



!! न हि ज्ञानेन सदृशं ! पवित्रमिह विद्यते !!

Shriram Shikshan Sanstha's

Shriram Mahila Vidyan Mahavidyalaya, Paniv

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

Tal.: Malshiras, Dist.: Solapur, 413113

(Affiliated to S. N. D. T. Women's University, Mumbai)

Criteria 2-Teaching Learning and Evaluation

2.6. Student Performance and Learning Outcomes

Metric No. 2.6.1.	Teachers and students are aware of the stated Programme and course outcomes of the Programmes offered by the institution
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List of courses offered

List of courses offered (UG)			
Program Name	Course code	Course Name	Year of introduction
F. Y. B. Sc. (Sem. I)	100101	Environmental science (Foundation course)	2014
	102101	Inorganic chemistry	
	102102	Organic chemistry	
	102201	Lab Course	
	104101	Algae, Fungi, Lichens, Bacteria, Viruses.	
	104102	Morphology, Taxonomy and Anatomy	
	104201	Lab Course	
	105101	Animal Diversity and Physiology	
	105102	Animal Diversity, Ecology and Biodiversity	
	105201	Lab Course	
F. Y. B. Sc. (Sem. II)	200101	Women's issue (Foundation course)	2014
	202101	Physical Chemistry	
	202102	Inorganic Chemistry	
	202201	Lab Course	
	204101	Bryophyta, Pteridophyta, Gymnosperms and Ecology.	
	204102	Physiology, Biochemistry, Biotechnology and cytogenetics.	
	204201	Lab Course	
	205101	Genetics, Biochemistry & Evolution	
	205102	Basic embryology & Biotechnologies	
	205201	Lab Course	
S. Y. B. Sc. (Sem. I)	300101	Women's issue (Foundation course)	2014
	302101	Organic Chemistry	
	302102	Physical Chemistry	
	302201	Lab Course	
	305101	Parasitology	



	305102	Cell biology & Instrumentation	
	305201	Lab Course	
S. Y. B. Sc. (Sem. II)	400101	English I (Foundation course)	2014
	402101	Inorganic Chemistry	
	402102	Physical Chemistry	
	402201	Lab Course	
	405101	Applied Zoology	
	405102	Current trends in Zoology	
	405201	Lab Course	
T. Y. B. Sc. (Sem. I)	500101	English II (Foundation course)	2014
	502101	Physical Chemistry	
	502102	Organic Chemistry	
	502103	Inorganic Chemistry	
	502104	Analytical Chemistry	
	502201	Lab Course	
	502202	Lab Course	
T. Y. B. Sc. (Sem. II)	600101	English I (Foundation course)	2014
	602101	Physical Chemistry	
	602102	Organic Chemistry	
	602103	Inorganic Chemistry	
	602104	Analytical Chemistry	
	602201	Lab Course	
	602202	Lab Course	



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Principal

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Department of Chemistry

Course outcome (COs)

Name of program	Course title	Course outcome
B. Sc. I. General Chemistry (Sem.-I)	Chemistry P-I (Inorganic Chemistry)	After successful completion of course a Student should be able to <ul style="list-style-type: none">➤ Understand atomic structure, modern periodic table and periodic properties of elements.➤ Understand the concept of chemical bonding➤ Learn chemistry of s and p block elements
	Chemistry P-II (Organic Chemistry)	<ul style="list-style-type: none">➤ Lerner can know about IUPAC names of any organic compounds.➤ Know structure and bonding of compounds of carbon.➤ Gain basic knowledge of stereochemistry of organic molecules.➤ Learn chemistry of alkenes, alkynes, alkadienes, cycloalkanes, alkyl halides, Grignard's Reagent, Alcohols, ethers, carbonyl compounds, carboxylic acids and amines.
	Lab Course:	After successful completion of course a Student should be able to <ul style="list-style-type: none">➤ Understand Inorganic volumetric analysis and Qualitative Analysis:
B. Sc. I. General Chemistry (Sem.-II)	Chemistry-I (Physical Chemistry)	After successful completion of course a Student should be able to <ul style="list-style-type: none">➤ Learn mathematical concepts required for understanding physical chemistry.➤ Understand concepts behind solid, liquid and gaseous states of matter.➤ Understand colloids, macromolecules and concepts behind catalysis and its applications.



	Chemistry-II (Inorganic Chemistry)	After successful completion of course a Student should be able to <ul style="list-style-type: none"> ➤ Understand Comparative study of elements Gr. 13-17 elements ➤ Learn trends in periodic properties, allotropy, Inert pair effect. ➤ Understand Chemical properties of the noble gases, chemistry of Xenon , structure and bonding in Xenon compounds. ➤ Understand Solubility product and common ion effect. Use of borax, cobalt nitrate, sodium carbonate, hydrogen sulphide, ammonium chloride and yellow ammonium sulphide. ➤ Understand Detection of following acid radicals in presence of each other: CO_3^{2-} and SO_3^{2-} , NO_2^- and NO_3^-, Cl^-, Br^- and I^-
	Lab Course:	After successful completion of course a Student should be able to <ul style="list-style-type: none"> ➤ Understand Physical Chemistry Viscometer ➤ Learn about Taglamometer ➤ Understand Semi Micro Qualitative Analysis.
B. Sc. II. (Sem. -III)	General Chemistry-I (Organic Chemistry)	After successful completion of course a Student should be able to <ul style="list-style-type: none"> ➤ Learn study preparations, reactions and mechanisms ➤ Understand properties, acidic and basic Nature, of Alcohols, Phenols, Aldehydes, ketones and carboxylic acid. ➤ Understand study properties, acidic and basic Nature, of Organic compound of Nitrogen and their synthesis.
	General Chemistry-II (Physical Chemistry)	After successful completion of course a Student should be able to <ul style="list-style-type: none"> ➤ Understand Thermodynamic ➤ First law of thermodynamics ➤ Learn Calculation of W, q, du and dH ➤ Hess's law of heat Summation and its application.
	Lab Course:	After successful completion of course a Student should be able to <ul style="list-style-type: none"> ➤ Understand Organic Chemistry: Organic Derivatives Preparation, crystallization and physical constant ➤ Understand Physical Chemistry to determine the equilibrium



		constant for the reaction.
B. Sc. II. (Sem.-IV)	General Chemistry-I (Physical Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand Second law of ➤ Learn Concept of Entropy ➤ Learn Gibbs and Helmholtz Function: Gibbs Function (G) and Helmholtz Function ➤ Understand Thermodynamic Quantities.
	General Chemistry- II (Inorganic Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand Condition for the formation of molecular orbitals ➤ Understand linear Combination of atomic orbitals methods to obtain molecular orbitals. ➤ Understand Chemistry of transition element(3d). ➤ Understand IUPAC nomenclature ➤ Learn about Stereoisomerism ➤ Understand treatment of precipitates in gravimetry ➤ Understand different classification of Acid and Bases
	Lab Course:	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand gravitation Estimation of Barium gravimetrically as Barium-Sulphate. ➤ Understand estimation of Ferrous gravimetrically as Fe₂O₃ ➤ Understand estimation of Zinc gravimetrically as Zinc Pyrophosphate (Zn₂P₂O₇). ➤ Understand estimation of Barium gravimetrically as Ba-Chromate (BaCrO₄) ➤ Understand estimation of Nickel gravimetrically as Ni-DMG ➤ Understand Physical Chemistry to determine normality and strength.
	General	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand elementary quantum mechanics.



B. Sc. III. (Sem.-V)	Chemistry-I (Physical chemistry)	<ul style="list-style-type: none"> ➤ Learn about quantum numbers ➤ Understand Photochemistry ➤ Understand qualitative description of fluorescence, phosphor fluorescence, non-radioactive process, quantum yield, photosynthesized reaction. ➤ Understand spectroscopy ➤ Understrand physical properties and molecular
	General Chemistry- II (Oragnic Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand details about Synthetic dyes and drugs ➤ Understand organomaganesium compound ➤ Understand Fats, Oils And Detergents
	General Chemistry- III (Inorganic Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand Solid state chemistry ➤ Understand superconductivity ➤ Understand chemistry of actinides, uranium and plutonium, applications. ➤ Understand Organometallic chemistry
	General Chemistry- IV (Analytical Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand qualitative and quantitative analysis ➤ Understand UV -visible Spectroscopy and Absorption spectroscopy ➤ Understand Beer's, Lambert's law and Lambert's Beer's law. ➤ Understand titrimetric method ➤ Understand Conductmetric titration and potentiometric titration. ➤ Understand Method of separation.
		<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand determine the energy of activation for the acid



	Lab Course:	<p>catalyzed hydrolysis of methyl acetate</p> <ul style="list-style-type: none"> ➤ Determine the strength of given strong acid (HCl) By potentiometric ➤ Understand investigate the kinetics of iodination of acetone ➤ Understand Binary mixture ➤ Understand inorganic Chemistry complex metric titration ➤ Understand Estimation of Hardness of water sample ➤ Understand to verify Lambert-Beers Law using Methyl Orange.
B. Sc. III. (Sem.-VI)	General Chemistry-I (Physical Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand colligative properties of dilute ➤ Understand osmotic pressure Vant'Hoff eq. for osmotic pressure, ➤ Understand nuclear chemistry ➤ Understand secondary cells lithium ion cell. Fuel Cells, Solar cell and biomass energy. ➤ Understand Hydrogen : fuel of the future, production of hydrogen and advantage. ➤ Understand Surface chemistry: Types of Adsorption, Langumir's adsorption isotherm. B. E. T. eq.
	General Chemistry-II (Organic Chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand Heterocyclic compound ➤ Learn Electrophilic substitution ➤ Understand carbohydrates ➤ Understand Synthetic polymere ➤ Understand Spectroscopy and infrared spectroscopy.
	General Chemistry-III (Inorganic)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand metal ligand bonding in TM complex ➤ Understand electronics spectra of TM complex ➤ Understand thermodynamics and kinetic stability of complexes.

Chemistry)	<ul style="list-style-type: none"> ➤ Understand Bioinorganic Chemistry ➤ Understand Catalysis by transition metals complexes
General Chemistry-IV (Analytical chemistry)	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand optical methods ➤ Understand Methods of separation ➤ Understand Miscellaneous Concept of quality, quality control, quality assurance, ISO series, good laboratory practices. ➤ Understand Turbidimetry and Nephelometry
Lab Course:	<p>After successful completion of course a Student should be able to</p> <ul style="list-style-type: none"> ➤ Understand to determine the amount of Fe present in the given solution using salicylic acid by colorimetric titration. ➤ Understand to determine the order of reaction between K₂S₂O₈ and KI by fractional change method. ➤ Understand to determine empirical formula of Ferric-5-sulphosalicylate. ➤ Understand determine the amount of Fe²⁺ in the given solution potentiometrically. ➤ Understand to determine the refractive indices of series of salt solutions and to find out concentration of the salt in given unknown solution. ➤ Understand estimation of nitro group by reduction. ➤ Understand to prepare tetramine Copper(II) sulphate, bis (ethylene diamine) Copper (II) sulphate tris (ethylenediamine) Nickel(II) thiosulphate. Tris (acetylacetonato) Iron(III). Bis (8-hydroxy quinolinato) Magnesium (II). ➤ Understand estimation of Saline from Dextrose Saline by Mohr's Method.



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Department of Zoology
Course Outcomes (COs)

Name of program	Course title	Course outcome
B. Sc. I. (Sem. I)	Zoology paper I	After completion of course learner can know about Diversity of Animal Kingdom I and Basic Animal Physiology
	Zoology paper II	After completion of course learner can know about Diversity of Animal Kingdom II, Ecology and Biodiversity.
	Lab Course	After completion of course learner can know about Animal Classification like Protozoa, Porifera, Coelenterata, Nematelminthes, Annelida, Arthropoda, Chondrichthyes, Amphibia, Reptilia and Aves. <ul style="list-style-type: none"> • Determination of pH of soil. • Estimation of Dissolved Oxygen in the water sample • Estimation of Hardness of water in the water sample.
B. Sc. I. (Sem. II)	Zoology paper I	After completion of course learner can know about Genetics, Evolution, Biochemistry and Biodiversity.
	Zoology paper II	After completion of course learner can know about Basic Embryology and Basic Biotechnology
	Lab Course	After completion of course learner can know about Chromatographic techniques, Extraction and qualitative detection of nucleic acids, Qualitative tests for proteins, lipids and carbohydrates. Introduction to basic laboratory safety practices, precautions and safety rules.
B. Sc. II. (Sem. III)	Zoology paper II	After completion of course learner can know about Parasitology, Protozoan Parasitology, Helminthes Parasitology and Epidemiology
	Zoology paper II	After completion of course learner can know about Cell Biology.
	Lab Course	After completion of course learner can know about Identification of Protozoans parasites and Working and principal of various instruments.
B. Sc. II. (Sem. IV)	Zoology paper I	After completion of course learner can know about Economics Importance Insects, Cattle farming, Dairy Science and Piggery and Poultry
	Zoology paper II	After completion of course learner can know about Basic Molecular Biology and Advanced Biotechnology
	Lab Course	After completion of course learner can know about Economically important insects, Animal Husbandry (Animal Types) and Poultry.



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Department of Botany

Course Outcomes (COs)

Name of the class	Course title	Course outcome
B. Sc. I. Botany (Sem.-I)	Botany Paper I	After completion of course learner can know about Algae, Fungi, Lichen, Bacteria and Viruses
	Botany Paper II	After completion of course learner can know about Morphology, Anatomy and taxonomy of plant.
	Lab Course: (Practical: I)	After completion of course learner can know practical knowledge about Stages in the life cycle of Algae, Fungi, Lichen and Bacteria
	Lab Course: (Practical: II)	After completion of course learner can know about Morphology of plants, Flower, Morphology Inflorescence, Angiospermic families and plant Anatomy.
B. Sc. I. Botany (Sem.-II)	Botany Paper I	After completion of course learner can know about Bryophyta, Pteridophyta, Gymnosperms and Ecology.
	Botany Paper II	After completion of course learner can know about Plant Physiology, Biochemistry, Biotechnology and cytogenetics.
	Lab Course: (Practical: I)	After completion of course learner can know practical knowledge about about stages in the life cycle of Bryophytes, Pteridophytes, Gymnosperms and Ecology
	Lab Course: (Practical: II)	After completion of course learner can know practical knowledge about Physiology, Biochemistry, Biotechnology, Cytology and Genetics




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Department of Chemistry

Undergraduate Program Outcomes (POs)

- 1. Disciplinary Knowledge:** Good knowledge and understanding of major concepts, theoretical principles and experimental findings of the subject and its different subfields.
- 2. Skills:** Ability to use modern instrumentation and laboratory techniques to design and perform experiments.
- 3. Critical thinking:** Ability to engage in reflective and independent thinking by understanding the concepts in every area of the subject.
- 4. Problem solving:** Capability to deduce a problem associated with subject and applies the class room learning into practice to offer a solution for the same.
- 5. Sense of inquiry:** Capability for asking relevant/appropriate questions relating to the issues and problems and planning, executing and reporting the results of a theoretical or experimental investigation.
- 6. Communication Skills:** Ability to share thoughts, ideas and applied skills of communication in its various perspectives like written communication, oral communication etc.
- 7. Lifelong learners:** Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of respective subjects.
- 8. Digitally literate:** Adequate training in the application of digital knowledge in higher education and workplace.
- 9. Ethics:** Recognize different value systems including one's own, understand the moral dimensions of one's decisions, and accept responsibility for them.
- 10. Environment and Sustainability:** Understand the issues of environmental contexts and sustainable development.



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Department of Chemistry (UG)

Program Specific Outcomes (PSOs)

The college has clearly stated learning outcomes in its vision and mission statement. Aims and objectives are clearly defined and stated by the college. The faculty and the students are made aware of the learning outcomes for all the programmes taught. Details are as follows:

- Learning outcomes for all the programmes taught are clearly stated in syllabi itself.
- Syllabi of every programme with aims and objectives, content of the course, reference books, pattern of examination and expected learning outcomes is given to the students by the faculty. It is also made available on the college and University websites.
- The students are made aware of the learning outcomes through the Principal's address in the beginning of the academic year in the form of induction programme.
 1. The specific outcome of this course is to enable students to acquire sufficient knowledge and skills related to Inorganic chemistry.
 2. The program specific outcome of this course is to enable students to acquire knowledge and skills and develop analytical approach for problem solving.
 3. Further a research oriented learning that develops analytical and integrative problem-solving approaches.
 4. Also to get hands on various preparations in organic chemistry with laboratory skills on preparation of various solutions, design of some reactions with its work up and isolation.
 5. To create, select and apply appropriate techniques, resources and modern technology in multidisciplinary environment.





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List of courses offered (As per NEP-2020)

List of courses offered (PG-Analytical Chemistry)			
Program Name	Course code	Course Name	Year of introduction
F. Y. M. Sc. (Sem. I)	115211	Analytical Chemistry Paper I	2023
	115212	Food & Biochemical Analysis	
	115223	Practical Analytical Chemistry	
	115224	Practical Food and Biochemical Analysis	
	125211	Drug Laws and Packaging	
	135211	Research Methodology	
F. Y. M. Sc. (Sem. II)	215211	Analytical Chemistry Paper II	2023
	215212	Cosmetics Formulations & Quality Control	
	215213	Environmental Science	
	215224	Practical Analytical Chemistry Paper II	
	225211	Pharmaceutical Analysis	
	245221	Practical Pharmaceutical Analysis	
S. Y. M. Sc. (Sem. III)	315211	Analytical chemistry - III	2023
	315212	Organic Analysis	
	315213	Practical Analytical Chemistry	
	315224	Practical Organic Analysis	
	325211	Microbiological Methods of Analysis	
	355221	Research Project Part - I	
S. Y. M. Sc. (Sem. IV)	415211	Analytical Chemistry - IV	2023
	415222	Practical Advanced Anal. Techniques	
	415223	In-plant training	
	425211	Advance Environmental Science	




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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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the module, learners will be able to,</p> <ul style="list-style-type: none"> • 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	<p>➤ After going through the course, learners will be able to,</p> <ul style="list-style-type: none"> • Asses and Develop skills in the identification of organic



	Biochemical Analysis (115224)	<ul style="list-style-type: none"> • 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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able.</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able to</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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-II (215224)	<p>➤ After going through the course, learners will be able to,</p> <ul style="list-style-type: none"> • 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)	<p>➤ After going through the course, learners will be able</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able to,</p> <ul style="list-style-type: none"> • 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)	<p>➤ After going through the course, learners will be able to,</p> <ol style="list-style-type: none"> 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)	<p>➤ After going through the course, learners will be able to</p> <ol style="list-style-type: none"> 1. Analyze and categorize impurities in samples using IR and UV- visible spectroscopy. 2. Apply NMR spectroscopy principles to interpret



		<p>spectra and identify organic functional groups.</p> <ol style="list-style-type: none"> 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.
	<p>Practical Analytical Chemistry-III (315213)</p>	<p>➤ After going through the course, learners will be able to,</p> <ul style="list-style-type: none"> • 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
	<p>Practical Organic Analysis (315224)</p>	<p>➤ After going through the course, learners will be able to,</p> <ul style="list-style-type: none"> • 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.
	<p>Microbiological Methods of Analysis (315213)</p>	<p>➤ After going through the course, learners will be able to</p> <ol style="list-style-type: none"> 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.
	<p>Research Project Part – I (355221)</p>	<p>➤ After this course, the students will be able to,</p> <ol style="list-style-type: none"> 1. Apply advanced analytical techniques to investigate complex research questions 2. Design and execute experiments to collect and analyze data in analytical chemistry.
<p>M.Sc.II (Sem.-IV)</p>	<p>Analytical chemistry IV (415211)</p>	<p>➤ After going through the course, learners will be able to</p> <ol style="list-style-type: none"> 1. Assess evaluate the concepts and principles of green chemistry and emerging green technologies, preparing them for careers in environmental



		<p>sustainability and green manufacturing.</p> <ol style="list-style-type: none"> 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.
	<p>Practical Advanced Analytical Techniques (415222)</p>	<p>➤ After going through the course, learners will be able to,</p> <ol style="list-style-type: none"> 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.
	<p>In-Plant Training (402302)</p>	<p>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:</p> <ul style="list-style-type: none"> • 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. <p>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</p>

		<p>expectations from your in-plant training, and how to identify and propose improvements within the plant.</p> <p>After going through the course, learners will be able to:</p> <ol style="list-style-type: none"> 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
	<p>Advanced Environmental Chemistry (425211)</p>	<p>➤ After going through the course, learners will be able to</p> <ol style="list-style-type: none"> 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.



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Principal

Shriram Mahila Vidyayan Mahavidyalaya
Paniv. Tal. Malshiras, Dist. Solapur



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Shriram Shikshan Sanstha's

Shriram Mahila Vidyan Mahavidyalaya, Paniv

Tal. Malshiras Dist.: Solapur

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

(Affiliated to SNTD Women's University, Mumbai)



Department of Chemistry


Postgraduate Program Outcomes (POs)

- 1. Disciplinary Knowledge:** Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of a programme of study.
- 2. Critical Thinking:** Apply analytic thought to a body of knowledge, analyses and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence, identify relevant assumptions or implications, formulate coherent arguments, critically evaluate practices, policies and theories by following scientific approach to knowledge development.
- 3. Analytical Reasoning:** Demonstrate the ability to evaluate the reliability and relevance of evidence, identify logical flaws and holes in the arguments of others, analyses and synthesize data from a variety of sources, draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
- 4. Problem Solving:** Demonstrate capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge and apply one's learning to real life situations.
- 5. Research-related Skills:** Demonstrate a sense of inquiry and capability for asking relevant/appropriate questions, problematizing, synthesising and articulating, demonstrate the ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships, plan, execute and report the results of an experiment or investigation.
- 6. Scientific Reasoning using Quantitative/Qualitative Data:** Demonstrate the ability to understand cause-and-effect relationships, define problems, apply scientific principles, analyse, interpret and draw conclusions from quantitative/qualitative data, and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
- 7. Communication Skills:** Ability to share thoughts and ideas effectively in writing and orally, communicate with others using appropriate media, confidently share one's views and express herself/himself, demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
- 8. Collaboration/Cooperation/Team work:** Demonstrate ability to work effectively and respectfully with diverse teams, facilitate cooperative or coordinated effort on the

part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team.

9. **Information/Digital Literacy:** Demonstrate capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources and to use appropriate software for analysis of data.
10. **Self-Directed Learning:** Demonstrate ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.
11. **Moral and Ethical Awareness/Reasoning:** Demonstrate the ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Demonstrate the ability to identify ethical issues related to one's work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights, appreciate environmental and sustainability issues, and adopt objective, unbiased and truthful actions in all aspects of work.
12. **Lifelong learners:** Capable of self-paced and self-directed learning aimed at personal development and for improving knowledge/skill development and reskilling in all areas of respective subjects.




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Department of Chemistry (PG)

Program Specific Outcomes (PSOs)

➤ After completing this programme, Learner will

1. To establish an appreciation of the role of chemistry in quantitative analysis.
2. To develop an understanding of the broad role of the chemist in measurement and problem solving for analytical tasks.
3. To provide an understanding of chemical methods employed for elemental and compound analysis.
4. To provide experience in some scientific methods.
5. Employed in analytical chemistry.
6. To develop some understanding of the professional and safety responsibilities residing in working on chemical analysis.



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Paniv, Tal. Malshiras, Dist. Solapur

COs, POs, PSOs displayed on notice board & website.

