

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 II

Year: I | Core Courses: 2 | Theory: 6 hrs/week | Practical: 4 hrs/week | Total Credits: 8 | Focus: Cell Biology, Molecular Biology & Embryology

THEORY PAPERS

PAPER 3: CELL AND MOLECULAR BIOLOGY

Core Subject | Credits: 3 | 3 Hrs/Week

1. Unit I — Cell Biology I: Definition, history; prokaryotic vs eukaryotic cells; virus, viroids, mycoplasma; Electron microscopic structure of animal cell; Plasma membrane models (Fluid Mosaic Model); Active, passive and facilitated transport
2. Unit II — Cell Biology II: Structure and functions of Golgi complex, Endoplasmic Reticulum, Lysosomes, Ribosomes, Mitochondria, Centriole, Nucleus and Chromosomes
3. Unit III — Cell Biology III: Mitosis and Meiosis; Cell cycle — stages, checkpoints, regulation; Abnormal cell growth — cancer, apoptosis; Bioenergetics — Glycolysis, Krebs cycle, ETS
4. Unit IV — Molecular Biology I: Central Dogma; DNA replication (semi-conservative, semi-discontinuous); Transcription in prokaryotes; Post-transcriptional modifications; Translation
5. Unit V — Molecular Biology II: Gene expression (Lac operon); Gene expression in eukaryotes; Biomolecules — Carbohydrates (glucose), Proteins (amino acids), Lipids (fatty acids)

PAPER 4: EMBRYOLOGY

Core Subject | Credits: 3 | 3 Hrs/Week

6. Unit I — Basic Concepts: Historical perspective; Phases of development; Cell-cell interaction; Pattern formation; Differentiation and growth; Differential gene expression; Cytoplasmic determinants and asymmetric cell division
7. Unit II — Gametogenesis & Early Development: Spermatogenesis; Oogenesis; Types of eggs and egg membranes; Fertilization; Cleavage planes and patterns; Types of blastulae; Fate maps; Early development of frog and chick up to gastrulation
8. Unit III — Germ Layers & Membranes: Fate of germ layers; Extra-embryonic membranes; Placenta — structure, types and functions; Amniocentesis
9. Unit IV — Metamorphosis & Regeneration: Metamorphosis in amphibians — hormonal regulation; Regeneration modes — epimorphosis, morphallaxis, compensatory; Ageing — concepts and theories; Teratogenic agents

10. Unit V — Gastrulation & Organogenesis: Comparative gastrulation in frog, chick and mammal; Spemann's organizer experiment; Organogenesis of skin and circulatory system

PRACTICAL / LABORATORY

PRACTICAL 3: CELL & MOLECULAR BIOLOGY LAB

Credits: 1 | 2 Hrs/Week

1. Preparation of temporary slides of mitotic divisions using onion root tips
2. Observation of various stages of Mitosis with prepared slides
3. Observation of various stages of Meiosis with prepared slides
4. Mounting of salivary gland chromosomes of Chironomus
5. Test for carbohydrates in biological sample (Benedict's test)
6. Test for proteins in biological sample (Nitric acid test — white ring)
7. Test for lipids in biological sample (Saponification test)

PRACTICAL 4: EMBRYOLOGY LAB

Credits: 1 | 2 Hrs/Week

8. Study of frog developmental stages through permanent slides: Cleavage, blastula, gastrula, neurula, tail-bud, tadpole (external and internal gill stages)
9. Study of chick developmental stages through permanent slides: Primitive streak (13h & 18h), 21h, 24h, 28h, 33h, 36h, 48h, 72h, 96h incubation (Hamilton & Hamburger stages)
10. Study of different sections of placenta (photomicrograph/slides)
11. Project report on chick embryo development