Describe basic concepts of Organometallic Chemistry of Transition metals 8. Explain role of metal ion Fe, Cu, Ni, Pt in biologically active compounds like Hb, Mb, cytochromes and enzymes. 9. Describe Environmental Chemistry with respect to heavy metal toxicity and radioactive emissions.
4	PSCHP 102 & PSCHP 202	<ol style="list-style-type: none"> 1. Illustrate applications of techniques like spectrophotometer, flame photometer, conductometer in inorganic analysis etc. 2. They are trained to handle various equipments like spectrophotometer, conductometer etc.
5	PSCH 103 & PSCH 203	<ol style="list-style-type: none"> 1. Outline fundamental principles of Organic Chemistry. 2. Explain basic concept Organic reaction mechanism and methods of determining the mechanism.

		<ol style="list-style-type: none"> 3. Describe basic concepts aliphatic and aromatic nucleophilic substitution 4. Describe basic concepts aromaticity, HMO theories. 5. Explain concept of stereochemistry. 6. Explain different oxidising and reducing agents with respect to mode of action, selectivity and applications 7. Describe basic concepts enolate ion chemistry 8. Explain important rearrangement reactions with respect to mechanism and applications 9. Describe basic concepts of organic spectroscopic methods such as UV-Visible, IR, NMR, ^1HNMR and ^{13}CNMR.
6	PSCHP 103 & PSCHP 203	<ol style="list-style-type: none"> 1. Illustrate one step synthesis of organic compounds including some heterocycles. 2. Illustrate concepts of TLC used as a tool to confirm purity of the products formed 3. Describe basic concepts separation of liquid and solid organic binary mixtures. 4. Describe basic concepts laboratory safety techniques and handling of chemicals.
7	PSCH 104 & PSCH 204	<ol style="list-style-type: none"> 1. Outline fundamental principles of Analytical Chemistry. 2. Explain basics of language of analytical chemistry with respect to errors involved, safety in laboratories and quality. 3. Describe basics of calculations based on chemical principles 4. Describe basic concepts optical instrumentation methods such as FTIR, UV-Visible Spectroscopy. 5. Explain concept different thermal methods such as TGA, DTA, DSC. 6. Explain basic concepts of chromatographic techniques.

		<p>7. Describe basic concepts of some advanced instrumentation techniques such as X-ray, Mass and radioanalytical methods.</p> <p>8. Explain important analytical methods such as Surface Analytical Techniques and atomic spectroscopic techniques</p> <p>9. Describe basic concepts of some electroanalytical methods such as ion selective potentiometry, polarography, electrogravimetry and coulometry.</p>
8	PSCHP 104 & PSCHP 204	<p>1. Explain concepts of preparation of various solutions, handling of different chemicals</p> <p>2. Infuse skills to be able to work as quality control chemist in various labs and such organizations.</p>