

F.Y.B. Sc NEP Zoology Skill Enhancement Course Syllabus Semester II



Hindi Vidya Prachar Samiti's
Ramniranjan Jhunjhunwala College
of Arts, Science & Commerce
(Empowered Autonomous College)
Affiliated to
UNIVERSITY OF MUMBAI

Syllabus for the F.Y.B.SC. ZOOLOGY (under NEP)

Vertical under NEP: Skill Enhancement Course (SEC)

COURSE CODE : RJSECZOO121

SEMESTER : II

**(REVISED 2023-2024 in alignment with the NEP2020 facilitating the inter-and
multidisciplinary learning and multiple entry and exit of the students)**

(CBCS 2023-2024)

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PREAMBLE

The National Education Policy 2020 is the first education policy of the 21st century that aims to address the many growing developmental imperatives of our country. This Policy proposes the revision and revamping of all aspects of the education structure, including its regulation and governance, to create a new system that is aligned with the aspirational goals of 21st century education, including SDG4, while building upon India's traditions and value systems. National Education Policy is based on the principle that education must develop not only cognitive capacities - both the 'foundational capacities' of literacy and numeracy and 'higher-order' cognitive capacities, such as critical thinking and problem solving – but also social, ethical, and emotional capacities and dispositions.

In the three-year UG program, the student has two exit options. Students also have the option for choosing the Honors program of four years study in a given discipline and later converting it to five-year integrated PG degree program. As undergraduate student, he/she learns the core subject (Major), subject complementing the core subject (Minor), a course from other discipline (OEC or GEC) Vocational and Skill Enhancement course from the Major(VSEC). The remaining verticals under NEP 2020 are IKS (Indian Knowledge System), AEC (Ability Enhancement Course), VEC (Value Enhancement Course) and with progressive three years of UG, student also completes at different levels OJT (On Job Training), FP (Field Projects), CEP (Community Engagement Program), RP (Research Project) which helps him/her in understanding their roots, application of the knowledge for the benefit of self and the society. Vertical CC (Co-curricular activities and activities related to yoga and human well-being) helps in preparing youth with good character and inter personal relationships.

The Department of Zoology at Ramniranjan Jhunjhunwala College was established in 1963. Currently it offers undergraduate, postgraduate and Ph.d courses in the subject of Zoology. The department provides facilities such as a well-equipped lab. with LCD projectors, fish Museum and museum for specimen, departmental library, computer facility, research facilities to students. The subject of Zoology offers the basic understanding about the vast diversity of the animal kingdom across the globe. It enables the students to strengthen their knowledge in Animal Sciences and also in the other allied branches of Zoology. Keeping the interest of learner in mind, the syllabus has been carefully designed. It has a balance of the classical aspects of Zoology which includes topics like taxonomy, ecology and advanced aspects which include topics on introductory biochemistry and biotechnology.

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The undergraduate curriculum has been meticulously designed by considering the need for the subject development, industry requirement, research outlook, competitive exams and entrepreneurship skills. Each unit included in the syllabus has clearly defined objectives. It focuses on outcome-based learning. It aims at inculcating the critical thinking, enhancing the analytical ability, developing writing skills of the students. The syllabus includes field trips to ecological habitats, national parks, sanctuaries, natural history museum, reputed research institutes and industries to widen the student's horizon. The students are encouraged to participate in various project-based activities.

Topics like animal diversity and ecology have been included to recognise the vital role animals play in ecosystem and also to develop empathy towards the animals. This will motivate students towards careers in wildlife right from the early graduation phase. To hone the analytical skills, topics such as animal biotechnology, bioinformatics, genetic engineering has been rightly placed in the syllabus. Wide range of topics such as life processes, biochemistry, molecular biology, genetics, toxicology, haematology, immunology, applied immunology, endocrinology, histology, animal tissue culture, Zoo pharmacognosy have been included. The course content includes applied biology-fishery, entomology, wildlife with a view of developing entrepreneurship skills in the learner.

Owing to the current needs of the industry and other sectors, the syllabi is designed in a manner that the learner will be able to apply the knowledge and skills acquired in varied fields. The course encourages a sense of responsibility and empathy towards all living beings, promoting sustainable practices in the learner.

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PROGRAM OUTCOMES FOR UNDERGRADUATE DEGREE PROGRAM IN ZOOLOGY

Program outcome refers to the overall characteristic an individual is supposed to acquire on completion of the three-year degree program in Bachelor of Science. The attributes based on acquisition, accumulation, and processing of knowledge of the subject are transferable beyond the discipline and useful in different domains of life.

Critical Thinking: Concepts, methodology and ability to formulate questions stimulate the inquisitiveness and critical thinking amongst the students.

Scientific Temperament: The nurturing of the young minds to observe and analyse the experiments in the laboratory or a phenomenon occurring around them to obtain a logical scientific explanation for it.

Analytical Thinking: The ability to think analytically can be developed by training and practice. The syllabus offers the student to understand the concept and design projects or experiments based on them.

Domain knowledge: The domain knowledge is the key to the understanding of advances and complex subject matter.

Social Ethics: The students are exposed to different problems caused due to human activity. They learn to conduct themselves without creating a damage to fellow beings.

Animal Ethics: The sensitization towards ethical issues associated with use of animals in the laboratory is highlighted and the solutions to overcome it are introduced.

Problem Solving: The ability to handle a situation is enhanced in the students by problem solving assignments, case studies, projects to make them competent, conscious and creative individual.

Environmental Sustainability: Environment related issues are addressed through workshops, Guest lectures and field studies.

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DEPARTMENT OF ZOOLOGY

PROGRAMME : B.SC ZOOLOGY

PROGRAMME SPECIFIC OUTCOMES (PSOS) FOR B.SC ZOOLOGY

Sr. .No.	A student completing BSc.Zoology will be able to:
PSO1	Understands the nature and basic concepts of systematic classification, ecology, biomolecules, animal biotechnology, cell biology and genetics.
PSO2	Analyse and comprehend the concepts of Enzymology, developmental biology, histology and molecular biology. Acquaint with the skills in fishery biology, medical diagnostics and environment management to boost entrepreneurship skills.
PSO3	Acquire skills and necessary training for techniques in haematology, immunology, physiology, endocrinology, molecular biology, toxicology and field biology. Enhance knowledge on biostatistics, bioinformatics, Wild-life tourism and epidemiology to provide wider job prospects in the realm of Zoology.
PSO4	Perform laboratory procedures as per standard protocols in the areas of animal diversity, genetics, biochemistry, molecular biology, physiology, immunology, developmental biology, environmental biology and ethology.
PSO5	Apply ethical principles and knowledge in understanding of Zoology to one's own life and work. Applications of biological sciences in different areas that contributes towards Nation building.

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SEMESTER	:	II
TITLE OF THE SUBJECT/COURSE	:	FUNDAMENTALS OF TECHNIQUES IN BIOTECHNOLOGY
COURSE CODE	:	RJSECZOO121
CREDITS	:	02
DURATION	:	30 HRS

LEARNING OBJECTIVES	
1	To get trained in sterilization techniques.
2	To understand the utility of instruments for sterilization.
3	To get acquainted with enzymes used in biotechnology.

COURSE OUTCOMES	AFTER COMPLETING THE COURSE, THE LEARNER WILL BE ABLE TO;	PSO ADDRESSED	BLOOM'S TAXONOMY LEVEL
CO1	apply sterilisation techniques.	1, 4	BT Level I, II, III identify, understand, apply
CO2	enhance skills of using instruments of sterilisation.	1, 3, 4	BT level I ,III explain, Apply
CO3	get acquainted with enzymes used in biotechnology.	1,4	BT level II,III Understand, apply

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F.Y.B.Sc ZOOLOGY SEMESTER-II
SEC : Fundamentals of techniques in Biotechnology Course Code: RJSECZOO121
Module 1 : Aseptic techniques: Packaging of test tubes, pipettes, petri plates, conical flask. Module 2: Instruments for sterilisation : Autoclave, Oven, Laminar air flow. Module 3: Demonstration of Aseptic transfer of liquids between burners, Study of streaking techniques, Study of Gram's staining technique. Module 4: Enzymes in biotechnology : Demonstration of calcium alginate beads preparation, Assay of invertase from immobilised yeast cells by DNSA method, Application of fermentation techniques, Effect of papaya protease enzyme(Papain) as a meat tenderizer.

Suggested References:

1. Biotechnology- U. Satyanarayana
2. Textbook of Biotechnology- R.C Dubey.

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F.Y BSc ZOOLOGY SEMESTER II

QUESTION PAPER PATTERN CODE: RJSECZOOPI21

Duration :2HRS

Total marks: 50

Q.1 Major experiment

12M

A. To perform assay of invertase activity from immobilized yeast cells by DNSA method.

OR

B. To perform gram staining of microbial population from the given sludge sample.

Q.2.Minor experiment

A.To Perform fermentation of sugarcane juice or any fruit juice by yeast.

08M

OR

B.To Perform the expt. based on effect of papain as meat tenderizer.

Q3.Packaging of test tubes, pipettes, petri-plates, conical flask (Any two)

05M

Q4. Identify and comment on the given instrument (Any two)
Autoclave, Oven, Laminar Air Flow.

10M

Q5. MCQ on

10M

- Aseptic transfer of culture medium between burners
- Streaking techniques
- Calcium alginate beads preparation

Q6. Journal and Attendance

05M