

# **Yashwantrao Chavan College of Science, Karad**

## **Department of Chemistry**

### **PROGRAMME - MASTER OF SCIENCE (M.Sc.)**

#### **POs, PSOs, COs**

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#### **PROGRAMME OUTCOMES (POs)**

**After completion of degree program in Chemistry student should able to:**

1. **PO-1.** Analyze and elucidate key concepts across various branches of chemistry.
2. **PO-2.** Solve problems, think methodically and independently and draw logical conclusions to derive logical conclusions.
3. **PO-3.** Employ critical thinking and scientific knowledge to design, carry out, record, and analyse the results of chemical reactions
4. **PO-4.** Create an awareness of the impact of Chemistry on the environment, society, and development among the scientific community.
5. **PO-5.** Find out the green route for the chemical reactions for sustainable development
6. **PO-6.** To inculcate scientific temperament in the students and among the scientific community.
7. **PO-7.** Use modern techniques, sophisticated equipment, and various Chemistry Softwares.

#### **PROGRAMME SPECIFIC OUTCOMES (PSOs)**

1. **PSOs-1.** Students will develop critical thinking and the Analytical mind by taking knowledge in advanced level Chemistry.
2. **PSOs-2.** The relevance of the extension of Chemistry in the social context for solving social issues.
3. **PSOs-3.** Analytical or experimental skills make the students capable of doing higher-level research work in the emerging fields of Chemistry.
4. **PSOs-4.** Students will gain a thorough Knowledge of the subject to work on projects at different research and academic institutions.
5. **PSOs-5.** 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.
6. **PSOs-6.** Employability Skills shall enable the students to find jobs in core Chemistry and other related fields.
7. **PSOs-7.** Entrepreneurial Skills shall empower the students to start their industries/businesses in core Chemistry fields.



**Yashwantrao Chavan College of Science, Karad**

**Department of Chemistry**

**M Sc (Chemistry) Sem 1**

**COURSE OUTCOMES**

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
1	OCH-101	Organic Chemistry-I	CO1	Learning & coherent understanding of reaction mechanism & Aliphatic nucleophilic substitution reactions.
			CO2	Learning & coherent understanding of Aromatic Electrophilic substitution reactions & nucleophilic Aromatic substitution reactions.
			CO3	Learning & understanding of some elimination reactions
			CO4	Learning & basic understanding of chirality of carbon

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
1	ICH-102	Inorganic Chemistry	CO1	Learning & understanding of Coordination chemistry & Stereochemistry of transition metal ions.
			CO2	Learning & basic understanding of classification, nomenclature, reactivity & some reactions of Organometallic compounds
			CO3	Learning & basic understanding of structure, preparation, properties & derivatives of Metal carbonyls.
			CO4	Learning & basic understanding about symmetry, symmetry elements & point groups

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
1	E-A CH103	Analytical Chemistry-1	CO1	Learning & basic understanding of Thermogravimetric analysis & its applications in research.
			CO2	Learning basic principle, instrumentation & applications of atomic absorption spectroscopy.
			CO3	Learning basic principle, instrumentation & applications of UV-Visible spectrometry.
			CO4	Learning basic principle, instrumentation & applications of IR & FT-IR spectrometry.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
1	RM-CH - 106	Research methodology	CO1	Basic understanding of research process & research designing.
			CO2	Basic understanding of Database, literature searching, preparation of project proposal & conference presentation.
			CO3	Learning of accuracy, precision, errors and data analysis.
			CO4	

**M Sc (Chemistry) Sem 2**

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
2	PCH201	Physical Chemistry II	CO1	Learning & basic understanding of postulates of Quantum chemistry, operators & its algebra.
			CO2	Learning & basic understanding of thermodynamic probability, partition function and evaluation of thermodynamic properties from partition function.
			CO3	Learning & basic understanding of Debye-Huckel theory, limiting Law, and its verification.
			CO4	Learning & basic understanding of rates of reactions, reaction mechanism & kinetics of catalysis.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
2	ACH-202	Analytical Chemistry-II	CO1	Learning basic knowledge about analytical chemistry, type of errors and its minimisation computer applications.
			CO2	Learning various volumetric titrations, estimations, Terms in gravimetric analysis and gravimetric estimations.
			CO3	Learning various chromatographic techniques and its applications.
			CO4	Learning principles, instrumentations & applications of Electroanalytical techniques.



SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
2	E-OCH-203	Organic Chemistry-III	CO1	learnings various mechanism of photochemical reactions.
			CO2	Learning Hydroboration, Enamines & protection of functional groups.
			CO3	Learnings reactions of organometallic compounds.
			CO4	Learning uses of various reagents in organic transformations.

M Sc (Analytical Chemistry )Sem 3

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	A-CH 3.1	Advanced Analytical Techniques	CO1	Learning Theory, Instrumentation & applications of Mass spectrometer.
			CO2	Learning various methods of synthesis of nanomaterials & their applications
			CO3	Learning various surface characterisation techniques & their applications
			CO4	Understanding theory, principal, Instrumentation of Raman & X-ray photoelectron spectrometry.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	A-CH -3.2	Organoanalytical Chemistry	CO1	Students able to solve problem related to structure determination & application of spectroscopic Techniques.
			CO2	develop ability to analyse commonly used drugs & Vitamines.
			CO3	students able to analyse body fluids to diagnose diseases.
			CO4	Learning various methods of analysis of pesticides & poisonous materials.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	ACH 3.3	Electroanalytical techniques in chemical analysis	CO1	Learning various type of voltametry, instrumentation and applications.
			CO2	Learning types of colloids and emulsion, properties, preparations and application.
			CO3	Learning theory, instrumentation and applications light scattering techniques.
			CO4	Students able to develop ion selective electrodes for estimation of ion to be determined.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	ACH-3.4	Environmental chemical analysis & control	CO1	Learning theory, techniques of sampling, criterion of good sampling and analysis.
			CO2	Learning various instrumental techniques for environmental analysis
			CO3	Learning various methods of analysis of pollutants in air and water.
			CO4	Learning treatments of organic pollutants and their analysis.

M Sc (Analytical Chemistry )Sem 4

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	ACH-4.1	Modern separation methods in analysis.	CO1	Learning theory, Instrumentation, working of Gas chromatography and it's practical application in research.
			CO2	Learning working working, Instrumentation of HPLC and it's practical application in research.
			CO3	
			CO4	Learning principle of Ion chromatography, and It's practical application in research.
				Learning solvent extraction process and it's application for separation of metals. & non metals.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	ACH-4.2	Organic Industrial analysis	CO1	Learning analysis of Oil, fats, soap manufacturing process and additives in soaps & detergents.
			CO2	Learning analysis of food colors food flavours and food additives.
			CO3	Learning about cosmetics, their types, analysis of contents in creams, lotions and face powder.
			CO4	Learning analysis of contents in paints and petroleum products.



SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	ACH-4.3	Advanced methods in chemical analysis	CO1	Learning details about fluorescence & phosphorescence, & its spectrometry for analysis of fluorescent nanomaterials.
			CO2	Learning various kinetic methods of analysis for determination of concentration of sample.
			CO3	Learning theory, instrumentation and applications of photoelectron spectroscopy for surface characterisation.
			CO4	Learning various X-ray methods, their Instrumentations and applications for analysis.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	ACH-4.4	Applied analytical chemistry.	CO1	Learning theory, Instrumentation of spectrochemical methods & its applications in analysis of ores, cements etc.
			CO2	Learning analysis of metal alloy.
			CO3	Learning methods of soil analysis, soil fertility, plant constituents and fertilizer analysis
			CO4	Learning analysis of explosive materials, conducting polymers, lubricants & adhesive.

#### M Sc (Organic Chemistry) Sem 3

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	OCH-3.1	Organic reaction mechanism	CO1	Learning order, molecularity of reactions, study effect of solvents and ionic strength on reaction rates
			CO2	Learning mechanism of pericyclic reactions
			CO3	Learning synthesis and applications of reactive intermediates and their reactions.
			CO4	Learning details of free radical reaction, free radical detection and their applications in organic reactions

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	OCH-3.2	Advanced spectroscopic methods	CO1	Learning theories of UV & IR spectroscopy & their use to determine structure of organic molecules.
			CO2	Learning details theory of NMR spectroscopy & their use to determine structure of organic molecules.
			CO3	Learning details theory of Mass spectroscopy, fragmentation & their use to determine structure of organic molecules.
			CO4	Learning details theory of C-13 NMR spectroscopy, & their use to determine structure of organic molecules.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	OCH-3.3	Advanced synthetic methods	CO1	Learning disconnection of organic molecules for its retrosynthesis.
			CO2	Learning uses of various reagents for organic transformations.
			CO3	Learning uses metal & ligands for organic transformations.
			CO4	Learning various techniques of organic synthesis.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
3	OCH-3.4	Drugs & Heterocycles	CO1	Learning drug designing, factors affecting on new drug synthesis & theories of drug activities.
			CO2	Learning action & use of some commonly used drugs
			CO3	Learning synthesis & reactions of heterocycles with one heteroatom.
			CO4	Learning synthesis & reactions of heterocycles with two or more heteroatom.
			CO5	Learning synthesis & reactions of Benzofused heterocycles with two or more heteroatom.

#### M Sc (Organic Chemistry) Sem 4

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	OCH-4.1	Theoretical Organic chemistry	CO1	Learning aromaticity of Benzenoid compounds with Huckel rule
			CO2	Learning aromaticity of Non Benzenoid compounds.
			CO3	Learning principles of Green chemistry for synthesis with less pollution.
			CO4	Learning kinetic & thermodynamic control of some organic reactions.

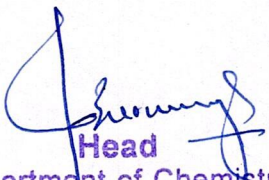


SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	OCH-4.2	Stereochemistry	CO1	Learning conformational analysis of acyclic & cyclic compounds & it's effect on reactivity.
			CO2	Learning conformational analysis & reactivity of Fused & Bridged ring system.
			CO3	Learning Stereoselective synthesis of some organic reactions.
			CO4	Learning stereochemistry of compound containing no chiral carbon atom.

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	OCH-4.3	Chemistry of Natural products	CO1	Learning classification & synthesis of some natural products.
			CO2	Learning stereochemistry & synthesis of Alkaloids
			CO3	Learning structure & synthesis of some Hormones
			CO4	Learning role of lipids, Fatty acids & synthesis of some vitamins

SEMESTER	COURSE CODE	COURSE NAME	COURSE OUTCOME	CO STATEMENTS
4	OCH-4.4	Applied Organic chemistry	CO1	learning synthesis & mode of action of some pesticides
			CO2	Learning Nitration ,Halogenation, & sulphonation of aromatic compounds
			CO3	Learning process of synthesis of some organic dyes.
			CO4	Learning process of synthesis of some polymers.



  
**Head**  
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