DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD

DEPARTMENT OF CHEMISTRY

The Department is conducting M. Sc Chemistry course with four specializations such as Inorganic, Organic, Physical and Analytical (Self Supported) Chemistry. This programme is divided into four semesters having 110 credits. There are 19 theory courses of 63 credits, 09 laboratory courses of 27 credits, research project of 18 credits and one course is on constitution of India (02 credit). A tutorial, assignments and seminar presentation is an integral part of all theory courses. Approximately, 44% are of core courses, 4% foundation courses, and 7% are elective courses, 25% laboratory courses and 20% research project

The curriculum of M. Sc. Chemistry is designed by considering the focus on fundamental concepts in chemistry for better understanding of advanced subjects in respective specializations. The courses were designed as per the requirements of corporate sectors particularly focus on pharmaceutical, fine chemicals, agro chemicals, beverages etc. The outcome of the courses, the students will understand the designing and development of materials/molecules, their characterizations and applications in various fields.

The basic requirement for research through various laboratory courses along with project work, which will help in their future career at corporate sectors, research organizations as well as academics.

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Academic Year	Name of Course	activities with direct bearing on Employability / Entrepreneurship/ Skill Development
2013-14	Analytical Chemistry	Hands on chromatographic techniques
2013-14	Inorganic Chemistry	Fundamental concepts of structural inorganic chemistry
2013-14	Organic Chemistry	Fundamentals of organic chemistry for understanding of advanced organic chemistry
2017-18	Solid State Chemistry	To understand the solid state reactions and their theories and properties.
2013-14	Physical Chemistry	Basic concepts in physical chemistry for understanding of applied physical chemistry
2013-14	Inorganic Chemistry	Interpretation of absorption spectra of transition metal complexes, metal carbonyls & clusters
2013-14	Organic Chemistry	Concepts in Aromatic electrophilic and nucleophilic substitution, addition reactions
2013-14	Physical Chemistry	Understanding of quantum chemistry, phase rule ,crystal structure and photochemistry
2013-14	Inorganic Chemistry	Basic requirements for interpretation of UV-Vis spectra.metal carbonys and clusters.
2013-14	Organic Chemistry	Concepts of Aromatic electrophilic and nucleophilic substitution, addition reactions.
2013-14	Physical Chemistry	Understanding of quantum chemistry, phase rule ,crystal structure and photochemistry
2014-15	Structural elucidation by spectral methods	Understanding of basic principles of PMR & CMR Mass, ESR, Mossbauer spectroscopy
2014-15	Electoro Analytical Techniques	fundamental principle of Potentiometry, polarography , cyclic voltametry electro-analytical techniques
2014-15	Environmental Analysis and Monitoring	To develop the skill of monitoring environment
2014-15	Advance Analytical Techniques-I	To develop the skill for analysis of matters using SEM, STM, etc
2014-15	Bioinorganic and supramolecular chemistry	Metalloenzymes and supramolcular catalytic reaction .
2014-15	Applied Inorganic Chemistry	Zeolites chemistry, active sites, catalytic applications,
2014-15	Chemistry of Materials	To study the general methods for synthesis of iorganic nanomaterials, and their characterizations
2014-15	Organic Synthesis –I	To understand the synthetic methods and applicability of oxidizing and reducing agents in organic
2014-15	Organic Synthesis –II	Strategic applications of basic and advanced organic reactions and rearrangements for

2014-15	Bioorganic and green Chemistry	Study of enzymes, enzyme catalyzed reactions , microwave, ultrasound sonication assisted organic tra
2014-15	Photo Chemistry Free Radical and Pericyclic	Photochemical reactions , use of cycloaddition , diels alder reaction and free radical reactions for
2014-15	Organic Synthesis Retrosynthetic Approach	To understand the concept of disconnection approach, retrosynthetic analysis and synthesis of variou
2014-15	Heterocyclic and Polymer Chemistry	Synthetic methods of various heterocyclic compounds and their use in drug synthesis; Synthetic metho
2014-15	Chemistry of Natural Products	Biosynthetic pathways for natural products, synthetic methods terpenoids, steroids, alkaloids and fl
2014-15	Medical Chemistry	Basic principles of medicinal chemistry, classification of drugs, understand3ty3c and pharmakokineti
2014-15	Nuclear Chemistry	To study of Nuclear particles and their properties, 3nderst models, understand3ty , nuclear reactio
2014-15	Photoinorganic Chemistry	i). To understand the basic concept of photoinorganic chemistry of transition metal complexes for ha
2014-15	Therapeutic bioinorganic and chemistry of forensic materials	TO study of metal ion in carcinogenesis, , Chemistry of forensic materials and physicals methods in b
2014-15	Organo-tranistonmetal Chemistry	TO understand the synthetic methodology or common organotranstion metal complexes and their structura
2016-17	Inorganic Chemistry	To understand the concepts in group theory, reaction mechanism of transition metal complexes.
2016-17	Organic Chemistry	To understand nature of chemical bonding, structure and reactivity, fundamentals of stereochemistry,
2016-17	Physical Chemistry	Understanding of ionic equilibrium and biological reactions, chemical dynamics, classical thermodynam
2016-17	Analytical Chemistry	Understanding of basic separation techniques, chromatography and statistical treatment of analytical d
2016-17	Constitution of India	To understand the preamble, details of constitution of India, rights , powers and duties of human
2016-17	Inorganic Chemistry	interpretation of electronic spectra of transition

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		metal complex, Metal carbonyl & clustrs
2016-17	Organic Chemistry	To understand aromatic electrophilic and nucleophilic substitution reactions and their utility.
2016-17	Physical Chemistry	Concepts in quantum chemistry, applications of phase rule, crystallography techniques
2016-17	Analytical Chemistry	Principles of microwave, vibrational and Raman spectroscopy in chemistry
2016-17	Research Methodology	Importance of AAS, ESCA, UV-Visible and Infrared spectroscopy in research
2016-17	Review of Literature	To develop the skill on how to search research literature on various topic through internet resource
2017-18	Structural Elucidation Spectral Methods	Applications of spectroscopy for structural elucidation of organic and inorganic compounds.
2017-18	Bioorganic and Supramolecular Chemistry	To study the structure and function of metalloenzymes, concepts on supramolecular chemistry.
2017-18	Applied Inorganic Chemistry	functions of catalysts in chemical reactions, synthesis, characterization and applications.
2017-18	Chemistry of Materials	synthesis, characterization, properties and applications of nanomaterials.
2014-15	Solid State Chemistry	solid state reaction, imperfection in solid, semiconductor and their devices.
2014-15	Macromolecules and Biophysical Chemistry	Biological macromolecules, chemistry and kinetics of polymerizations,
2014-15	Nano Chemistry	Methods of synthesis, characterization and applications of nanometerials
2014-15	Advanced Electro Chemistry	Electrocatalysis, electrodeposition, polarization and over potentials.
2014-15	Nuclear Chemistry	Concepts of nuclear particles, nuclear models, radioactivity, nuclear reactions.
2014-15	Thermodynamics	To study the molecular partition function, applications of chemical and quantum systems.
2014-15	Surface and Magetochemistry	To understand surface chemistry, colloidal state of matter, magneto chemistry.
2014-15	Chemical Dynamics Catalysis	Kinetics of complex reactions, reactions in solutions, photochemical reactions.
2017-18	Organic Synthesis	Synthesis and chemical reactivates of various reagents in organic reactions.
2017-18	Advanced Organic Chemistry	Bioorganic chemistry, enzymes , Asymmetric synthesis.
2017-18	Environmental Chemistry	environmental chemistry special reference to atmosphere, hydrosphere and lithiosphere.

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2017-18	Green Chemistry	principles of Green Chemistry, nonconventional methods in organic synthesis.
2017-18	Heterocyclic Chemistry	Nomenclature, named reactions for the synthesis of heterocycles
2017-18	Organic Synthesis Rerosynthetic Approach	Concepts in retrosynthetic analysis, disconnection, approach, protective groups , complex molecules.
2017-18	Chemistry of Natural Products	Total synthesis of terpenoids and carotenoids, alkaloids, steroids.
2017-18	Medicinal Chemistry	Concepts in medicinal chemistry, drug activity, pharmacokinetics, pharmacodynamics.
2017-18	Organic High Poymers	understanding of polymers, natural and synthetic polymers, processing of polymeric materials.
2017-18	Drug Design and drug Discovery	Principles of drug design and drug discovery, lead modification and SAR studies.
2017-18	Nuclear Chemistry	To understand properties of nuclear particles, , nuclear models, nuclear reactions
2017-18	Photo Inorganic Chemistry	photochemistry of transition metal complex, charge transfer transitions.
2017-18	Theraputic Bioinorganic and Chemistry of Forensic Materials	chemistry of forensic material, metal and toxicity, metal iron in medicine
2017-18	Polymer Chemistry	chemistry of polymerization, kinetics of polymerization, conducting polymers,.
2014-15	Food Fertilizer and Pesticide Analyses	Skills in the analysis of food, fertilizer, pesticide, oils and soaps.
2014-15	Petrochemical & Polymer Analyses	Design and development of different polymers, fuels and petroleum materials
2017-18	Nano Chemistry	Nanoscience and nanotechnology, fabrication methods, properties, its applications
2017-18	Instruments Methods of Chemical Analysis	Knowledge about advanced instrumental methods of chemical analysis for structural determination
2017-18	Biophysical Chemistry	Introduction to biomolecules and bioenergitics with special attention towards biostatistical analysis.
2017-18	Research Project (Experimental)	developmental of experimental skill on the synthesis of metal complexes, nanocomposites.
2017-18	Research Project (Dissertation, Presentation and Seminars)	development of writting skill, ppt presentation, seminar presentation on project
2017-18	Research Project (Experimental)	Skills for the design and synthesis of new bioactive molecules and their characterization techniques.

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2017-18	Research Project (Dissertation, Presentation and Seminars)	to develop computer handling basic skill, handing of softwares, ppt presentation and seminars.
2017-18	Research Project (Experimental)	Skill for development of new materials and characterization by spectral techniques.
2017-18	Research Project (Dissertation, Presentation and Seminars)	to develop computer handling basic skill, handing of software's, ppt presentation and seminar.
2016-17	Advanced Analytical Techniques-I	Skills of separation and identification of different matters using chromatographic,
2016-17	Quality Assurance and Accreditation	Awareness ofquality assurance and control of different laboratories.
2016-17	Electro analytical Techniques	Analytical skills using electroanalytical techniques such as potentiometry, coulorometry
2016-17	Advanced Analytical Techniques -II	Skills of separation and identification of different matters using EDS
2016-17	Polymer & Petrochemical Analysis	Skills for analyzing the polymer, paints, pigments, fuels and petroleum
2016-17	Analytical Method Development & Validation	To develop different analytical methods along with their validation
2016-17	Pharmaceutical & Forensic Analysis	To develop the skill for analysis of sample/matter in pharmaceutical forensic laboratory
2016-17	Environmental Analysis & Monitoring	To analyzing the environment for its constituents and monitoring the desired and undesired constituent
2016-17	Food Fertilizer Pesticides Analysis	To develop the skills for analyzing food, fertilizer and pesticide samples

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