

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 III

Year: II | Core Courses: 3 | Theory: 9 hrs/week | Practical: 6 hrs/week | Total Credits: 12 |  
Focus: Genetics, Evolution, Physiology

## THEORY PAPERS

### PAPER 5: GENETICS

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Core Subject | Credits: 3 | 3 Hrs/Week

1. Unit I — Mendelian Genetics: History; Concepts of phenotype, genotype, heredity, variation, pure lines; Monohybrid cross; Back cross and test cross; Dihybrid cross
2. Unit II — Linkage & Gene Interactions: Linkage — complete and incomplete; Crossing over — mechanism, chiasma, interference and coincidence; Incomplete dominance; Codominance; Pleiotropy; Lethal alleles; Epistasis; Non-epistasis
3. Unit III — Non-Mendelian Inheritance: Polygenes; Multiple alleles and blood group inheritance; Rh inheritance — erythroblastosis foetalis; Extrachromosomal inheritance — Kappa particles in Paramecium; Shell coiling in snails
4. Unit IV — Sex Determination & Sex-Linked Inheritance: Chromosomal and genic balance theories; Hormonal, environmental and haplo-diploidy types; X-linked; Y-linked; XY-linked inheritance
5. Unit V — Human Genetics: Human karyotyping; Pedigree analysis; Sickle cell anaemia — autosomal recessive; Huntington's disease — autosomal dominant; Basics of genomics and proteomics

### PAPER 6: EVOLUTION AND ZOOGEOGRAPHY

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Core Subject | Credits: 3 | 3 Hrs/Week

6. Unit I — Origin of Life: Big Bang theory; Primitive atmosphere; Coacervates, microspheres; Formation of nucleic acids and nucleoproteins; Miller & Urey experiment
7. Unit II — Evidences of Evolution: Paleontological and taxonomical; Morphological and anatomical; Embryological and physiological; Connecting links; Missing links; Biogeographical distribution
8. Unit III — Theories of Evolution: Lamarckism; Neo-Lamarckism; Weismann's germplasm theory; Darwinism (Natural Selection); Neo-Darwinism (Modern Synthetic Theory)
9. Unit IV — Evolutionary Mechanisms: Variations — types, sources, importance; Mutations — classification, causes, significance; Isolation mechanisms; Sewall Wright effect; Hardy-Weinberg Principle
10. Unit V — Zoogeography: Animal distribution and barriers; Zoogeographical realms — Palearctic, Nearctic, Neotropical, Ethiopian, Oriental, Australian regions

## **PAPER 7: ANIMAL PHYSIOLOGY — LIFE SUSTAINING SYSTEMS**

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*Core Subject | Credits: 3 | 3 Hrs/Week*

11. Unit I — Physiology of Digestion: Structural organization of GI tract and associated glands; Vitamins and minerals; Mechanical and chemical digestion; Absorption; Hormonal control of enzyme secretion
12. Unit II — Physiology of Respiration: Structural organization of respiratory system; Mechanism and control; Pulmonary ventilation; Respiratory volumes and capacities; Transport of O<sub>2</sub> and CO<sub>2</sub>; Dissociation curves; CO poisoning
13. Unit III — Renal Physiology: Kidney structure and functional unit; Urine formation mechanism; Regulation of water balance; Regulation of acid-base balance
14. Unit IV — Physiology of Exciting Tissues: Neuron structure and types; Nerve impulse transmission (myelinated, non-myelinated, synaptic); Ultrastructure of muscle; Molecular and chemical basis of muscle contraction
15. Unit V — Cardiac Physiology: Mammalian heart structure; Coronary circulation; Conducting myocardial fibers; Origin and conduction of cardiac impulses; Cardiac cycle; Cardiac output and regulation; Blood pressure and regulation

## **PRACTICAL / LABORATORY**

### **PRACTICAL 5: GENETICS LAB**

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*Credits: 1 | 2 Hrs/Week*

1. Study of Mendelian inheritance using suitable examples/problems
2. Study of linkage recombination and gene mapping using data
3. Study of human karyotypes
4. Blood grouping and Rh determination in humans
5. Demonstration of prenatal diagnosis (Virtual lab)
6. Amniocentesis demonstration or virtual lab
7. Demonstration of ultrasonography (Virtual lab)
8. Scoring dysmorphic features in syndromic patients
9. Genetic counselling methods based on case history
10. Construction and analysis of pedigree charts

### **PRACTICAL 6: EVOLUTION AND ZOOGEOGRAPHY LAB**

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*Credits: 1 | 2 Hrs/Week*

11. Study of fossil evidences
12. Study of homology and analogy from specimens and pictures
13. Study of embryological evidences by charts/pictures
14. Study of Lamarckism with images/animations
15. Study of Darwinism with images/animation

16. Study of connecting links/missing links
17. Phylogeny of horse using pictures
18. Study of Genetic Drift using Darwin's finches (pictures)
19. Visit to Natural History Museum and submission of report
20. Mapping distribution of animals according to zoogeographical regions

## **PRACTICAL 7: ANIMAL PHYSIOLOGY LAB**

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*Credits: 1 | 2 Hrs/Week*

21. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, kidney
22. Study of activity of salivary amylase under optimum conditions
23. Qualitative tests for identification of carbohydrates
24. Qualitative tests for identification of proteins
25. Qualitative tests for identification of fats
26. Urine tests for sugar and albumin
27. Estimation of haemoglobin using Sahli's haemoglobinometer
28. Recording blood pressure using sphygmomanometer
29. Recording frog's heartbeat under in situ and perfused conditions
30. ECG observation — spotting/identification of curves from given ECG