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

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COURSE TITLE: BIOANALYTICAL CHEMISTRY & FOOD ANALYSIS  
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	:	Bioanalytical Chemistry & Food Analysis
Course Code	:	S603CHT
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.- III**

**Course Title: Bioanalytical Chemistry & Food Analysis**

**No. of Credits - 04**

**Type of Vertical: Compulsory Major**

**Course Code: S603CHT**

**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	Describe basic terms involved in Bioanalytical chemistry and food analysis.
CLO-02	Understand	Explain nutritional , physiological significance, fuel value and biological values of minerals , vitamins, foods and compound which plays vital role in immune system.
CLO-03	Apply	Illustrate methods used for detection of body fluids, food additives , milk , oil , spices etc
CLO-04	Analyze	Identify additives present in various food product .

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(With effect from the academic year 2024-2025)

**SEMESTER-III**

**Paper No- III**

**Course Title: Bioanalytical Chemistry & Food Analysis**

**No. of Credits - 04**

**Type of Vertical: Compulsory Major**

**Course Code: S603CHT**

<b>COURSE CONTENT</b>			
<b>Module No.</b>	<b>Content</b>	<b>Credits</b>	<b>No. of Hours</b>
1	<p><b>Unit 1: Bioanalytical Chemistry</b> Body Fluids</p> <ul style="list-style-type: none"> <li>• Composition of body fluids and detection of abnormal levels of glucose, creatinine, uric acid in blood, protein, ketone bodies and bilirubin in urine leading to diagnosis of diseases.</li> <li>• Physiological and nutritional significance of vitamins (water soluble and fat soluble) and minerals.</li> <li>• Analytical techniques (including microbiological techniques) for vitamins.</li> </ul>	01	15
2	<p><b>Unit 2: Immunological Method</b></p> <ul style="list-style-type: none"> <li>• General processes of immune response, antigen-antibody reactions, precipitation reactions, radio, enzyme and fluoro-immuno assays.</li> <li>• Human Nutrition: Biological values and estimation of enzymes, carbohydrates, proteins, essential amino acids and lipids.</li> </ul>	01	15
3	<p><b>Unit 3: Food Analysis -I</b></p> <ul style="list-style-type: none"> <li>• Fuel value of food and importance of food nutrients</li> <li>• Food Additives – General idea about Food processing and preservation, Chemical preservatives, fortifying agents, emulsifiers, texturizing agents, flavours, colours, artificial sweeteners, enzymes. Analysis of food products for flavoring agents and colour.</li> <li>• Food Contaminants– Trace metals and pesticide residues, contaminants from industrial wastes (polychlorinated polyphenols, dioxins), toxicants formed during food processing (aromatic hydrocarbons, nitrosamines), veterinary drug residues and melamine contaminants.</li> </ul>	01	15
4	<p><b>Unit 4: Food Analysis -II</b></p>	01	15

	<ul style="list-style-type: none"> <li>• Food packaging – Introduction, types of packing materials, properties and industrial requirements.</li> <li>• Analysis of Milk – Fat content, proteins, acidity, bacteriological quality and milk adulterants.</li> <li>• Analysis of Oils and Fats – acid value, sap value, iodine value. Determination of rancidity and antioxidants.</li> <li>• Analysis of spices (cloves, cinnamon, pepper, mustard) Determination of volatile oils and fixed oils.</li> </ul>		
	<b>Total</b>	<b>4</b>	<b>60</b>

### 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. General, organic and biological chemistry, H. Stephen Stoker, Cengage Learning.
2. Advance dairy chemistry, vol 3, P. F. Fox, P. L. H. McSweeney Springer.
3. Physiological fluid dynamics vol 3, Nanjanagud Venkatanarayanasastry Chandrasekhara Swamy Narosa Pub. House, 1992
4. Molecular Biological and Immunological Techniques and Applications for food, edited by Bert Popping, Carmen Diaz-Amigo, Katrin Hoenicke, John Wiley & sons.
5. Food Analysis: Theory and practice, Yeshajahu Pomeranz, Clifton E. Meloan, Springer.
6. Modern packaging Encyclopedia and planning guide, Macgra Wreyco.
7. Food Analysis, Edited by S. Suzanne Nielsen, Springer
8. Analytical Biochemistry, D, J. Homes and H. Peck, Longman (1983)
9. Bioanalytical Chemistry, S. R. Mikkelesen and E. Corton, John Wiley and sons 2004
10. Analysis of food and beverages, George Charalanbous, Accademic press 1978

