ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

B.Sc. (Zoology) Major — 4-Year UG Honours

Semester-Wise Syllabus

Semesters I – VI | Theory & Practicals | w.e.f. AY 2025–26

Curriculum Framework Compliance • NEET/CUET-PG Orientation • Skill-Based Learning

COURSE STRUCTURE OVERVIEW

Semester	Year	Core Papers	Theory Hrs	Practical Hrs	Credits
I	Year I	2	6	4	8
II	Year I	2	6	4	8
III	Year II	2	6	4	8
IV	Year II	3	9	6	12
V	Year III	3+5 Elect.	9+15	6+10	12+20
VI	Year III	5 Electives	15	10	20

SEMESTER IV

Year: II | Core Courses: 3 | Theory: 9 hrs/week | Practical: 6 hrs/week | Total Credits: 12 | Focus: Immunology, Biotechnology & Wildlife Conservation

THEORY PAPERS

PAPER 8: IMMUNOLOGY

Core Subject | Credits: 3 | 3 Hrs/Week

1. Unit I — Overview of Immune System: Introduction to basic concepts; Innate and adaptive immunity; Cells and organs of immune system
2. Unit II — Antigens: Basic properties; B and T cell epitopes, paratopes; Haptens and adjuvants; Factors influencing immunogenicity
3. Unit III — Antibodies: Antibody structure; Classes of antibodies; Functions; Monoclonal antibodies
4. Unit IV — Working of Immune System: Structure and functions of MHC; Exogenous and endogenous antigen presentation and processing; Basic properties and functions of cytokines
5. Unit V — Immune System in Health & Disease: Gell and Coombs' classification — Hypersensitivities; Autoimmunity; Immunodeficiency; Vaccines — types and immunization; Organ transplantation, graft rejection and immunosuppression

PAPER 9: ANIMAL BIOTECHNOLOGY

Core Subject | Credits: 3 | 3 Hrs/Week

6. Unit I — Enzymes & Vectors: Restriction modification systems (Type I, II, III); Mode of action of Type II restriction enzymes; DNA modifying enzymes; Cloning vectors — pBR, pUC, lambda, M13, Cosmids, BACs, YACs
7. Unit II — Gene Delivery & PCR: Microinjection, electroporation, biolistic method, liposome and viral delivery; PCR basics; Sanger's DNA sequencing; Hybridization techniques — Southern, Northern, Western blotting
8. Unit III — Cell & Tissue Culture: Primary, secondary culture and continuous cell lines; Organ culture; Cryopreservation; Hybridoma technology — cell fusion and monoclonal antibodies; Stem cells — types and applications
9. Unit IV — Reproductive Biotechnology: Artificial insemination; IVF; Super ovulation; Embryo transfer; Embryo cloning; Transgenic animals (sheep, fish) — strategies and applications
10. Unit V — Advanced Applications: DNA fingerprinting; Biotechnology in fisheries — monoculture and polyploidy; Gene therapy; Bioinformatics — concept, definition, database types

PAPER 10: WILDLIFE AND CONSERVATION BIOLOGY

Core Subject | Credits: 3 | 3 Hrs/Week | Interdisciplinary — Ecology & Conservation

11. Unit I — Wildlife Wealth & Depletion: Wildlife wealth of India; Threatened wildlife; Reasons for depletion; National Parks, Sanctuaries, Biosphere Reserves; Community and conservation reserves
12. Unit II — Conservation Status & Legislation: Red Data Book categories; Wildlife trade and legislation; Policies and laws in wildlife management and ethics
13. Unit III — Biodiversity Conservation: Ecologically Sensitive Areas (ESA); Regional and national approaches; Population Viability Analysis (PVA) — conceptual foundation and uses
14. Unit IV — International Conservation Efforts: CITES, IUCN, CBD; International agreements for marine life; Ramsar Convention on Wetlands; Human impact on terrestrial and aquatic resources; Forest and grassland conservation
15. Unit V — Human-Wildlife Interactions: Human-wildlife conflicts; Strategies to reduce interactions; Role of Government and NGOs; Socio-economic issues related to human-wildlife interactions

PRACTICAL / LABORATORY

PRACTICAL 8: IMMUNOLOGY LAB

Credits: 1 | 2 Hrs/Week

1. Demonstration of lymphoid organs (as per UGC guidelines)
2. Histological study of spleen, thymus and lymph nodes (prepared slides)
3. Blood group determination
4. Demonstration of ELISA
5. Demonstration of Immunoelectrophoresis
6. Testing for typhoid antigens by Widal test
7. Differential Leukocyte Count
8. Isolation of monocytes from blood
9. Rapid Plasma Reagin (RPR) Test

PRACTICAL 9: ANIMAL BIOTECHNOLOGY LAB

Credits: 1 | 2 Hrs/Week

10. Cloning vectors — pBR, pUC series, Bacteriophage lambda, M13, Cosmids, BACs, YACs (Charts/Images/Models)
11. DNA quantification using DPA Method
12. DNA Fingerprinting techniques
13. Separation and purification of biological compounds by paper chromatography

14. Cleaning and sterilization of glass and plastic wares for cell culture
15. Preparation of culture media
16. Amplification of DNA by PCR

PRACTICAL 10: WILDLIFE AND CONSERVATION BIOLOGY LAB

Credits: 1 | 2 Hrs/Week

17. Identify and study ecological role of characteristic animal species of various biomes (photographs/paintings)
18. Identify marine and fresh water planktons (preserved water samples)
19. Study of animal architecture — hive of honeybee, nests of wasps, mount of termite, nests of Weaver Bird and Tailor Bird
20. Identify and study distribution and ecological role of common bivalves and gastropods of sea-shore
21. Compare and interpret sonograms of bird calls (courtship calls, alarm calls)
22. Locate and demarcate major sanctuaries/national parks on phytogeographic map of India