

PRINCIPAL SUBJECT AREA

ZOOLOGY

300 LEVEL COURSES

ZL 301 Functional Histology (2 credits)

Light and electron microscopy; Cell structure and function; Cell cycle and replication; structure and function of basic tissue types (epithelial, connective muscle and nervous tissues); Anatomic organization of organ systems (digestive, reproductive, excretory, nervous and sensory systems); Histological techniques (Fixation and fixatives, Tissue processing, microtomy and paraffin sections, staining, histochemistry); Safety.
Practicals based on above.

Recommended Texts:

1. *Histology: Cell and Tissue Biology*. L. Weiss (ed.)
2. *Histochemistry Theoretical and Applied, Vol. I*. A.G.E. Pearse.
3. *A Laboratory Guide for Histology*. J. Forbes.

ZL 302 Comparative Anatomy and Animal Physiology (2 credits)

Anatomy and Physiology of Digestion, and Nutrition; Excretion and Homeostasis; Respiration and Gas exchange; Circulation and Blood; Reproduction and hormones; their Action and Regulation; Muscular system and Movement; Nervous system, Sense organs and Coordination
Practicals based on above.

Recommended Texts:

1. *Concepts of Human Anatomy and Physiology*. K.M. De Graff & I.S. Fox.
2. *Atlas and Dissection Guide for Comparative Anatomy*. S. Wischnitzer.
3. *Animal Physiology: Mechanisms and Adaptations*. R. Eckert, D. Randall & G. Augustine.
4. *Animal Physiology: Adaptation and Environment*. K. Schmidt-Nielsen.
5. *Biology*. N.K. Wessels & J.L.H. Hopson.

ZL 303 General Entomology (2 credits)

Insect Structure and Function; Classification and Identification of insects, Methods of Collecting, Preserving and Curating different insect orders; Insect development and Role of hormones; Insects of Agricultural, Medical and Veterinary importance; Principles and Methods of Insect Pest Control.
Practicals and Field work based on above.

Recommended Texts:

1. *A General Textbook of Entomology*. O.W. Richards & R.G. Davies.
2. *An Introduction to the Study of Insects*. D.J. Borror, C.A. Tiplehorn & N.F. Johnson.

ZL 304 Biology of Parasites (2 credits)

Symbiotic associations and definitions; Overview of parasitism; Ecology of parasitic infections; Taxonomy, Morphology, lifecycles and geographic distribution of selected parasites (representative of major taxa); Proteomics of parasites; Important pathogenic effects of parasitic infections; Methods of parasite identification.
Practicals based on above.

Recommended Texts:

1. *Introduction to Animal Parasitology*. J.D. Smith.
2. *A Colour Atlas of Medical Entomology*. N.R.H. Burgess & C.O. Cowan.
3. *Helminthic Zoonoses*. I. Miyazaki.

ZL 305 Fisheries (2 credits)

Importance of fisheries to Sri Lanka; Fishing gear and methods of fishing; Marine fisheries (fin fish & shellfish); Inland fisheries (finfish); Fisheries regulation and management; Fish preservation and processing; Ornamental fish trade in Sri Lanka: Species used, Current status; Potential and future prospects.
Practicals based on above

Recommended Texts:

1. *Fisheries Biology: Assessment and Management*. M. King.

ZL 306 Biological Indicators in Environmental Assessments (2 credits)

Changes and challenges of environment of emerging Asia, Indicator organisms: background, principles and examples; The use of Biota, sediments and water in environmental monitoring; indicators of land and water quality and sustainable management; a systematic approach to measuring and reporting environmental problems such as acidification, eutrophication, air pollution and climatic changes; Framework for the development of environmental health indicators; Biological indicators of environmental health; Rapid urban environmental assessment and case studies or urban development in the developing world; developing a national set of environmental indicators.

Recommended Texts:

1. *Limnology" Lake and River Ecosystems*, R.G. Wetzel. Harcourt Brace College Publishers, San Diego.
2. *Pollution of Lakes and Rivers, A Paleolimnological Perspective*, J. Smol, Oxford University Press.
3. *Data analysis in community and landscape ecology*, ed. R.H.G. Jongman, C.J.F. ter Braak & O.F.R. Tongeren. Cambridge University Press.

ZL 307 Fish Biology (2 Credits)

Morphological, physiological and ecological diversity of Fishes; Behaviour, growth, life history strategies; Composition of major fish assemblages; Fishes and their habitats; Fish community structure, food webs and pollution dynamics.

Recommended Texts:

1. *The Diversity of Fishes* G.S. Heklfman, B.B Collette & D. E. Facy.
2. *The Biology of Fishes*. M.M. Kyle.
3. *Biology of Fishes*. Q. Pane & N. B. Marshall.

ZL 311 Ethology (2 credits)

Principles of Animal Behaviour; Ultimate and Proximate factors; Altruistic behaviour; Cost-benefit analysis; Social organization; Fighting and Assessment; Sexual conflict and Sexual selection; Parental care and Mating systems; Co-evolution.

Field work.

Recommended Texts:

1. *An Introduction to Behavioural Ecology*. J.R. Krebs & N.B. Davies.
2. *Evolution and the Theory of Games*. J. Maynard Smith.

ZL 312 Developmental Biology (2 credits)

(Prerequisite: ZL 201)

Introduction to Developmental Biology; Differentiation and morphogenesis in *Dictyostelium*; The cellular basis of morphogenesis; Organizing multicellular embryo; Genomic constancy; Cytoplasmic determinants; Differential gene expression during development; Maternal and zygotic control of gene expression; Maternal specification of embryonic axes; Hox genes and establishment of body plan; Cell-cell interactions; Cell signalling; Cell adhesion; Programmed cell death; Pattern formation; Establishment of segments, hierarchy of segments and segment identity of *Drosophila*; Sex determination and differentiation; Life cycles and development patterns; Aging and senescence; Regeneration; Teratogenesis; Cloning and transgenic animals.

Practical based on above.

Recommended Texts:

1. *Developmental Biology*. S.F. Gilbert.
2. *Principles of Development*. L. Wolpert, et al.
3. *Evolutionary Developmental Biology*. B.K. Hall.

ZL 313 Animal Genetics (2 credits)

Genetic systems and extra-chromosomal inheritance; Heteroploidy, Chromosomal aberrations and Point mutations; Genetic variation; Hardy-Weinberg equilibrium; Factors affecting H-W equilibrium: migration, mutation selection, genetic drift and effective population size; Inbreeding and outbreeding.

Practicals based on above.

Recommended Texts:

1. *The Science of Genetics*. G.W. Burns & P.J. Botting.
2. *Introduction to Quantitative Genetics*. D.S. Falconer & T.F.C. Mackay.
3. *Principles of Population Genetics*. D.L. Hartl & A.G. Clark.

ZL 314 Evolutionary Biology and Systematics (2 credits)

Major phases of Evolutionary Theory; Major aspects of Evolutionary Biology; Evolutionary forces; Variation among organisms; Natural Selection: Adaptation; Camouflage; Mimicry; Coevolution; Coadaptation; Exaptation; Reproductive isolation mechanisms and Speciation; Extinction in evolution: Causes and consequences; Molecular evolution and genetic variation; Principles of Cladistics.

Recommended Texts:

1. *Evolution*. M. Ridley.
2. *Evolutionary Biology*. D. Futuyma.
3. *Homology and Systematics: Coding Characters for Phylogenetic Analysis*. Eds R. Scotland & T. Pennington.

ZL 316 Economic Zoology (2 credits)

An overview of Invertebrates and Vertebrates of Economic and Industrial importance; Methods of Rearing, Handling and Marketing of commercially important selected animals or their products. Biology of commercially important animal groups.

Practicals and field work based on above.

Recommended Texts:

1. *Economic Zoology*. B.S. Jongi. Oxford & IBH Publishing Co., New Delhi. 1991.
2. *Invertebrate Zoology*. C.P. Hickman, L.S. Roberts & A. Larson.

ZL 317 Primatology (2 credits)

Origin and evolution of primates; Taxonomy and systematics of primates with special reference to Sri Lanka; Techniques for the study of primates; Population structure and factors affecting survival; Types of primate social organization; Social behaviour; Feeding and lifestyles; Home range and territoriality; Reproduction and mating systems; Management of primates in humans dominated landscapes; *In situ* and *ex situ* conservation of primates.

Recommended Texts:

1. *Primate Behaviour: field studies of monkeys and apes*. Ed. I. DeVore. Holt, Rinehart & Winston, New York (1981)
2. *Techniques for the Study of Primate Population Ecology*. Subcommittee on Conservation of Natural Populations. National Research Council, National Academy Press, Washington DC. (1981)
3. *Primate Ecology: Studies of feeding and ranging behaviour in lemurs, monkeys, and apes*. Ed. T. Clutton-Brock. Academic Press, London. 1977.
4. *The Pictorial Guide to the Living Primates*. N. Rowe. Pogonias Press. Charlestown, Rhode Island. 1996.

ZL 318 Amphibian and Reptilian Biology (2 Credits)

Transition from water to land and the evolution and adaptive radiation of amphibians; Biology of amphibians; Metamorphosis and Paedomorphosis; Parental care and behaviour; Communication in frog and toads; Amphibians as bio-indicators; Global and local threats to amphibians; Conservation of amphibians. Life on land: the evolution and radiation of reptiles; temperature dependent- sex- determination; Cleidoic egg and its significant; K/T extinction of the dinosaurs; conservation and management of endangered reptiles.

Recommended Texts:

1. *Reptiles*. A. 'Da. Bellaris.
2. *Living Amphibians of the World*. D. Cochran.
3. *Biology of Amphibians*. W. Duellman.
4. *The New Encyclopedia of Reptiles and Amphibians*. T. Halliday & K. Adler.
5. *The Evolution of Vertebrate Design*. L. Radinsky.
6. *Reptiles and Amphibians*. Z. Vogel.

ZL 319 Avian and Mammalian Biology (2 Credits)

Origin and evolution of birds; Adaptation for aerial life; Dynamics of avian flight; Biology of birds; Migration and navigation of birds; Bird song and territory; Darwin's finches; Origin and evolution of mammals; Mammalian characteristics; Egg-laying mammals; Biology of kangaroos; Carnivorous mammals; Herbivorous mammals; Aquatic mammals; Insectivorous mammals; Flying mammals; Echolocation; Coping with cold and heat; Conservation and management of Endangered Mammals.

Recommended Texts:

1. *The Mammalian Radiations*. J. F. Eisenberg.
2. *Mammalogy*. T.A. Vaughan, J. M. Ryne & N. J. Czaplewski.
3. *Fundamentals of Ornithology*. J. van Tyne & A. J. Berger
4. *The Beak of the Finch*. J. Weiner.