

**Rayat Shikshan Sanstha's**  
**Karmaveer Bhaurao Patil College Vashi, Navi Mumbai**  
**[Autonomous]**


**Name of the Program: Masters in Science**

**Program outcomes (POs)**

<b>PO-1</b>	<b>Disciplinary Knowledge and Skills:</b> Acquire the comprehensive and in-depth knowledge of various subjects in sciences such as Physics, Chemistry, Mathematics, Microbiology, Bio-analytical Science, Computer Science, Data Science, Information Technology and disciplinary skills and ability to apply these skills in the field of science, technology and its allied branches.
<b>PO-2</b>	<b>Communication and Presentation Skills:</b> Develop various communication skills including presentation to express ideas evidently to achieve common goals of the organization.
<b>PO-3</b>	<b>Creativity and Critical Judgment:</b> Facilitate solutions to current issues based on investigations, evaluation and justification using evidence based approach.
<b>PO-4</b>	<b>Analytical Reasoning and Problem Solving:</b> Build critical and analytical attitude in handling the problems and situations.
<b>PO-5</b>	<b>Sense of Inquiry:</b> Curiously raise relevant questions based on highly developed ideas, scientific theories and its applications including research.
<b>PO-6</b>	<b>Use of Digital Technologies:</b> Use various digital technologies to explore information/data for business, scientific research and related purposes.
<b>PO-7</b>	<b>Research Skills:</b> Construct, collect, investigate, evaluate and interpret information/data relevant to science and technology to adapt, evolve and shape the future.
<b>PO-8</b>	<b>Application of Knowledge:</b> Develop scientific outlook to create consciousness against the social myths and blind faith.
<b>PO-9</b>	<b>Moral and Ethical Reasoning:</b> Imbibe ethical, moral and social values to develop virtues such as justice, generosity and charity as beneficial to individuals and society at large.
<b>PO-10</b>	<b>Leadership and Teamwork:</b> Work cooperatively and lead proactively to achieve the goals of the organization by implementing the plans and projects in various field-based situations related to science, technology and society at large.
<b>PO-11</b>	<b>Environment and Sustainability:</b> Create social awareness about the environment and develop sustainability for betterment of the future.
<b>PO-12</b>	<b>Lifelong Learning:</b> Realize that pursuit of knowledge is a lifelong activity and in combination with determined efforts, positive attitude and other qualities to lead a successful life.

  
**Program**  
**Coordinator**

  
**BOS Chairman**

  
**Principal**



**I/C PRINCIPAL**  
**KARMAVEER BHAURAO PATIL COLLEGE**  
**VASHI, NAVI MUMBAI - 400 703.**

**Name of the faculty: Science and Technology**

**Name of the Program: Masters in Science**

**Program Specific Outcomes (PSOs)**

At the end of the two-year program, the student will understand and be able to-

<b>PSO-1</b>	Establish a foundation of the fundamentals and applications of current advanced analytical techniques and their scientific theory
<b>PSO-2</b>	Adapt and practice the Bioanalytical techniques which are most prominently used in current industry trends
<b>PSO-3</b>	Justifies the professional ethics, attitudes, and behaviors which they learn during Practical and research work and through group activities.
<b>PSO-4</b>	Inculcate the knowledge that includes Traditional as well as Modern Medicine System, Regulatory bodies in Pharmacy, Pharmacognosy, Clinical Trial and Data Management, Pharmacology, Applied Molecular Biology and Microbiology, cosmetics, perfumery along with Instrumentation



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**Title of Specific Program: M.Sc. Bioanalytical Sciences**

<b>Course Code</b>	<b>Title of Course</b>	<b>Course Outcomes</b>
		After successful completion of each course the learner will be able to:
<b>Semester-I</b>		
<b>PGBAS101</b>	<b>Extraction techniques and Different Medicine Systems-I and Pharmacognosy</b>	<p>CO-1. Choose an extraction technique for the analysis. [1]*</p> <p>CO-2. Describe the principles and practices of ASU [2]*</p> <p>CO-3. Identify the disease(s) and then compare and decide its management with respect to ASU and Modern drugs. [4]*</p> <p>CO-4. Summarize the concept of Pharmacognosy [2]*</p> <p>CO-5. Assess the Herbal raw material and its evaluation. [5]*</p>
<b>PGBAS102</b>	<b>Chromatography and Spectroscopy-I</b>	<p>CO-1. Explain the different chromatographic and spectroscopic techniques [2]*</p> <p>CO-2. Illustrate the different analytical instruments [2]*</p> <p>CO-3. Compare the different chromatographic techniques and choose the appropriate chromatographic separation technique. [5]*</p> <p>CO-4. Test the analyte(s) in a sample using chromatographic and spectroscopic techniques [4]*</p> <p>CO-5. Select the appropriate spectroscopy techniques for sample analysis. [3]*</p>
<b>PGBAS103</b>	<b>Drug Act and Quality Management, Quality Control and Quality Assurance and Stability studies.</b>	<p>CO-1. Formulate the documentation required for laboratory work and also prepare SOPs for analytical laboratories [6]*</p> <p>CO-2. Associate WHO guidelines with Pharmacopeial standards [2]*</p> <p>CO-3. Compare the different pharmacopeias [5]*</p> <p>CO-4. Recall the personnel requirements in QA and QC [1]*</p> <p>CO-5. Determine the product's stability [5]*</p>
<b>PGBAS104A</b>	<b>Biomolecules and OMICS, Electrophoresis and Polymerase chain reaction</b>	<p>CO-1. Describe the concept of OMICS and its various branches. [2]*</p> <p>CO-2. Calculate the molecular weight of the biomolecules by electrophoretic techniques [5]*</p> <p>CO-3. Compare the classical and modern techniques of electrophoresis. [5]*</p> <p>CO-4. Classify different types of electrophoretic techniques. [4]*</p> <p>CO-5. Memorize the guidelines for regulation of the Pollution Control Board for laboratories. [1]*</p> <p>CO-6. Identify the different types of wastes and determine the disposal of Bioanalytical laboratory-generated wastes [3]*</p>



<b>PGBAS104B</b>	<b>Cosmetics and Cosmeceuticals -I</b>	<p>CO-1. Discuss the basic concept of cosmetics in the Indian market. [6]*</p> <p>CO-2. Classify the different types of cosmetics.</p> <p>CO-3. Formulate the different cosmetic products. [6]*</p> <p>CO-4. Recall the basic Human anatomy relevant to cosmetic application. [1]*</p>
<b>PGBAS105</b>	<b>Bioinformatics</b>	<p>CO-1. Explain the concept of Bioinformatics. [2]*</p> <p>CO-2. Enlist the databases and search tools. [1]*</p> <p>CO-3. Summarize the applications of Bioinformatics [2]*</p> <p>CO-4. Describe chemi-informatics. [2]*</p>
<b>Semester II</b>		
<b>PGBAS201</b>	<b>Solid Phase extraction, Supercritical fluid extraction and Environmental issues in Bioanalytical Laboratory</b>	<p>CO-1. Explain the principle and working of SPE and SCFE [2]*</p> <p>CO-2. Demonstrate the SPE instrument. [2]*</p> <p>CO-3. Distinguish between primary and secondary metabolites in plants. [4]*</p> <p>CO-4. Summarize the factors affecting the synthesis of secondary metabolites in plants. [2]*</p> <p>CO-5. Identify the different types of wastes and determine the disposal of Bioanalytical laboratory-generated wastes. [4]*</p>
<b>PGBAS202</b>	<b>Chromatography and spectroscopy II</b>	<p>CO-1. Compare HPTLC and TLC techniques [5]*</p> <p>CO-2. Develop methods for analysis by HPLC [6]*</p> <p>CO-3. Make use of the GC instrument for analysis [3]*</p> <p>CO-4. Distinguish and select the appropriate spectroscopic technique [4]*</p> <p>CO-5. Estimate and solve the complications arising during instrumental analysis. [5]*</p>
<b>PGBAS203</b>	<b>Research Methodology</b>	<p>CO-1. Understand various study designs and hypotheses pertaining to research topics. [2]*</p> <p>CO-2. Enlist different methods of data collection. [1]*</p> <p>CO-3. Describe various methods of sampling. [2]*</p> <p>CO-4. Compare the role of different variables in research. [5]*</p> <p>CO-5. Understand steps involved in processing data. [2]*</p> <p>CO-6. Design research review article [6]*</p> <p>CO-7. Elaborate in details Copyright and Neighboring Rights and Filing Patent Applications [6]*</p>
<b>PGBAS204A</b>	<b>Immunoassays and Clinical Pharmacology and Proteomics</b>	<p>CO-1. Explain the principle and applications of Immunoassays. [2]*</p> <p>CO-2. Define the parameters of pharmacokinetics and pharmacodynamics [1]*</p> <p>CO-3. Illustrate and describe the various stages of Drug discovery and development. [2]*</p> <p>CO-4. Explain protein extraction and Purification [2]*</p>





<b>PGBAS204B</b>	<b>Cosmetics and cosmeceuticals-II</b>	<p><b>CO-1.</b> Summarize the FDA guidelines for labeling and packaging of cosmetics. [2]*</p> <p><b>CO-2.</b> Test the adulterants present in cosmetic products. [6]*</p> <p><b>CO-3.</b> Assess the raw materials used in cosmetic preparations. [5]*</p> <p><b>CO-4.</b> Formulate the different cosmetic products [6]*</p> <p><b>CO-5.</b> Compare and contrast cosmetics and cosmeceuticals [4]*</p>
<b>PGBAS205</b>	<b>General Statistics And Biostatistics</b>	<p><b>CO-1.</b> Select the appropriate statistical approach to biological samples. [3]*</p> <p><b>CO-2.</b> Enlist data collection techniques. [1]*</p> <p><b>CO-3.</b> Outline the design of statistical experiments. [2]*</p> <p><b>CO-4.</b> Enlist the variations in biological samples and their statistical treatment. [1]*</p> <p><b>CO-5.</b> Give examples of parametric and non-parametric tests. [1]*</p>
<b>Semester III</b>		
<b>PGBAS301</b>	<b>Standardization of ASU drugs, Electronic data management, Nanotechnology and Laboratory safety and chemical handling</b>	<p><b>CO-1.</b> Understand the concept of standardization and demonstrate the use of Bioanalytical tools in standardization of ASU drugs. [2]*</p> <p><b>CO-2.</b> Apply the concept behind electronic data management [3]*</p> <p><b>CO-3.</b> Explain the concept of nanotechnology and relate its applications in Drug delivery system [2]*</p> <p><b>CO-4.</b> Summarize the concept of functional foods and relate nutritional genomics [2]*</p> <p><b>CO-5.</b> Understand and apply the use of MSDS [2]*</p>
<b>PGBAS302</b>	<b>Mass Spectroscopy and thermal analysis</b>	<p><b>CO-1.</b> Explain the concept of MS [2]*</p> <p><b>CO-2.</b> Illustrate the analysis of samples with MS [2]*</p> <p><b>CO-3.</b> Compare the difference between conventional analysis methods and Tandem MS [4]*</p> <p><b>CO-4.</b> Measure the quantity of analyte in the sample by MS [5]*</p> <p><b>CO-5.</b> Enlist different techniques of Bhasma preparation [1]*</p>
<b>PGBAS303</b>	<b>3 months internship</b>	<p><b>CO-1.</b> Apply theoretical knowledge in real-time. [3]*</p> <p><b>CO-2.</b> Demonstrate the techniques learnt for real samples and analysis [2]*</p>



<b>PGBAS304A</b>	<b>Genomics, Ethical issues in clinical trials, GCP, BA-BE and Regulatory toxicology</b>	<p>CO-1. Recall the principle of DNA Sequencing [1]*</p> <p>CO-2. Describe hybridoma technology used in production of transgenic organisms [2]*</p> <p>CO-3. Recognize the origins of ethical issues and dealing with ethical issue [3]*</p> <p>CO-4. Understand and summarize the requirement and need of GCP compliance [2]*</p> <p>CO-5. Understand the concept of toxicology and apply the same during pre-clinical trials. [2]*</p>
<b>PGBAS304B</b>	<b>Perfumery and Fragrance-I</b>	<p>CO-1. Identify the raw materials used in perfumery [3]*</p> <p>CO-2. Classify the different types of perfumes and flavors [2]*</p> <p>CO-3. Understand the synthesis of fragrances and flavors [2]*</p> <p>CO-4. Summarize different terminologies involved in perfumery and flavors [2]*</p>
<b>PGBAS305</b>	<b>Analysis of samples in food industry</b>	<p>CO-1. Recognize the qc guidelines during food analysis</p> <p>CO-2. Tests different food samples using different analytical techniques</p> <p>CO-3. Justify the quality of the food by performing different analysis.</p>
<b>Semester IV</b>		
<b>PGBAS401</b>	<b>Regulatory aspects, Packaging in Pharma. industry, Regulatory microbiology and Environmental safety</b>	<p>CO-1. Discuss national and multi-national initiatives for regulation of ASU [6]*</p> <p>CO-2. Summarize Schedule T and Y of Drug and Cosmetic Act, 1940 [2]*</p> <p>CO-3. Explain the various packaging materials and types of packaging used in pharmaceutical industry [2]*</p> <p>CO-4. Assess the microbiological aspects of pharmaceutical and food samples [5]*</p> <p>CO-5. Calculate carbon credits and carbon footprint [5]*</p> <p>CO-6. Describe and develop strategies to reduce the environmental impact of Bioanalytical laboratory [2]*</p>
<b>PGBAS402</b>	<b>Bioassays in Pharmaceutical evaluation, Nutraceuticals, Analytical Method validation and Tracer techniques</b>	<p>CO-1. Decide and recommend the appropriate bioassays for pharmaceuticals [5]*</p> <p>CO-2. Explain the concept of nutraceuticals and able to identify human nutrition and functional food [2]*</p> <p>CO-3. Justify the concept of Analytical method development and Analytical Method Validation [5]*</p> <p>CO-4. Summarize the Analytical Instrument qualifications [2]*</p> <p>CO-5. Apply the concept of radioactivity in Bioanalysis [3]*</p>
<b>PGBAS403</b>	<b>Research Project</b>	<p>CO-1. Apply theoretical knowledge in real-life problems [3]*</p> <p>CO-2. Demonstrate the techniques learnt to solve social problems [2]*</p>





PGBAS404A	Therapeutic Drug Monitoring, Clinical Data Management, Bioavailability and Bioequivalence studies, Application of Statistical Analysis Systems	CO-1. Explain the concept and purpose of therapeutic drug monitoring [2]* CO-2. Justify the need and significance of Pharmacovigilance [5]* CO-3. Summarize the clinical data management activities [2]* CO-4. List the parameters involved in the evaluation of BA-BE [1]* CO-5. Interpret the regulatory requirements of BA-BE [2]* CO-6. Relate the importance of Statistical analysis systems in clinical research [1]*
PGBAS404B	Perfumery and Fragrances-II	CO-1. Discover the natural ingredients that can be used in perfumery and flavors [4]* CO-2. Understand the applications of perfumes and flavors in aromatherapy [2]* CO-3. Relate Application of perfumes and flavors in cosmetics [1]* CO-4. Illustrate the preparation of perfumes and flavors [2]*
PGBAS405	Regularly Guideline and regulatory affairs in Pharmaceutical and Food Industries	CO-1. Understand the various terminologies of Regulatory affairs [2]* CO-2. Relate the roles of regulatory affairs in pharma and food industry [1]* CO-3. Explain the documentations in Regulatory affairs [2]*

Note: Numbers in bracket [] indicate cognitive levels of revised Bloom's Taxonomy as follows:

[1]: Remembering, [2]: Understanding, [3]: Applying, [4]: Analyzing, [5]: Evaluating, [6]: Creating

  
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