



SECOND -YEAR OF MASTER OF SCIENCE CHEMISTRY REVISED SYLLABUS ACCORDING TO CBCS NEP 2020

COURSE TITLE: BIOORGANIC CHEMISTRY-II
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	:	02
Title of the Course	:	Bioorganic Chemistry-II
Course Code	:	S615CHT
Name of the Vertical in adherence to NEP 2020	:	Elective
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 and Summative
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.- V

Course Title: Bioorganic Chemistry-II

No. of Credits: 02

Type of Vertical: Elective

COURSE CODE: S615CHT

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 chemistry of co-enzyme and role of main enzymes involved in the synthesis and breakdown of glycogen.
CLO-02	Understand	Discuss oxidative phosphorylation, chemiosmosis and enzyme catalyzed organic reactions.
CLO-03	Apply	Derive synthesis of L-ephedrine.

Syllabus for Second Year of Master of Science in Chemistry

(With effect from the academic year 2024-2025)

SEMESTER-IV

Paper No.- V

Course Title: Bioorganic Chemistry-II

No. of Credits: 02

Type of Vertical: Elective

COURSE CODE: S615CHT

COURSE CONTENT			
Module No.	Content	Credits	No. of Hours
1	Unit-I: Biomolecules – III <ul style="list-style-type: none">○ Chemistry of coenzymes. Structure, mechanism of action and bio-modeling studies of the following coenzymes: nicotinamide adenine dinucleotide, flavin adenine dinucleotide, thiamine pyrophosphate, pyridoxal phosphate, Vitamin B12, biotin, lipoic acid, Coenzyme A.○ Oxidative phosphorylation, chemiosmosis, rotary model for ATP synthesis and role of cytochrome in oxygen activation.	01	15
2	Unit-II: Biomolecules – IV <ul style="list-style-type: none">○ Role of main enzymes involved in the synthesis and breakdown of glycogen.○ Enzyme catalyzed organic reactions: Hydrolysis, hydroxylation, oxidation and reduction.○ Enzymes in organic synthesis. Fermentation: Production of drugs/drug intermediates by fermentation. Production of chiral hydroxy acids, vitamins, amino acids, β-lactam antibiotics. Synthesis of chemicals via microbial transformation, synthesis of L-ephedrine. Chemical processes with isolated enzymes in free form (hydrocyanation of m-phenoxybenzaldehyde) and immobilized form (production of 6- aminopenicillanic acid).	01	15
	Total	02	30

Access to the Course

The course is available for all the students admitted for Second year of 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) Bioorganic, Bioinorganic and Supramolecular chemistry, P.S. Kalsi and J.P. Kalsi. New Age International Publishers
- 2) The Organic Chemistry of Enzyme-Catalysed Reactions, Academic Press, By Richard B. Silverman
- 3) Enzymes: Practical Introduction to structure, mechanism and data analysis, By Robert A. Copeland, Wiley-VCH, Inc.
- 4) The Organic Chemistry of Biological Pathways By John McMurry, Tadhg Begley by Robert and company publishers
- 5) Bioorganic Chemistry- A practical approach to Enzyme action, H. Dugas and C. Penny. Springer Verlag, 1931
- 6) Biochemistry: The chemical reactions in living cells, by E. Metzler. Academic Press.
- 7) Concepts in biotechnology by D. Balasubramanian & others
- 8) Principals of biochemistry by Horton & others.
- 9) Bioorganic chemistry - A chemical approach to enzyme action by Herman Dugas and Christopher Penney.