

Palus Shikshan Prasarak Mandals
ARTS COMMERCE AND SCIENCE COLLEGE, PALUS.
PG Department of Chemistry
M.Sc Part-I

1. Program Outcomes (POs):

- a) Demonstrate, solve, and have an understanding of major concepts in all disciplines of Chemistry.
- b) Solve problems, think methodically, and independently and draw logical conclusions.
- c) Employ critical thinking and scientific knowledge to design, carry out, record, and analyze the results of chemical reactions.
- d) Create an awareness of the impact of Chemistry on the environment, society, and development among the scientific community.
- e) Find out the green route for the chemical reactions for sustainable development.
- f) To inculcate scientific temperament in the students and among the scientific community.
- g) Use modern techniques, sophisticated equipment, and various Chemistry softwares

2. Program-Specific Outcomes (PSOs):

- a) Students will develop critical thinking and the Analytical mind by taking knowledge in advanced-level Chemistry
- b) The relevance of the extension of Chemistry in the social context for solving social issues
- c) Analytical or experimental skills make the students capable of doing higher-level research work in the emerging fields of Chemistry
- d) Students will gain a thorough Knowledge of the subject to work on projects at different research and academic institutions.
- e) Students will become familiar with the different branches of Chemistry like Analytical, Organic, Inorganic, Physical, Environmental, Polymer, and Biochemistry. They will also learn to apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.
- f) Employability Skills shall enable the students to find jobs in core Chemistry and other related fields
- g) Entrepreneurial Skills shall empower the students to start their industries/businesses in core Chemistry fields

3. Course Outcomes (COs):

CH-101 (Inorganic Chemistry – I)

CO1: Students will be able to explain the basic chemistry of transition metals and its compounds, spectroscopic characteristics of such compounds, nomenclature, reactions and applications.

CO2: Students will obtain knowledge about Preparation, structure, physical and chemical properties of metal carbonyls of transition metals.

CO3: Students will be able to understand the all aspects of synthesis, bonding, structure and reactivity of organometallic compounds and their applications in homogenous catalysis.

CO4: Student will be able determine the stability of the complexes and will be able to explain the nuclear stability and reactions.

CH-102 (Organic Chemistry – I)

CO1: Students will able to differentiate between various organic reactive intermediates.

CO2: Students can recognize, classify, explain, and apply fundamental organic reactions.

CO3: Students will have ability to distinguish between different kinds of isomers.

CO4: Course will develop interest in writing and finding mechanisms of new reactions.

CH.103: Analytical Chemistry-I

CO1: Students would acquire the knowledge about the fundamentals of Analytical Chemistry including the sampling, sample pretreatment, basic techniques, methods and data handling, processing and statistical analysis of the same.

CO2: Students would acquire the knowledge and understand the scope of Analytical Chemistry spanning various fields. The students will learn fundamentals of qualitative analysis using conventional techniques

CO3: Students will learn the chromatographic techniques, choice of chromatographic techniques and tuning of the chromatographic technique as per the need based on the samples to deal with, learn electroanalytical techniques and computation chemistry which would groom them for alternative analytical strategies which form one of the important components of analytical chemistry.

CO4: Students will learn about referring to the standard reference books and infer information from the same. Analytical case study problems would be discussed to familiarize with the scope and advantages of Analytical Chemistry.

M.Sc Part-II

1. Program Outcomes(POs)

Program Outcomes(POs)

PO1. Students will be able to acquire in depth knowledge about fundamental as well as applied organic chemistry concepts.

PO2. Students will be able to solve various problems by identifying the essential parts of a problem, formulate strategy for solving the problem, applying appropriate techniques to arrive at a solution, test the precision and accuracy of the solution and interpret the results.

PO3. Students will be able to acquire domain specific knowledge and technical skills needed for employment in industries, teaching fields and pursue research.

PO4. Students will be able to apply the fundamental knowledge to address the cross-cutting issues such as sustainable development.

- PO5. Students will get perfect insight into organic chemistry research ethics for production of quality research.
- PO6. Students will be able to communicate effectively i.e. being able to comprehend and write effective reports, make effective presentations and documentation and capable of expressing the subject through technical writing as well as through oral presentation.

2. Program Specific Outcomes (PSOs)

- PSO1. Students will be able to qualify competitive examinations like NET, SET, GATE, etc.
- PSO 2. Students will have opportunities to serve in different Chemical, Pharmaceutical as well as food and agrochemical industries.
- PSO 3. Students will have global level research opportunities in Ph.D. programme.
- PSO 4. Collaborate effectively on team-oriented projects in the field of Chemistry or other related fields.
- PSO 5. Students can start their own chemical industry / business (entrepreneurship).
- PSO 6. Students will be able to interpret NMR, MS, IR for structural elucidation.

M Sc Part-II semester-III **3. Course Outcomes (COs)**

OCH-301 (Organic Reaction Mechanism)

- CO1: Adopt the knowledge about the pathway and determine reaction rates using kinetic and non-kinetic methods. This involves steps such as reaction rate determination, order and molecularity, testing trapping of intermediate stereochemistry, and the Hammet-Taft equation.
- CO2: Familiarize with the concept of Pericyclic reactions, Woodward-Hoffmann correlation diagrams, and the Frontier Molecular Orbital (FMO) and Molecular Orbital (PMO) approaches. Understand conrotatory and disrotatory motion, and be able to identify reactions as $4n$, $4n+2$, and $2+2$ addition of ketenes. Additionally, learn about sigmatropic shifts (3,3) and (5,5), Claisen and Cope rearrangements, and Aza-Cope rearrangement.
- CO3: Learn about the mechanisms, stereochemistry, migratory aptitude, and Applications of different name reactions such as Dienone-phenol, Favorskii, Smiles, Brooke, Neber, Stevens, and Sommelet-Hauser rearrangement reactions.
- CO4: adopt the knowledge

OCH-302 (Advanced Spectroscopic Methods)

- CO1: Students will be able to identify different stretching and bending vibrational modes in IR spectroscopy and can apply their knowledge in interpretation of functional groups.
- CO2: Understand mass spectral fragmentation techniques with respect to structure determination.
- CO3: Understand how to interpret nuclear magnetic resonance spectrum from values of chemical shift.
- CO4: Students will have an idea of Beer Lambert's law and its applications.

OCH- 303: (Advanced Synthetic Methods)

- CO1: The applications of the reagents help students in designing multistep organic synthesis.
- CO2: They can utilize advanced techniques like microwaves, ionic liquids, ultrasound etc during their higher studies.

CO3: Knowledge of retro-synthetic analysis helps for the study and design of a new reaction.
CO4: Students will have an ability to develop ecofriendly methods for organic transformations

OCH-304 (A) (Drugs and Heterocycles)

CO1: Able to correlate structure activity relationship of bioactive compounds
CO2: Give idea of different classes of drugs for particular diseases
CO3: Utilize their knowledge in synthesis of various bioactive heterocycles.
CO4: Able to recognize reactivity and applications of three, four, five, six and seven-member heterocycles.

M Sc Part-II semester-IV

3.Course Outcomes (COs)

OCH 401 (Theoretical Organic Chemistry)

CO 1: Students will apply principles of green chemistry inorganic synthesis
CO 2: Students will be able to identify aromatic compounds.
CO 3: Students will get an idea of calculation of delocalization energy of organic compounds.
CO 4: Students will acquire knowledge of kinetic and thermodynamic controlled reactions.

OCH-402(Stereochemistry)

CO1: The study of stereochemical aspects of organic molecules gives very important tool in assigning the properties of bioactive molecules.
CO2: Students will have sound knowledge about conformations of acyclic and cyclic compounds.
CO3: Students will have sound expertise in designing of new bioactive molecules with specific stereochemical properties.
CO4: Students will have an idea of applications of chiral reagents in asymmetric synthesis.

OCH-403 Chemistry of Natural Products

CO1: Gain knowledge about classification of natural products and their stereochemistry.
CO2: Illustrate the principles of biosynthesis, green synthesis, stereoselective transformations and its physiological role in human body.
CO3: Understand structure and synthesis of various hormones.
CO4: Able to understand vitamin deficiency and importance of different vitamins in human health.

OCH-404 (A)(Applied Organic Chemistry)

CO1: This knowledge helps to get placement to the students in agrochemicals, cosmetic, pharmaceuticals, dyes, polymers industries
CO2: Students will have knowledge of cosmetics, perfumes and food flavours in day to day life.
CO3: Knowledge of unit processing will be useful for automation industries.
CO4: Students will get an idea of synthesis of pesticides and their applications in agriculture.

OCH-404(B) (Bioorganic Chemistry)

CO1: Students will understand the concept building blocks of biomacromolecules.
CO2: Students will have an idea regarding classification, structure and functions of different bioorganic molecules.
CO3: Students will get idea regarding structure and functions of plant and animal cells.
CO4: Students will understand the physiological role of RNA, DNA and enzymes

