

SYLLABUS OF SEMESTER-II
ZOOLOGY
HARD CORE THEORY PAPER (ZCORT-205)

(Chordate Biology and Biosystematics and Taxonomy)

Module	Unit	Content	Credit
(Chordate Biology)	I	Blood and cardiovascular system: Blood pressure and baroreceptors, bloodvolume regulation.	3
	II	Cardiac cycle. Myogenic and neurogenic heart, originand conduction of heart beat,ECG and its implications, neural andchemical regulation of functions of heart.	
	III	Respiratory system: Comparative account of respiratory pigments; transportandexchange of gases.	
	IV	Nervous system: Gross anatomy of brain and spinal cord; cranial nerves, neuralcontrol of muscle tone.	
	V	Thermoregulation: Importance of body temperature in animal physiology,heat exchange interactions between animals and environment.	
	VI	Thermoregulation in ectotherms and endotherms, physical, chemical, neuralregulation of body temperature; acclimation and acclimatization.	
	VII	Digestive system: Acquisition of Energy: Types of feeding, Digestion (motility andSecretions), Metabolism, and absorption.	
	VIII	Physiology ofgastrointestinal system(mammals) including neural and hormonalregulatory mechanisms.	
	IX	Circulatory systems: General plan, Hemodynamics.	
	X	Cardiovascularresponse to extremeconditions like exercise, diving and hemorrhage Neural control of cardiovascular system.	

(Biosystematics and Taxonomy)	XI	Species concept: Biological species concept, difficulties in application of biological species concept.	3
	XII	Nomenclature rules, ICZN: The code; amendments and applications; Concept of Type.	
	XIII	Character and character states in taxonomy: Types of character: primitive and advanced, missing, polymorphic, micro, cryptic and internal.	
	XIV	Character state transition, environmental effect and their significances, artifacts and special characters.	
	XV	Taxonomic key: types and their role in classification	
	XVI	Phenetic method of classification a. Numerical phenetics and numerical taxonomy. b. Preparation of data matrix and similarity matrix using distance method (Manhattan distance and Euclidian distance); c. Cluster analysis (different methods)	
	XVII	Cladistic method of classification - Cladistics and cladogram, terminologies in cladistics.	
	XVIII	Methods of measuring evolutionary transitions c) Homoplasy, parsimony and character conflict.	
	XIX	Polyphasic concept in biosystematics - Biochemical taxonomy, cytotaxonomy and molecular taxonomy and DNA barcoding	
	XX	Phylogenetic trees: construction and analysis; types.	

HARD CORE THEORY PAPER (ZCORT-206)

Group A (Advanced Parasitology, Vector Biology)				
Module	Unit	Content	Credit	
ZCORT-206 (Advanced Parasitology, Vector Biology)	I	Protozoans as parasites and causal agents of diseases	3	
	II	Physiology and metabolism of Haemo flagellates.		
	III	Physiology and immunopathogenesis of <i>Plasmodium vivax</i> and <i>P. falciparum</i> .		
	IV	Physiology of cestodes, trematodes and nematodes.		
	V	Fish parasites and its control		
	VI	Parasites of edible oysters		
	VII	Mode of transmission, pathogenicity and prevention of tuberculosis, cholera		
	VIII	Mode of transmission, pathogenicity and prevention of tetanus, rabies and dengue		
	IX	Life cycle, medical importance and control of disease-causing vectors: <i>Anopheles</i> sp., <i>Culex</i> sp., <i>Aedes</i> sp.		
	X	Life cycle, medical importance and control of disease-causing vector: i. Black fly		
ZCORT-206 (Fish Biology)	Group B (Fish Biology)			
	XI	Excretion and osmoregulation in fish.	3	
	XII	Reproduction in fish: reproductive strategies, oviparity, viviparity, ovo-viviparity, maturity stages, breeding cycle		
	XIII	Structure and physiology of endocrine glands in fishes		
	XIV	Electroreception in fish		
	XV	Determination of age of fish by scale and hard parts		
	XVI	Poisonous and venomous fish.		

	XVII	Fish migration: Types, Theories and Significances		
	XVIII	Parental care in Fish		
	XIX	Respiratory organs of Fishes: Water breathing, air breathing		
	XX	Swim Bladder in Fish		

HARD CORE THEORY PAPER (ZCORT- 207)

Immunology, Human Genetics and Biostatistics

Module	Unit	Content	Credit
ZCORT - 207 (Immunology, Human Genetics and Biostatistics)	I	Basic concepts of Immune System; Primary and Secondary Lymphoid Organs, Cells, Tissues and molecules of Immune System.	6
	II	Innate immunity: Overview, features, epithelial barrier, neutrophils, macrophage functions, inflammation, NK cells, cross talk with adaptive immune system.	
	III	Humoral immune system: Structure and class switching of antibodies.	
	IV	B cell function, maturation and development.	
	V	Complement system and diseases.	
	VI	Antigen presentation: Concept of haptens, determinants, conditions of antigenicity, superantigen, Dendritic cell, MHC, role of APCs.	
	VII	Antigen Recognition: Antigen Receptor: T and B cell Receptor, Structure of Immunoglobulin and T-cell receptor	
	VIII	Antigen Receptor Diversity-Mechanism, Antigen Receptor Maturation and selection.	
	IX	Vaccination and immunization: natural and artificial immunization; active immunization, vaccines.	
	X	Immuno-techniques: Antigen-Antibody Reaction Analysis- Agglutination, Diffusion etc. Isolation and culture of Immune cells, Antigen-Antibody reaction-RIA, ELISA, Visualization of Immune reaction In vivo and vitro- Immunofluorescence, FISH, GISH, immunohistochemistry.	
	XI	Basic concept of human genetics: introduction to the structure of	

		human genome; human genome and mapping.
	XII	Human karyotype; karyotype and nomenclature of metaphase chromosome bands.
	XIII	Chromosome anomalies and Structural Variants. Human genetics and society: genetic testing; human rights; genetic counselling.
	XIV	Molecular Pathology: Loss of function, Gain of function; Mitochondrial disorders.
	XV	Genetic analysis of complex traits and disease. Quantitative genetics; variance; heritability and its measurement; inbreeding and cross breeding; QTL.
	XVI	Measures of Central Tendency
	XVII	Measures of dispersion. Concept of Probability and significant test, Probability Distribution (Binomial, Poisson and normal).
	XVIII	Graphical representation of biological data: Box plot analysis, leaf and stem diagram.
	XIX	Test of Hypothesis, Students' t-test and z-test and their application. Analysis of Variance (ANOVA).
	XX	Nonparametric tests: Chi-square test and Wilcoxon sign-rank test. Linear Regression, Correlation analysis and rank Correlation analysis.

HARD CORE THEORY PAPER (ZGECT- 201)

APPLIED ZOOLOGY

Module	Unit	Content	Credit
ZGECT - 201 (APPLIED ZOOLOGY)	I	Categories of wild life	4
	II	Wild life and wild life habitat in India: Wild life wealth of India	
	III	Wild life management: Distribution, status, habitat utilization pattern, threats and survival of – Royal Bengal Tiger, <i>Rhinoceros</i> , Olive Ridley Turtle	
	IV	National and International efforts for conservation: CITES, IUCN, CBD, Protected area concept	
	V	Conservation of natural enemies of insect pest	
	VI	Concept of habitat and niche	
	VII	Ecological principles	
	VIII	Community ecology: nature of communities; levels of species diversity and its measurements	
	IX	Biogeographical zones of India	
	X	Environmental management: Solid waste management; Bioremediation; Bioreactors in Environment monitoring.	
	XI	Organic farming and vermicomposting	
	XII	Insect pollinators: Types and role in agriculture	
	XIII	Genetics of Human Diseases. Nutrigenomics, Pharmacogenomics and their applications.	
	XIV	Preliminary knowledge on zoonotic diseases	
	XV	Immunodiagnostics: Concepts of Innate and Humoral Immunity, Antigen Presentation, Antigen-antibody interactions, its application in medical Diagnosis (Western Blot, ELISA, RIA, Elispot, FACS, Immunofluorescence	