॥ न हि ज्ञानेन सदृशं। पवित्रमिह विद्यते ॥

Shriram Shikshan Sanstha's

Shriram Mahila Vidnyan Mahavidyalaya, Paniv

Tal. Malshiras Dist.: Solapur

NAAC Accredited at 'B' Grade with CGPA 2.46 (1st cycle)

(Affiliated to SNDT Women's University, Mumbai)

Department of Chemistry (PG)

Course outcome (COs)

Name of the Class	Course Title	Course Outcome
M. Sc. I. General Chemistry (Sem.-I)	**Analytical Chemistry I (115211)**	➢ After going through the course, learners will be able 1. **Analyze** the Fundamentals concept of analytical chemistry 2. **Apply**, how to Prepare different standard solution Theoretically 3. **Assess** to develop the knowledge of theoretical concepts of volumetric techniques. 4. **Evaluate** and develop expertise in use of statistical aids to compile, tabulate, and present analytical data.
	Food and Biochemical analysis (115212)	➢ After going through the course, learners will be able 1. **Analyze** the regulation and legislation related to food safety and officers 2. **Assess** able to compare quality parameters of various food products. 3. **Analyze** and perform methods of biochemical analysis. 4. **Evaluate** the Types, Nutritional value and adulteration test for food products
	Practical Analytical Chemistry (115223)	➢ After going through the module, learners will be able to**,** • **Assess** Gain hands-on experience with various titration and analytical instruments (potentiometer). Learn to set up, calibrate, and operate different analytical instruments. Understand the principles behind each analytical technique. • **Discuss** analytical results with the structural features and chemical properties of molecules, essential for roles in quality assurance and research and development
	Practical Food and	➢ After going through the course, learners will be able to**,** • **Asses** and Develop skills in the identification of organic

	Biochemical Analysis (115224)	• compounds based on their spectra, preparing for careers in analytical chemistry and pharmaceuticals. • **Discuss** organic compounds based on functional group analysis, relevant to roles in quality control and chemical analysis laboratories.
	Drug Laws & Packaging (125211)	➢ After going through the course, learners will be able 1. **Analyze** the knowledge of basic regulation and legislation of drugs 2. **Assess** standards of ISI, AGMARK, ISO, WHO 3. **Discuss** the importance of products Certification 4. **Discuss** the importance of GDP, GMP, GLP
	Research Methodology (135211)	➢ After going through the course, learners will be able 1. **Analyze** the Standard chemical safety protocol, Literatures survey & review. 2. **Assess** and presentation of data practically to chemically 3. **Apply** equipped with the knowledge of chemical safety and disaster management to work in research field/industries.
M. Sc. I. General Chemistry (Sem.-II)	**Analytical chemistry Paper II (215211)**	➢ After going through the course, learners will be able. 1. **Analyze** the principle and working of different types of instruments used for analysis. 2. **Apply** these techniques practically. 3. **Assess** these techniques in research and analysis.
	Cosmetics Formulation & Quality Control (215212)	➢ After going through the course, learners will be able to **1. Assess** with understanding cosmetic formulation procedures. **2. Analyze** the benefits and drawbacks of the raw ingredients used in the manufacture of cosmetics. **3. Evaluate** the significance of quality control procedures in the cosmetics industry. **4. Assessing** and analyzing cosmetic compositions for personal. **5. Discuss** professional development.
	Environmental Science (215213)	➢ After going through the course, learners will be able 1. **Analyze** the different types of environmental pollutants and their global impact. 2. **Asses** the methods for control of environmental pollution. 3. **Analysis** of pollutants and their management 4. **Discuss** the Environmental Legislation and Contemporary

		Environmental Issues.
	Practical Analytical Chemistry-ll (215224)	➢ After going through the course, learners will be able to**,** • **Asses** Gain hands-on experience with various analytical instruments (potentiometer, spectrophotometer, polarography, etc.). Learn to set up, calibrate, and operate different analytical instruments. Understand the principles behind each analytical technique. • **Discuss** analytical results with the structural features and chemical properties of molecules, essential for roles in quality assurance and research and development
	Pharmaceutical Analysis (225211)	➢ After going through the course, learners will be able 1. **Analyze** the active pharmaceutical components in medicinal products. 2. **Assess** the administration method and dosage type. 3. **Discuss** the consulting and contrasting pharmacopeias for various parameters and studies. 4. **Apply** the fundamental QA and QC concepts in the pharmaceutical sectors.
	Practical Pharmaceutical Analysis (245221)	➢ After going through the course, learners will be able to**,** • **Asses** and Develop skills in the identification of organic compounds based on their spectra, preparing for careers in analytical chemistry and pharmaceuticals. • **Discuss** organic compounds based on functional group analysis, relevant to roles in quality control and chemical analysis laboratories.
M. Sc. II (Sem. -III)	**Analytical Chemistry III (315211)**	➢ After going through the course, learners will be able to, **1. Analyze** the principles, instrumentation, and applications of Gas Chromatography, HPLC, Ion Chromatography, and other advanced chromatographic techniques. **2. Evaluate** the effectiveness and suitability of various spectroscopic methods including AES, AMS, NMR, and miscellaneous techniques like chemiluminescence and photoacoustic spectroscopy. **3. Discuss** the theoretical foundations and practical implications of laser-based techniques in atomic spectroscopy and their diverse applications in research and industry. **4. Apply** knowledge gained to critically assess and solve complex analytical challenges in the field of advanced chromatography and spectroscopy.
	Organic Analysis (315212)	➢ After going through the course, learners will be able to **1. Analyze** and categorize impurities in samples using IR and UV- visible spectroscopy. **2. Apply** NMR spectroscopy principles to interpret

		spectra and identify organic functional groups. 3. **Discuss** reaction outcomes and assess factors influencing organic reactions. 4. **Analyze** the unique properties of nanoparticles and develop skills for trace element analysis in nanotechnology.
	Practical Analytical Chemistry-lll (315213)	➢ After going through the course, learners will be able to**,** • **Asses** Gain hands-on experience with various analytical instruments (potentiometer, spectrophotometer, polarography, etc.). Learn to set up, calibrate, and operate different analytical instruments. Understand the principles behind each analytical technique. • **Discuss** analytical results with the structural features and chemical properties of molecules, essential for roles in quality assurance and research and development
	Practical Organic Analysis (315224)	➢ After going through the course, learners will be able to**,** • **Asses** and Develop skills in the identification of organic compounds based on their spectra, preparing for careers in analytical chemistry and pharmaceuticals. • **Discuss** organic compounds based on functional group analysis, relevant to roles in quality control and chemical analysis laboratories.
	Microbiological Methods of Analysis (315213)	➢ After going through the course, learners will be able to 1. **Evaluate** the functioning of the immune system, contributing to careers in immunology and healthcare. Implement methods for controlling microbial growth, essential for roles in public health and microbiology research. 2. **Discuss** and formulate and optimize various culture media for different microorganisms, supporting careers in clinical microbiology and biotechnology. 3. **Apply** various staining techniques for microorganisms, aiding careers in diagnostic microbiology and laboratory technology.
	Research Project Part – I (355221)	➢ After this course, the students will be able to, 1. Apply advanced analytical techniques to investigate complex research questions 2. Design and execute experiments to collect and analyze data in analytical chemistry.
M.Sc.II (Sem.-IV)	**Analytical chemistry IV (415211)**	➢ After going through the course, learners will be able to 1. **Assess** evaluate the concepts and principles of green chemistry and emerging green technologies, preparing them for careers in environmental

		sustainability and green manufacturing. 2. **Analyze** and apply the principles of Mössbauer spectroscopy, including its effects, instrumentation, and applications, essential for roles in materials science and advanced physics research. 3. **Discuss** advanced thermal methods and radioactive methods of analysis, equipping them for careers in nuclear chemistry and materials characterization. 4. **Synthesize** and apply the fundamentals of X-ray and neutron diffraction techniques, critical for careers in crystallography and nanotechnology research.
	Practical Advanced Analytical Techniques (415222)	➢ After going through the course, learners will be able to**,** 1) **Develop** advanced analytical skills in conductometry, pH-metry, and thermometry for accurate analysis of acids and bases, enhancing problem-solving capabilities in complex chemical environments. 2) **Evaluate** and interpret water quality parameters using sophisticated analytical techniques, preparing for leadership roles in environmental monitoring and water resource management. 3) **Analyze** and innovate methods for evaluating cosmetic raw materials, contributing to advancements in the cosmetics and personal care industry. 4) **Apply** interdisciplinary knowledge and advanced analytical techniques to address and solve complex real-world problems in various fields of applied chemistry.`
	In-Plant Training (402302)	An orientation program for the In-Plant Training for aspiring students should be planned before students proceed for training. This program is essential in preparing students for real-world industrial environments, ensuring they gain valuable practical experience and develop problem- solving skills. As a faculty advisor, your role is critical in facilitating this training. You will: • Identify suitable plants for student training. • Liaise with plant authorities to establish and sign MOUs. • Ensure students understand and commit to safety protocols through a signed undertaking. • Coordinate with industry mentors assigned to the students. • Conduct surprise visits to review student performance. • Assist students with any issues they encounter during training. • Help students make the most of their training experience, fostering a problem-solving aptitude. For students, this orientation will outline the skills and competencies you need to develop during your training. You will learn about the technical, safety, and professional

		expectations from your in-plant training, and how to identify and propose improvements within the plant. After going through the course, learners will be able to: 1) **Analyze** proficiency in laboratory techniques, instrumentation, and data analysis relevant to the analytical chemistry industry. 2) **Apply** knowledge to solve problems, optimize processes, and develop innovative solutions in an industrial setting. 3) **Discuss** communicate with colleagues, supervisors, and clients, both verbally and in writing, while collaborating with cross- functional teams to achieve common goals. **4) Assess** industry-specific safety protocols and regulations to ensure a safe working environment
	Advanced Environmental Chemistry (425211)	➢ After going through the course, learners will be able to **1. Analyze** and assess the environmental and societal impacts of various energy technologies, including nuclear energy, bioenergy, and renewable energy sources. **2. Demonstrate** comprehensive knowledge of environmental science principles, focusing on the interactions between living organisms and their ecosystems. **3. Evaluate** the role and effectiveness of environmental NGOs in managing and conserving natural resources and biodiversity. **4. Apply** ethical principles and social responsibilities in addressing environmental challenges and promoting sustainable development practices.