# S.N.D.T. WOMEN'S UNIVERSITY

## Syllabus for

## M.Sc. Analytical Chemistry

| | **Programme Outcome** |
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| PO1 | Knowledge in the field: Acquire theoretical knowledge of the field and be able to apply it in various situations |
| PO2 | Professional competence : to be able to acquire various skills and prepare solutions of various normality, analyze various compounds , deciding quality parameters |
| PO3 | Problem solving: understand the rules regulation in food safety & security. Laws related to environment and its implications |
| PO4 | Researcher: equipped with the various techniques for experimentation in the laboratory, carry out chemical analysis of various products and compare its quality and suggest ways of improving quality |
| PO5<br>PO6 | Effective analysist: Correlate principle and working of different types of instruments used for analysis. To be able to use various techniques in different types of analysis may be of air, water, food drugs etc |
| | **Course Outcome** |
| | **SEMESTER I** |
| **1001** | **Fundamentals of Analytical Chemistry** |
| CO1 | Explain the basic concepts of analytical techniques. |
| CO2 | Prepare standard solutions. |
| CO3 | Explain the theoretical concepts of volumetric techniques. |
| CO4 | Develop expertise in collection, preparation and preservation of samples. |
| CO5 | Use statistical aids to compile, tabulate, evaluate and present analytical data |
| **1002** | **Food and Biochemical Analysis** |
| CO1 | Explain regulation and legislation related to food safety. |
| CO2 | Compare quality parameters of various food products. |
| CO3 | Perform methods of biochemical analysis. |
| CO4 | Use methods of food analysis for various products.<br>This knowledge will enable them to perform better in food industries |
| **1003** | **Environmental Science** |
| CO1 | Student will be able to<br>Identify different types of environmental pollutants and their global impact. |
| CO2 | Compare causes and effects of pollutants on human life. |
| CO3 | Correlate various methods for control of environmental pollution. |
| CO4 | Acquire knowledge to promote better environmental conditions |
| **1004** | **Drug Laws & Packaging** |
| CO1 | Explain the basic regulation and legislation of drugs. |
| CO2 | Compare standards of ISI and AGMARK |
| CO3 | Compare standards of ISI and AGMARK |
| CO4 | Identify better packaging materials based on advantages and limitations. |
| **1005** | **PRACTICAL ANALYTICAL CHEMISTRY** |
| CO1 | Prepare standard solutions of various concentrations. |

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| CO2 | Develop skills in volumetric titrations. |
| CO3 | Separate and estimate elements by solvent extraction method. |
| CO4 | Separate and estimate elements and compounds by chromatographic methods |
| **1005** | **PRACTICAL FOOD AND BIOCHEMICAL ANALYSIS** |
| CO1 | Analyze milk and milk products |
| CO2 | Compare analysis of tea and coffee. |
| CO3 | Develop skills in analytical methods of food products |
| CO4 | **SEMESTER II** |
| **2001** | **Electro Analytical and Spectroscopic Methods** |
| CO1 | Compare basic concepts of electro analytical and spectroscopic methods. |
| CO2 | Correlate principle and working of different types of instruments used for analysis. |
| CO3 | Use these techniques in research and analysis. |
| CO4 | Apply these techniques in the work place. |
| **2002** | **Pharmaceutical Analysis** |
| CO1 | Identify active drug ingredients in drug products. |
| CO2 | Describe dosage form and its mode of administration |
| CO3 | Refer and compare pharmacopoeias for different parameters and analysis. |
| CO4 | Correlate basic concept of QA and QC in pharma industries. |
| **2003** | **Cosmetics Formulation & Quality Control** |
| CO1 | Explain processes of cosmetic formulations. |
| CO2 | Explain advantages and limitations of raw materials used in cosmetic formulations. |
| CO3 | Assess importance of quality control process in cosmetic industries. |
| CO4 | Perform analysis of cosmetic formulations for professional growth |
| **2004** | **Research Methodology** |
| CO1 | Explain the basic principles. |
| CO2 | Collect data, literature survey for research project. |
| CO3 | Use statistical tests for analysis and presentation of data.. |
| CO4 | Exhibit the knowledge of chemical safety and disaster management to work in research field/industries |
| **2005** | **PRACTICAL SPECTROSCOPY AND CHROMATOGRAPHY** |
| CO1 | Handle colorimetric instrument for analysis. |
| CO2 | Develop skills in chromatographic techniques for analysis |
| **2005** | **PRACTICAL PHARMACEUTICAL ANALYSIS** |
| CO1 | Analyze various drugs by standard methods. |
| CO2 | Compare dissolution and disintegration test for different drugs. |
| | **SEMESTER III** |
| **3001** | **Advanced Chromatography and Spectroscopic Methods** |
| CO1 | Explain basic concept of chromatographic and spectroscopic methods. |
| CO2 | Correlate principle and instrumentation of various instruments used. |
| CO3 | Compare chromatographic and spectroscopic methods. |
| **3002** | **Organic Analysis** |
| CO1 | Describe spectroscopic methods for characterization of organic compounds. |
| CO2 | identify spectra for structure elucidation |
| CO3 | Compile implication of significance and application of carbon Nanotubes. |
| CO4 | Correlate importance of organic synthesis |
| **3003** | **Microbiological Methods of Analysis** |
| CO1 | Identify microorganism based on their morphology. |
| CO2 | Prepare various culture medium for different microorganisms |
| CO3 | Use various methods of staining for microorganism. |
| CO4 | Compare sign and symptoms of food, water, air borne diseases. |

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| CO4 | Use methods of precaution for air, water and food borne diseases. |
| **3004A** | **ELECTIVE I: Industrial Product and Forensic Analysis** |
| CO1 | Explain importance of industrial products. |
| CO2 | Compare content analysis of different types of steel, cements and ceramics |
| CO3 | Explain surfactants as pollutant. |
| CO4 | Describe soil and fertilizer analysis. |
| CO4 | Compare forensic analysis of blood and hair. |
| **3004 B** | **ELECTIVE II: Medicinal Chemistry** |
| CO1 | Explain various types of medicines. |
| CO2 | Compare mode of administration and bioavailability of drugs |
| **3004 C** | **ELECTIVE III: Biosensors, Agrochemicals & Organic Polymers** |
| CO1 | Explain basic concept of biosensors and their applications. |
| CO2 | Identify different types of agrochemicals and their analysis. |
| CO3 | Describe synthesis and analysis of organic polymers |
| **3005** | **PRACTICAL ADVANCED SPECTROSCOPIC METHODS** |
| CO1 | Compare different methods of spectroscopic analysis. |
| CO2 | Develop skills in flame photometry and fluorimetry instruments |
| **3006** | **PRACTICAL ORGANIC ANALYSIS** |
| CO1 | Develop skill in identification of organic compounds on the basis of their spectra |
| CO2 | Estimate organic compounds on the basis of functional groups |
| CO3 | **SEMESTER IV** |
| **4001** | **Advanced Analytical Techniques** |
| CO1 | Explain basic concepts of advanced analytical techniques. |
| CO2 | Describe the principle and instrumentation of advanced analytical techniques. |
| CO3 | Explain role of computers in analytical chemistry |
| CO4 | Apply the concepts of green chemistry to analytical chemistry for better environment |
| **4002** | **PRACTICAL ADVANCED ANALYTICAL TECHNIQUES** |
| CO1 | Develop skill in conductometry, pHmetry and thermometry for analysis of acids and bases. |
| CO2 | Analyze different parameters for water analysis |
| CO3 | Analyze cosmetic raw materials |
| **4003** | **RESEARCH PROJECT** |
| CO1 | Collect data and literature survey. |
| CO2 | Use statistical aids for data processing |
| CO3 | Acquire knowledge and skills for higher level research work. |
| **4004** | **IN-PLANT TRAINING** |
| CO1 | The intern will develop skills in the analytical techniques in practical work situation. |
| CO2 | Develop and strengthen their professional skills and interpersonal relationship in work environment of the industry. |
| CO3 | Provide opportunity to find out their interest in a particular carrier. |
| CO4 | Experiential learning will have broader perspective for employment |