SECOND-YEAR OF MASTER OF SCIENCE CHEMISTRY REVISED SYLLABUS ACCORDING TO CBCS NEP2020

COURSE TITLE: QUALITY IN ANALYTICAL CHEMISTRY-I
SEMESTER-III
W.E.F. 2024-2025

RECOMMENDED BY THE BOARD OF STUDIES IN CHEMISTRY
AND
APPROVED BY THE ACADEMIC COUNCIL

Devrukh Shikshan Prasarak Mandal's
Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh.
Tal. Sangameshwar, Dist. Ratnagiri-415804, Maharashtra, India

Academic Council Item No:

Name of the Implementing Institute	:	Nya. Tatyasaheb Athalye Arts, Ved. S. R. Sapre Commerce, and Vid. Dadasaheb Pitre Science College (Autonomous), Devrukh. Tal. Sangameshwar, Dist. Ratnagiri-415804,
Name of the Parent University	:	University of Mumbai
Name of the Programme	:	Master of Science
Name of the Department	:	Chemistry
Name of the Class	:	Second Year
Semester	:	Third
No. of Credits	:	04
Title of the Course	:	Quality in Analytical Chemistry-I
Course Code	:	S601CHT
Name of the Vertical in adherence to NEP 2020	:	Compulsory Major
Eligibility for Admission	:	Chemistry Graduate learner seeking Admission to Post Graduate Programme in adherence to Rules and Regulations of the University of Mumbai and Government of Maharashtra
Passing Marks	:	40%
Mode of Assessment	:	Formative
Level	:	PG
Pattern of Marks Distribution for SEE and CIA	:	60:40
Status	:	NEP-CBCS
To be implemented from Academic Year	:	2024-2025
Ordinances /Regulations (if any)		

Syllabus for Second Year of Master of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-III **Paper No.- I**

Course Title: Quality in Analytical Chemistry-I **No. of Credits - 04**

Type of Vertical: Compulsory Major **Course Code: S601CHT**

Learning Outcomes Based on BLOOM's Taxonomy:

After completing the course, the learner will be able to…		
Course Learning Outcome No.	Blooms Taxonomy	Course Learning Outcome
CLO-01	Remember	Recall basic concepts of analytical chemistry.
CLO-02	Understand	Explain terms involved in quality in analytical chemistry and chromatographic techniques.
CLO-03	Apply	Illustrate principle, instrumentation and applications involved in different chromatographic techniques.
CLO-04	Analyze	Explain methods used for selection of an analytical method and signal to noise ratio enhancement .

Syllabus for Second Year of Master of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-III **Paper No.- I**

Course Title: Quality in Analytical Chemistry-I **No. of Credits - 04**

Type of Vertical: Compulsory Major **Course Code: S601CHT**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Hours**
1	**Unit 1: Quality in Analytical Chemistry-I** • Sampling: Definition, types of sample, sampling plan, quality of sample, subsampling, Sampling of raw materials, intermediates and finished products. Sample preparations – dissolution technology and decomposition, storage of samples. • Pre-treatment of samples: soil, food and cosmetics. • Selection of the Method: sources of methods, factors to consider when selecting a method, performance criteria for methods used, reasons for incorrect analytical results, method validation, and quality by design (PAT).	01	15
2	**Unit 2: Quality in Analytical Chemistry-II** • Measurement of uncertainty: Definition and evaluation of uncertainty, putting uncertainty to use, interpretation of results and improving the quality of results. • Signal to noise: Signal to noise ratio, sources of noise in instrumental analysis. Signal to noise enhancement, hardware devices for noise reduction, software methods for noise reduction. • Pharmaceutical Legislation: introduction to drug acts, drug rules (schedules), concept of regulatory affairs in pharmaceuticals, review of GLP and GMP and their regulations for analytical labs, roles and responsibilities of personnel, appropriate design and placement of laboratory equipment, requirements for maintenance and calibration.	01	15

3	**Unit 3: Chromatographic Technique -I** • Ion exchange chromatography: Ion exchange equilibria, breakthrough capacity, inorganic ion exchangers, synthetic ion exchangers, chelating resins and their applications for separation of inorganic and organic compounds. • Ion chromatography: Principle, instrumentation with special reference to separation and suppressor columns, applications. • Exclusion chromatography : Theory, instrumentation and applications of gel permeation chromatography, retention behavior, inorganic molecular sieves, determination of molecular weight of polymers,	01	15
4	**Unit 4: Chromatographic Technique -II** • Supercritical fluid Chromatography: Theory, concept of critical state of matter and supercritical state, types of supercritical fluids, instrumentation, applications to environmental, food, pharmaceuticals and polymeric Analysis • Affinity Chromatography: principle, instrumentation and applications • Optimum pressure liquid chromatography (OPLC)	01	15
	Total	**4**	**60**

Access to the Course

The course is available for second year students admitted for Master of Science.

Methods of Assessment

The assessment pattern would be 60:40, 60% for Semester End Examination (SEE) and 40% for Continuous Internal Assessment (CIA). The structure of the SEE and CIA would be as recommended by the Board of Studies and approved by the Board of Examination and the Academic Council of the college.

References:

1. Quality in the analytical chemistry laboratory, E Prichard, John Wiley and sons N.Y 1997.
2. Quality assurance in analytical Chemistry, W Funk, V Dammann, G. Donnevert VCH Weinheim1995.
3. Fundamentals of Analytical Chemistry, D. A. Skoog and D. M. West, Saonders, College publication.
4. Chemical methods of separation, J A Dean, Van Nostrand Reinhold, 1969
5. Solvent extraction and ion exchange, J Marcus and A. S. Kertes Wiley INC 1969.
6. Analytical Chemistry, G. D. Christain, Wiley
7. Extraction Chromatography T. Braun, G. Ghersene, Elsevier Publications 1978.
8. Supercritical Fluid Extraction, Larry Taylor Wiley publishers N.Y. 1996
9. Ion exchange separation in analytical chemistry O Samuelson John Wiley 2
10. Ion exchange chromatography Ed H.F Walton Howden, Hutchenson and Rossing 1976
11. Chromatographic and electrophoresis techniques I Smith Menemann Interscience 1960