

It is hereby inform to all concerned that, on the recommendation of Board of Studies, the Academic Council at it's Meeting held on 28th July, 2026 has accepted the "Curriculum of Pre-Ph.D. Course Work as per Guidelines of University".

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

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Date: 31 / 07 / 2026.

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- 1] The Head, all concerned departments,
- 2] The Director, University Network & Information Centre, UNIC,
with a request to upload this Circular on University Website.
- 3] The Director, Board of Examinations & Evaluation,
- 4] Public Relation Officer [PRO],

Dr. Babasaheb Ambedkar Marathwada University,
Chhatrapati Sambhajinagar.

2008-11-27 PM

Dr.Babasaheb AmbedkarMarathwada University

Chhatrpati Sambhajinagar



Pre.Ph.d.course Subject wise curriculum List under the Faculty of Science & Technology.

Sr.No.	Curriculum/Subject
1.	Biochemistry
2.	Biotechnology
3.	Botany
4.	Chemistry
5.	Computer Engineering
6.	Computer Science
7.	Environmental Science
8.	Food Technology
9.	Geology
10.	Mathematics
11.	Microbiology
12.	Pharmacy
13.	Physics
14.	Statistics
✓ 15.	Zoology
16.	Civil Engineering
17.	Electronics Engineering
18.	Mechanical Engineering
19.	Nanotechnology
20.	Biophysics
21.	Pharmaceutical and Fine Chemical

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.
FACULTY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF ZOOLOGY
(Pre Ph. D. Course Work in the subject of Zoology 2026-2027)**


11/09/2026



**Dr. Babasaheb Ambedkar Marathwada University,
Chhatrapati Sambhajanagar
Department of Zoology**

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Pre Ph. D. Course in the subject of Zoology
Syllabus of Core Papers in the subject of Zoology (08 Credits)

Learning Objectives:

1. To understand the fundamental concepts and recent advances in animal diversity, systematics and evolutionary biology.
2. To develop knowledge of cell biology, molecular biology, genetics and developmental biology relevant to zoological research.
3. To understand the principles and applications of ecology, biodiversity conservation and environmental biology.
4. To introduce students to modern research methods, instrumentation, biostatistics and bioinformatics used in Zoology.

Learning Outcomes :

1. Students will be able to explain the organization, diversity and evolutionary relationships of animals.
 2. Students will be able to apply concepts of cell biology, genetics and molecular biology in zoological research.
 3. Students will be able to analyze ecological processes, biodiversity issues and conservation strategies.
 4. Students will be able to use basic research methodology, biostatistics and bioinformatics tools for scientific investigation.
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Unit I: Cell Biology and Molecular Biology

Structure and function of prokaryotic and eukaryotic cells; cell organelles; biological membranes and transport; cell cycle, mitosis and meiosis; cell signalling; DNA replication, transcription and translation; gene regulation; recombinant DNA technology; PCR, electrophoresis and blotting techniques; applications of molecular biology in Zoology.

Unit II: Animal Diversity, Systematics and Evolution

Principles of animal taxonomy and nomenclature; species concept; systematic hierarchy; modern approaches to classification; biodiversity of invertebrates and vertebrates; comparative anatomy and adaptive radiation; phylogenetic relationships; molecular systematics; evolutionary theories; natural selection, genetic drift, gene flow and speciation; molecular evolution and conservation genetics.



Unit III: Genetics and Developmental Biology

Mendelian and non-Mendelian inheritance; linkage and crossing over; chromosome structure and aberrations; mutations and mutagens; population genetics; quantitative genetics; cytogenetics; gametogenesis; fertilization; embryonic development; organogenesis; regeneration; stem cells; developmental genes and signalling pathways; applications of developmental biology.

Unit IV: Ecology and Environmental Biology

Levels of ecological organization; abiotic and biotic factors; population ecology; community structure; ecosystem functions; energy flow and nutrient cycling; ecological succession; animal behaviour; wildlife ecology; environmental pollution; climate change; environmental impact assessment; biodiversity hotspots; protected areas; in-situ and ex-situ conservation; sustainable development.

Unit V: Parasitology and Entomology

Introduction to parasitism; host-parasite relationships; types of parasites and hosts; life cycles; transmission and parasitic adaptations; morphology, biology and pathogenicity of important protozoan, helminth and arthropod parasites; epidemiology; zoonotic parasites; host immune responses; diagnosis, prevention and control of parasitic diseases; basic parasitological techniques including collection, preservation, staining, microscopy, culture, immunodiagnosis, PCR and DNA barcoding.

Introduction to Entomology; insect morphology, anatomy, classification, identification, physiology, growth, development, reproduction, ecology and behaviour; economically important, beneficial and harmful insects; insect vectors; pest management; Integrated Pest Management (IPM); biological control; insecticide resistance; insect culture and rearing; molecular identification; DNA barcoding and forensic entomology.

Unit VI: Fishery Science and Aquaculture

Introduction to Fishery Science; diversity and biology of commercially important fishes; morphology, anatomy, physiology and reproductive biology; induced breeding; seed production; hatchery management; principles of aquaculture; aquaculture systems including pond, cage, pen, RAS and biofloc; fish nutrition; diseases and water quality management; fisheries resource assessment; population dynamics; genetics; biotechnology; biodiversity conservation and sustainable fisheries; effects of climate change; post-harvest technology, processing and value addition.

Unit VII: Biochemistry, Physiology and Endocrinology

Principles of homeostasis and biochemical basis of physiological processes; digestion, absorption and metabolism of nutrients; respiration and gas exchange; circulation and transport of materials; excretion and osmoregulation; nervous coordination and sensory physiology; muscle physiology and bioenergetics; reproductive physiology; endocrine glands, hormones and hormonal regulation.

mechanisms of endocrine control and feedback regulation; stress physiology; physiological and biochemical adaptations to environmental conditions; applications of physiological, biochemical and endocrinological approaches in contemporary Zoological research.

Unit VIII: Immunology, Biotechnology and Contemporary Research Applications

Principles of innate and acquired immunity; immune cells, organs, antigens and antibodies; complement system; hypersensitivity; autoimmunity and vaccines; basic immunological techniques; fundamentals of biotechnology including animal cell culture, transgenic animals, cloning and cryopreservation; applications of immunology, biotechnology and bioinformatics in health, agriculture, aquaculture, biodiversity and conservation research; applications of molecular biology, genomics, biotechnology and bioinformatics in Parasitology, Entomology, Fishery Science and contemporary Zoological research.

Unit XI: Laboratory and Field Research Techniques

Laboratory and field methods; microscopy; preparation of temporary and permanent slides; collection and preservation of zoological specimens; field sampling and ecological observations; introduction to molecular biology techniques including electrophoresis and PCR; database searching; sequence analysis; DNA-based research tools; scientific data documentation and research data management.

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