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

COURSE TITLE: SELECTED TOPICS IN ANALYTICAL CHEMISTRY
SEMESTER-IV
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	:	Four
No. of Credits	:	04
Title of the Course	:	Selected topics in Analytical Chemistry
Course Code	:	S612CHT
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-IV **Paper No.- III**

Course Title: Selected topics in Analytical Chemistry **No. of Credits - 04**

Type of Vertical: compulsory major **Course Code: S612CHT**

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	Understand	Describe method used for analysis analyte solution in effluent treatment, plastic -polymer and metallurgy.
CLO-02	Apply	Illustrate method used for recovery of metals from effluent and their permissible limits.
CLO-03	Apply	Explain treatment and disposal method used in effluent treatment and solid waste management.
CLO-04	Analyze	Analyze additives,metallic impurities in plastic

Syllabus for Second Year of Master of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-IV **Paper No.- III**

Course Title: Selected topics in Analytical Chemistry **No. of Credits - 04**

Type of Vertical: compulsory major **Course Code: S612CHT**

COURSE CONTENT			
Module No.	**Content**	**Credits**	**No. of Hours**
1	**Unit 1: Effluent Treatment** • Effluent treatment plant general construction and process flow charts • Treatment and disposal of Sewage. • Effluent parameters for metallurgical industry. • Permissible limits for metal (example Cr, As, Pb, Cd etc) traces in the effluent. • Recovery of metals from effluent, modern methods – Electrodialysis, Electrodeposition and Ion Exchange Recycle and reuse of process and treated (effluent) water	01	15
2	**Unit 2: Solid Waste Management** • Solid waste management: objectives, concept of recycle, reuse and recovery • Methods of solid waste disposal. • Treatment and disposal of sludge / dry cake • Managing non-decomposable solid waste • Bio- medical waste : Introduction , Classification and methods of disposal	01	15
3	**Unit 3: Plastic and Polymer** • Classification of plastic, determination of additives, molecular weight distribution, analysis of plastic and polymers based on styrene, vinyl chloride, ethylene, acrylic and cellulosic plastics. • Metallic impurities in plastic and their determination • Impact of plastic on environment as pollutant. • Paints and pigments: Types of paints pigments, determination of volatile and non - volatile components, Flash point (significance and method of	01	15

	determination), separation and analysis of pigments, binders and thinners.		
4	**Unit 4: Metallurgy** • Ores and minerals: Dressing of ores, pollution due to metallurgical processes (ore dressing, calcination, smelting) • Chemical analysis of ores for principal constituents : Galena, Pyrolusite, Bauxite, Hematite, Monazite • Alloys: definition, analysis of Cupronickel, Magnelium, Steel And Stainless Steel, Bronze, Gun metal. • Techniques of purification: Zone refining, analysis of high purity materials like silicon, vacuum fusion and extraction techniques.	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. Environmental Pollution Analysis, S. M. khopkar, New Age International publication (2011).
2. Water and water pollution (hand book) Ed., Seonard'l Ciacere, Vol I to IV, Marcel Dekker inc. N.Y.(1972)
3. Water pollution, Arvind kumar, APH publishing (2004)
4. Introduction to Potable Water Treatment Processes Simon Parsons, Bruce Jefferson, Paperback publication.
5. Solid waste management, K Sasikumar and Sanoop Gopi Krishna PHI publication (2009)
6. Solid waste management, Surendrakumar Northen Book Center (2009)rd
7. Handbook of chemical technology and pollution control 3 Edn Martin Hocking AP Publication (2005).
8. Fundamental Concepts of Environmental Chemistry, Second Edition G. S. Sodhi , Alpha Science, 2005

9. Chemical analysis of metals ; Sampling and analysis of metal bearing ores: American Society for Testing and Materials 1980 - Technology & Engineering
10. Manual of Procedures for Chemical and Instrumental Analysis of Ores, Minerals, and Ore Dressing Products. Government of India Ministry of Steel & Mines, Indian Bureau of Mines, 1979.
11. Alloying: understanding the basics, edited by Joseph R. Davis, ASM International (2001).