

**DEPARTMENT OF ZOOLOGY**  
**LESSION PLAN**  
**SESSION 2023-24**  
**SEMESTER – VI**

**NAME OF TEACHER: DR. SUTAPA BISWAS**

**PAPER ALLOTTED: ZOOADSE04T**

Month	Paper	Topic	No of classes
March 2024 (02.03.2023)	ZOOADSE04T	Unit-1 Overview of the Immune System Introduction to basic concepts in immunology, components of immune system, principles of innate and adaptive immune system	5
	ZOOADSE04T	Unit-2 Cells and Organs of the Immune System Haematopoiesis, Cells of immune system and organs (primary and secondary lymphoid organs) of the immune system	8
	ZOOADSE04T	Unit-3 Antigens Basic properties of antigens, B and T cell epitopes, haptens and adjuvants	5
	ZOOADSE04P	1. Demonstration of lymphoid organs in human through model/ photograph. 2. Histological study of spleen, thymus and lymph nodes through slides/photographs 3. Preparation of stained blood film to study various types of blood cells. 4. ABO blood group determination	6
April 2024	ZOOADSE04T	Unit-4 Antibodies Structure, classes and function of antibodies, monoclonal antibodies, antigen antibody interactions as tools for research and diagnosis	8
	ZOOADSE04P	1. Demonstration of lymphoid organs in human through model/ photograph. 2. Histological study of spleen, thymus and lymph nodes through slides/photographs 3. Preparation of stained blood film to study various types of blood cells. 4. ABO blood group determination	4
May 2024	ZOOADSE04P	1. Demonstration of lymphoid organs in human through model/ photograph. 2. Histological study of spleen, thymus and lymph nodes through slides/photographs 3. Preparation of stained blood film to study various types of blood cells. 4. ABO blood group determination	4
June 2024		<b>REVISION CLASSES</b>	4
June 2024 03.06.2024		<b>Internal Examination &amp; Class for Slow Learners</b>	6
14.06.2024		<b>END SEMESTER EXAMINATION</b>	

Total Classes	50
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**NAME OF TEACHER: DR. NITHAR RANJAN MADHU**  
**PAPER ALLOTTED: ZOOACOR14T, ZOOACOR14P, ZOOADSE04T, ZOOADSE04P**

Month	Paper	Topic	No of classes
<b>March 2024 (02.03.2023)</b>	<b>ZOOACOR14T</b>	<b>Unit 2: Historical review of evolutionary concept Pre-Darwinian Concepts and theories including Lamarckism, Darwinian Theory Neo-Darwinian Synthesis Anti-evolutionary ideas of Creationism and their scientific refusal</b>	<b>7</b>
	<b>ZOOACOR14T</b>	<b>Unit 3: Evidences in favour of Evolution 4 Fossil records: types of fossils, geological time scale, transitional forms: examples of fossils depicting the evolutionary stages of the modern horses Molecular (universality of genetic code and protein synthesis machinery) evidences</b>	<b>4</b>
	<b>ZOOACOR14P</b>	<b>1. Study of fossils from models/ photographs- Direct ancestors of horses, Archaeopteryx 2. Study of homology and analogy from suitable specimens (from Photographs/models) 3. Verification of Hardy-Weinberg equilibrium in a population by chi square analysis</b>	<b>10</b>
	<b>ZOOADSE04T</b>	<b>Unit 3: Fisheries 10 Inland Fisheries; Marine Fisheries; Environmental factors influencing the seasonal variations in fish catches in the Arabian Sea and the Bay of Bengal; Fishing crafts and Gears; Depletion of fisheries resources; Application of remote sensing and GIS in fisheries; Fisheries law and regulations</b>	<b>16</b>
<b>April 2024</b>	<b>ZOOACOR14T</b>	<b>Unit 5: Population genetics: 16 Concept of Populations and calculation of allele frequencies in a population Hardy-Weinberg Law and equilibrium (derivations, applications of law to find gene and genotype frequencies in human Populations) Evolutionary forces disrupting H-W equilibrium- Natural selection: Definition as the non-differential rate of reproductions and survivals of competing alleles, concept of fitness, selection coefficient, Types of natural selection with examples- Disrupting, Stabilizing, Directional. Genetic Drift- outline of its mechanism, basic concepts and examples of founder's effect, bottleneck phenomenon; Role of Gene flow and Mutation rates in changing allele frequencies in a population (No mathematical models)</b>	<b>8</b>
	<b>ZOOACOR14P</b>	<b>1. Study of fossils from models/ photographs- Direct ancestors of horses, Archaeopteryx 2. Study of homology and analogy from suitable specimens (from Photographs/models) 3. Verification of Hardy-Weinberg equilibrium in a population by chi square analysis</b>	<b>10</b>
	<b>ZOOADSE04T</b>	<b>Unit 2: Morphology and Physiology 14 Types of fins and their modifications; Locomotion in fish; Hydrodynamics; Types of Scales, Use of scales in Classification and determination of age of</b>	<b>8</b>

		fish; Gills and gas exchange; Swim Bladder: Types and role in Respiration, buoyancy; Osmoregulation in Elasmobranchs; Reproductive strategies (special reference to Indian fish); Electric organ, Bioluminescence	
	ZOOADSE04P	4. Study of crafts and gears used in Fisheries 6. Study of air breathing organs in Channa, Heteropneustes, Anabas and Clarias	10
May 2024	ZOOACOR14T	Unit 5: Population genetics: 16 Concept of Populations and calculation of allele frequencies in a population Hardy-Weinberg Law and equilibrium (derivations, applications of law to find gene and genotype frequencies in human Populations) Evolutionary forces disrupting H-W equilibrium- Natural selection: Definition as the non-differential rate of reproductions and survivals of competing alleles, concept of fitness, selection coefficient, Types of natural selection with examples- Disrupting, Stabilizing, Directional. Genetic Drift- outline of its mechanism, basic concepts and examples of founder's effect, bottleneck phenomenon; Role of Gene flow and Mutation rates in changing allele frequencies in a population (No mathematical models)	8
June 2024		REVISION CLASSES	6
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	6
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			85

NAME OF TEACHER: DR. SOUMOSISH PAUL

PAPER ALLOTTED: ZOOACOR14T, ZOOACOR14P, ZOOADSE04T, ZOOADSE04P

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	ZOOACOR14T	Unit 1: Oigin of earliest life 5 classes Chemogeny, RNA world, Biogeny, Origin of photosynthesis, Evolution of eukaryotes, three domains of life	5
	ZOOACOR14T	Unit 6: Products of evolution Inter-population variations: clines, races, Species concepts and modes of speciation (just outlines of Allopatric, Sympatric and Parapatric speciation models with examples ), Isolating mechanisms Adaptive radiations/ macroevolution as exemplified by Galapagos finches	5
	ZOOACOR14P	1. Study of fossils from models/ photographs- Direct ancestors of horses, Archaeopteryx 2. Study of homology and analogy from suitable specimens (from Photographs/models) 3. Verification of Hardy-Weinberg equilibrium in a population by chi square analysis	15

	ZOOADSE04T	Unit-5 Working of the immune system 12 Structure and functions of MHC, exogenous and endogenous pathways of antigen presentation and processing, Basic properties and functions of cytokines, Complement system: Components and pathways	6
April 20223	ZOOACOR14T	Unit 6: Products of evolution 10 Inter-population variations: clines, races, Species concepts and modes of speciation (just outlines of Allopatric, Sympatric and Parapatric speciation models with examples ), Isolating mechanisms Adaptive radiations/ macroevolution as exemplified by Galapagos finches	5
	ZOOACOR14T	Unit 8: Molecular Phylogeny 7 The basic concept of molecular phylogeny, Neutral theory of molecular evolution, molecular clock (brief introductions) Example of evolution in vertebrate globin genes	7
	ZOOADSE04T	Unit-6 Immune system in health and disease 10 Gell and Coombs' classification and brief description of various types of hypersensitivities, Introduction to concepts of autoimmunity and immunodeficiency	6
		ZOOGDSE04P: Immunology, Lab (Credits 2) 1. Demonstration of lymphoid organs in human through model/ photograph. 2. Histological study of spleen, thymus and lymph nodes through slides/photographs 3. Preparation of stained blood film to study various types of blood cells. 4. ABO blood group determination	10
		ZOOACOR14P	1. Study of fossils from models/ photographs- Direct ancestors of horses, Archaeopteryx 2. Study of homology and analogy from suitable specimens (from Photographs/models) 3. Verification of Hardy-Weinberg equilibrium in a population by chi square analysis
May 2024	ZOOADSE04T	Unit-7 Vaccines 2 General introduction to vaccines, Types of vaccines	2
	ZOOADSE04P	ZOOGDSE04P: Immunology, Lab (Credits 2) 1. Demonstration of lymphoid organs in human through model/ photograph. 2. Histological study of spleen, thymus and lymph nodes through slides/photographs 3. Preparation of stained blood film to study various types of blood cells. 4. ABO blood group determination	10
June 2024		REVISION CLASSES	4
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	5
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			90

NAME OF TEACHER: DR. PHULJHURI CHAKRABORTY

PAPER ALLOTTED: ZOOACOR13T, ZOOACOR13P

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	ZOOACOR13T	Unit 2: Early Embryonic Development 20 Gametogenesis, Spermatogenesis, Oogenesis; Types of eggs, Egg membranes; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy; Planes and patterns of cleavage; Types of Blastula; Fate maps (including Techniques); Early development of frog and chick up to gastrulation; Embryonic induction and organizers	10
	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life cycle of Drosophila from stock culture 3. Study of different sections of placenta (microphotographs/ slides) 4. Project report on Drosophila culture/chick embryo development	10
	ZOOADSE05T	Unit 1: Introduction to Parasitology 3 Brief introduction of Parasitism and other animal associations, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship and zoonosis	8
	ZOOADSE05P	Study of life stages of Entamoeba histolytica, Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani and Plasmodium vivax through permanent slides/micro photographs • Study of adult and life stages of Fasciola hepatica, Schistosoma haematobium, Taenia solium and Hymenolepis nana through permanent slides/micro photographs	6
April 2024	ZOOACOR13T	Unit 2: Early Embryonic Development 20 Gametogenesis, Spermatogenesis, Oogenesis; Types of eggs, Egg membranes; Fertilization (External and Internal): Changes in gametes, Blocks to polyspermy; Planes and patterns of cleavage; Types of Blastula; Fate maps (including Techniques); Early development of frog and chick up to gastrulation; Embryonic induction and organizers	10
	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life cycle of Drosophila from stock culture 3. Study of different sections of placenta (microphotographs/ slides) 4. Project report on Drosophila culture/chick embryo development	10
	ZOOADSE05T	Unit 3: Parasitic Platyhelminthes 15 Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Fasciola hepatica, Paragonimus westermani, Schistosoma haematobium, Taenia solium , Echinococcus granulosus and Hymenolepis nana	
	ZOOADSE05P	Study of life stages of Entamoeba histolytica, Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani and Plasmodium vivax through permanent slides/micro photographs • Study of	10

		adult and life stages of <i>Fasciola hepatica</i> , <i>Schistosoma haematobium</i> , <i>Taenia solium</i> and <i>Hymenolepis nana</i> through permanent slides/micro photographs	
May 2024	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life cycle of <i>Drosophila</i> from stock culture 3. Study of different sections of placenta (microphotographs/ slides) 4. Project report on <i>Drosophila</i> culture/chick embryo development	10
	ZOOADSE05P	Study of adult and life stages of <i>Ascaris lumbricoides</i> , <i>Ancylostoma duodenale</i> , <i>Wuchereria bancrofti</i> and <i>Trichinella spiralis</i> through permanent slides/micro photographs . • Study of plant parasitic root knot nematode, <i>Meloidogyne</i> from the soil sample • Study of <i>Pediculus humanus</i> (Head louse and Body louse), <i>Xenopsylla cheopis</i> and <i>Cimex lectularius</i> through permanent slides/ photographs • Study of monogenea from the gills of fresh/marine fish [Gills can be procured from fish market as by product of the industry] • Study of nematode/cestode parasites from the intestines of Poultry bird [Intestine can be procured from poultry/market as a by product]	8
June 2024		REVISION CLASSES	4
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	4
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			90

NAME OF TEACHER: GOUTAM BISWAS

PAPER ALLOTTED: ZOOADSE05T, ZOOADSE05P

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	ZOOADSE05T	Unit 2: Parasitic Protists 15 15 Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of <i>Entamoeba histolytica</i> , <i>Giardia intestinalis</i> , <i>Trypanosoma gambiense</i> , <i>Leishmania donovani</i> , <i>Plasmodium vivax</i> , <i>Plasmodium falciparum</i> and <i>Toxoplasma gondii</i>	10
	ZOOADSE05P	• Study of life stages of <i>Entamoeba histolytica</i> , <i>Giardia intestinalis</i> , <i>Trypanosoma gambiense</i> , <i>Leishmania donovani</i> and <i>Plasmodium vivax</i> through permanent slides/micro photographs • Study of adult and life stages of <i>Fasciola hepatica</i> , <i>Schistosoma haematobium</i> , <i>Taenia solium</i> and <i>Hymenolepis nana</i> through permanent slides/micro photographs • Study of adult and life stages of <i>Ascaris lumbricoides</i> , <i>Ancylostoma duodenale</i> ,	10

		Wuchereria bancrofti and Trichinella spiralis through permanent slides/micro photographs . • Study of plant parasitic root knot nematode, Meloidogyne from the soil sample	
April 2024	ZOADSE05T	Unit 3: Parasitic Nematodes 15 Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Ascaris lumbricoides, Ancylostoma duodenale, Wuchereria bancrofti and Trichinella spiralis. Study of structure, life cycle and importance of Meloidogyne (root knot nematode), Pratylenus (lesion nematode)	10
	ZOADSE05P	• Study of plant parasitic root knot nematode, Meloidogyne from the soil sample • Study of Pediculus humanus (Head louse and Body louse), Xenopsylla cheopis and Cimex lectularius through permanent slides/ photographs • Study of monogenea from the gills of fresh/marine fish [Gills can be procured from fish market as by product of the industry] • Study of nematode/cestode parasites from the intestines of Poultry bird [Intestine can be procured from poultry/market as a by product]	10
May 2024	ZOADSE05T	Unit 4: Parasitic Arthropoda 3 Mosquitoes and flies as vectors of human pathogen Biology, importance and control of myiasis causing diptera Biology, importance and control of ticks, mites, Pediculus humanus (head and body louse), Xenopsylla cheopis and Cimex lectularius	3
June 2024		REVISION CLASSES	4
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	6
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			53

NAME OF TEACHER: DIPTAK CHAKROBORTY

PAPER ALLOTTED: ZOOACOR13T, ZOOACOR13P

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	ZOOACOR13T	Unit 1: Introduction 2 Classes Basic concepts: Phases of Development, Cell-cell interaction, Differentiation and growth, Differential gene expression	2
	ZOOACOR13T	Unit 3: Late Embryonic Development 8 Fate of Germ Layers; Extra-embryonic membranes in birds; Implantation of embryo in humans, Placenta (Structure, types and functions of placenta)	8
	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life	4

		cycle of <i>Drosophila</i> from stock culture 3. Study of different sections of placenta (microphotographs/ slides)	
April 2024	ZOOACOR13T	Unit 5: Implications of Developmental Biology 8 Teratogenesis: Teratogenic agents and their effects on embryonic development; In vitro fertilization, Stem cell (ESC), Amniocentesis	8
	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life cycle of <i>Drosophila</i> from stock culture 3. Study of different sections of placenta (microphotographs/ slides)	4
May 2024	ZOOACOR13T	Unit 4: Post Embryonic Development 12 Development of brain and Eye in Vertebrate Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (with one example each)	12
	ZOOACOR13P	1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak (13 and 18 hours), 21, 24, 28, 33, 36, 48, 72, and 96 hours of incubation (Hamilton and Hamburger stages) 2. Study of the developmental stages and life cycle of <i>Drosophila</i> from stock culture 3. Study of different sections of placenta (microphotographs/ slides)	8
June 2023		REVISION CLASSES	4
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	6
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			56

NAME OF TEACHER: SHRINKA GHOSH

PAPER ALLOTTED: ZOOACOR04T, ZOOACOR04P

Month	Paper	Topic	No of classes
March 2024 (02.03.2024)	ZOOACOR04T	Unit 1: Introduction and Classification 4 General description of fish Feeding habit, habitat and manner of reproduction Classification of fish (up to Subclasses) with important examples	4
	ZOOACOR04T	Unit 4: Aquaculture 16 Sustainable Aquaculture; Extensive, semi-intensive and intensive culture of fish; Pen and cage culture; Polyculture; Composite fish culture; Brood stock management; Induced breeding of fish; Management of finfish hatcheries; Preparation and maintenance of fish aquarium; Preparation of compound diets for fish; Role of water quality in aquaculture; Fish diseases: Bacterial, viral and parasitic; Preservation and processing of harvested fish, Fishery by-products	8

	ZOOACOR04P	1. Morphometric and meristic characters of fishes 2. Study of Petromyzon, Myxine, Pristis, Chimaera, Exocoetus, Hippocampus, Gambusia, Labeo, Heteropneustes, Anabas	10
April 2024	ZOOACOR04T	Unit 4: Aquaculture 16 Sustainable Aquaculture; Extensive, semi-intensive and intensive culture of fish; Pen and cage culture; Polyculture; Composite fish culture; Brood stock management; Induced breeding of fish; Management of finfish hatcheries; Preparation and maintenance of fish aquarium; Preparation of compound diets for fish; Role of water quality in aquaculture; Fish diseases: Bacterial, viral and parasitic; Preservation and processing of harvested fish, Fishery by-products	8
	ZOOACOR04P	3. Study of different types of scales (through permanent slides/ photographs). 4. Study of crafts and gears used in Fisheries	8
May 2024	ZOOACOR04P	5. Water quality criteria for Aquaculture: Assessment of pH, conductivity, Total solids, Total dissolved solids 6. Study of air breathing organs in Channa, Heteropneustes, Anabas and Clarias 7. Project Report on a visit to any fish farm/ pisciculture unit/Zebra fish rearing Lab.	12
June 2024		REVISION CLASSES	4
June 2024 03.06.2024		Internal Examination & Class for Slow Learners	6
14.06.2024		END SEMESTER EXAMINATION	
Total Classes			60