

Zoology Optional Syllabus for UPSC CSE (Detailed) – Paper I & II with Expected Question Areas

PAPER – I

1. Non-Chordata and Chordata

- Detailed classification, diagnostic features, and evolutionary relationships.
- *Expected Questions:* Differences between major phyla, larval forms, comparative anatomy, evolutionary significance.

2. Ecology

- Ecosystems, energy flow, ecological pyramids, biogeochemical cycles, population ecology.
- *Expected Questions:* Ecological succession, population regulation, ecological niche case studies.

3. Ethology

- Animal behavior, instincts, learning, communication, social organization.
- *Expected Questions:* Konrad Lorenz studies, behavioral mechanisms, imprinting, migration.

4. Economic Zoology

- Apiculture, sericulture, lac culture, pests, aquaculture, parasitology.
- *Expected Questions:* Vector biology, IPM, fishery development, economic importance of insects.

5. Biostatistics

- Measures of central tendency, dispersion, correlation, regression, probability, tests of significance.
- *Expected Questions:* Chi-square applications, ANOVA basics, population data interpretation.

6. Instrumentation

- Microscopy, spectrophotometry, electrophoresis, chromatography, centrifugation.
- *Expected Questions:* SEM vs TEM, applications, gel electrophoresis principles.

PAPER – II

1. Cell Biology

- Structure & function of organelles, cell division, cell signaling, apoptosis.
- *Expected Questions:* Cell cycle regulation, mitochondria-DNA, cancer cell features.

2. Genetics

- Mendelian genetics, gene interaction, linkage, chromosomal aberrations, population genetics.
- *Expected Questions:* Pedigree analysis, Hardy–Weinberg law, mutations, genetic disorders.

3. Evolution

- Darwinism, Neo-Darwinism, speciation, fossils, molecular evolution.
- *Expected Questions:* Natural selection case studies, adaptive radiation, human evolution.

4. Systematics

- Taxonomic principles, cladistics, species concept, numerical taxonomy.
- *Expected Questions:* Phylogenetic trees, molecular taxonomy tools.

5. Biochemistry

- Enzymes, metabolism, biomolecules, cellular energetics.
- *Expected Questions:* Enzyme kinetics, glycolysis, Krebs cycle regulation.

6. Physiology

- Digestion, respiration, excretion, circulation, endocrinology, neurobiology.
- *Expected Questions:* Hormonal pathways, nerve impulse mechanisms, kidney regulation.

7. Developmental Biology

- Gametogenesis, fertilization, morphogenesis, organogenesis, placenta, teratogenesis.
- *Expected Questions:* Induction, organizers, developmental gene regulation (Hox genes).