



Master of Science, Chemistry
M. Sc. Chemistry, Semester – II

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| Course Code | PS02CCHE51 | Title of the Course | Analytical Chemistry |
| Total Credits of the Course | 4 | Hours per Week | 4 |

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| Course Objectives: | <ol style="list-style-type: none">1. This course gives an introduction to analytical chemistry and an overview of important analytical methods.2. Important analytical techniques from classical methods, electrochemical methods, spectrochemical / spectrophotometric methods, and separation techniques are reviewed.3. The course also includes theory on sampling, analyses of real samples, risk assessment of chemical experiments, important steps and procedures in analytical chemistry, and evaluation/interpretation of results. |
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| Course Content | | |
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| Unit | Description | Weightage* (%) |
| 1. | Fundamental of Analytical Chemistry: Definitions, classification of analytical techniques and importance, Classical and Instrumental methods, Factors affecting choice of analytical methods. Verification and validation in chemical analysis: Introduction, Fundamental definitions. Categories of validation. Quality Management System, Good laboratory practices. | 25 |
| 2. | Assessment of Analytical Data and Numerical Chemistry: SI units, calibrations in laboratory practice and numerical. Measures of central tendency, validation parameters: Accuracy, precision, mean and standard deviation, calibration, classification of errors, minimization of errors, significant figures and computation, Q-test (Student t-test), tests for rejection of outlying data. numerical of statistical analysis | 25 |
| 3. | Fundamentals of spectroscopy and Components of optical instruments: Brief introduction to spectroscopy, Classification of spectroscopic techniques, Electromagnetic Radiation (EMR) and Interaction of EMR with Matters. Spectrometers and their components: Sources of radiations, wave length selectors, sample holders, detectors and signal processors and display units. | 25 |
| 4. | Separation Methods : Introduction & classification of various separation methods. Chromatography techniques: General introduction, Principles and classification of chromatography according to types of chromatographic bed, physical state of mobile phase, mechanism of separation. Paper chromatography & Thin layer chromatography: Principle, types, choice of paper and solvent, location of spot and measurement of Rf Values. | 25 |





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| | Gas Chromatography: Principle, Introduction, instrumentation. | |
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| Teaching-Learning Methodology | Lectures (3 hours per week), Seminar (1 hour per week), Tutorial, Continuous evaluation by quiz, Discussion, Questioning, Problem Solving |
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| Evaluation Pattern | | |
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| Sr. No. | Details of the Evaluation | Weightage |
| 1. | Internal Written / Practical Examination (As per CBCS R.6.8.3) | 15% |
| 2. | Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3) | 15% |
| 3. | University Examination | 70% |

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| Course Outcomes: Having completed this course, the learner will be able to | |
| 1. | Form this course learner will be able to know an overview of important use of selected classical and instrumental methods and a short introduction to their basic theory. |
| 2. | This course also covered to impart basic knowledge on several important legislations, SOP and GMPs related to the profession of food, pharmacy in India. |
| 3. | It also provides the skill for selection of proper analytical techniques to solve the analytical problems. |

| Suggested References: | |
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| Sr. No. | References |
| 1. | Skoog, West, Holler, Grouch "Fundamental of Analytical Chemistry" Eight edition, Cengage Learning, 2004. |
| 2. | Robert D. Braun "Introduction to chemical analysis" McGraw-HILL International Edition. |
| 3. | Gary D. Christian. "Analytical chemistry" 6th edition John Wiley & sons, Inc. 2004 |
| 4. | Robert D. Braun "Introduction to instrumental analysis" McGraw-HILL International Edition. |





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| 5. | Judith F. Rubinson, Kenneth A. Rubinson, "Contemporary Chemical analysis" 1st edition, Prentice-Hall International Inc., 1998 |
| 6. | B. K. Sharma. "Instrumental method of chemical analysis" 28th edition, GOEL Publishing house Meerut. 2012. |
| 7. | R. A. Day, Jr, A. L. Underwood., "Quantitative analysis" 6th edition, Prentice -Hall of India Private Limited, New Delhi. 2006. |
| 8. | David Harvey. "Modern analytical chemistry" McGraw-HILL International Edition. 2000 chemistry series. |
| 9. | L. Huber, "Validation and qualification in analytical laboratories" 2nd Edition, 2007. |
| 10. | B. Sivasankar, "Instrumental Methods of Analysis" Oxford University Press, 2012. |

On-line resources to be used if available as reference material

On-line Resources

<https://edu.rsc.org/teacher-pd/in-person/analytical-chemistry/classroom-resources>

