

Lesson Plan: Department of Zoology						
Semester	Programme	Course & Name of the paper	Topic	Teacher	No. of Hours	
	HONS.	CC1-1-TH Non-Chordata - I	Unit 1: Basics of Animal Classification	PM	04	
			Unit 2: Protista and Metazoa	PM, DD, SC	15	
			Unit 3: Porifera	PM	06	
			Unit 4: Cnidaria	SS	10	
			Unit 5: Ctenophora	SS	02	
			Unit 6: Platyhelminthes	DD	06	
			Unit 7: Nematoda	SC	07	
		CC-1-1-P Non-Chordates - I	Study of whole mount of Euglena, Amoeba and Paramecium	PM	60 Hrs	
			Identification with reason & Systematic position of Amoeba, Euglena, Entamoeba, Paramecium, Plasmodium, Balantidium, Vorticella (from the prepared slides)	PM, DD		
			Identification with reason & Systematic position of Sycon, Poterion (Neptune's Cup), Obelia, Physalia, Aurelia, Gorgonia, Metridium, Pennatula, Madrepora, Fasciola hepatica, Taenia solium and Ascaris lumbricoides.	SS, DD		
			Staining/mounting of any protozoa/helminth from gut of Periplaneta sp.	DD		
		CC1-2-TH Molecular Biology	Unit 1: Nucleic Acids	SK	03	
			Unit 2: DNA Replication	SK	09	
			Unit 3: Transcription	SK	09	
			Unit 4: Translation	SK	09	
			Unit 5: Post Transcriptional Modifications and Processing of Eukaryotic RNA	SK	08	
			Unit 6: Gene Regulation	SK	07	
			Unit 7: DNA Repair Mechanism	SC	02	
			Unit 8: Molecular Techniques	SC	03	
		CC-1-2-P Molecular Biology	Demonstration of polytene and lampbrush chromosome from photograph	PM	60 Hrs	
			Isolation and quantification of genomic DNA from goat liver.	SK		
			Agarose gel electrophoresis for DNA.	SK		
			Histological staining of DNA and RNA in prepared slides	SK		
		GENERAL	CC1-1-TH Animal Diversity	Unit 1: Kingdom Protista	SS	02
				Unit 2: Phylum Porifera	PM	02
				Unit 3: Phylum Cnidaria	SS	02

			Unit 4: Phylum Platyhelminthes	DD	02
			Unit 5: Phylum Nematelminthes	DD	02
			Unit 6: Phylum Annelida	DD	04
			Unit 7: Phylum Arthropoda	PM	04
			Unit 8: Phylum Mollusca	SS	02
			Unit 9: Phylum Echinodermata	DD	04
			Unit 10: Protochordates	SC	02
			Unit 11: Agnatha	SC	02
			Unit 12: Pisces	SS	04
			Unit 13: Amphibia	SC	04
			Unit 14: Reptiles	PM	04
			Unit 15: Aves	SC	04
			Unit 16: Mammals	SC	04
		CC1-1-P Animal Diversity	Identification with reasons of the following specimens: <i>Amoeba</i> , <i>Euglena</i> , <i>Paramecium</i> , <i>Sycon</i> , <i>Obelia</i> , <i>Aurelia</i> , <i>Metridium</i> , <i>Taenia solium</i> , <i>Ascaris lumbricoides</i> (Male and female), <i>Aphrodite</i> , <i>Nereis</i> , <i>Hirudinaria</i> , <i>Palaemon</i> , <i>Cancer</i> , <i>Limulus</i> , <i>Apis</i> , <i>Chiton</i> , <i>Dentalium</i> , <i>Unio</i> , <i>Sepia</i> , <i>Octopus</i> , <i>Echinus</i> , <i>Cucumaria</i> and <i>Antedon</i> , <i>Balanoglossus</i> , <i>Branchiostoma</i> , <i>Petromyzon</i> , <i>Torpedo</i> , <i>Labeo rohita</i> , <i>Exocoetus</i> , <i>Salamandra</i> , <i>Hyla</i> , <i>Chelone</i> , <i>Hemidactylus</i> , <i>Chamaeleon</i> , <i>Draco</i> , <i>Vipera</i> , <i>Naja</i> , <i>Bat</i> , <i>Funambulus</i>	PM & SC	60 Hrs
			Key for Identification of poisonous and non-poisonous snakes	PM	
			Study of anatomy of digestive system, salivary gland, mouth parts of <i>Periplaneta</i> , Study of reproductive system of female cockroach	PM & SC	
			An "animal album" containing photographs, cut outs, with appropriate write up about the above mentioned taxa. Different taxa/ topics may be given to different sets of students for this purpose	PM & SC	
2	HONS.	CC2-3-TH Non- Chordates - II	Unit 1: Introduction	PM	02
			Unit 2: Annelida	DD	10
			Unit 3: Arthropoda	PM	16
			Unit 4: Onychophora	DD	02
			Unit 5: Mollusca	SS	10
			Unit 6: Echinodermata	DD	08
			Unit 7: Hemichordata	SS	02
		CC-2-3-P Non- Chordates - II	Study of following specimens: a. Annelids - <i>Aphrodite</i> , <i>Nereis</i> , <i>Chaetopterus</i> , Earthworm, <i>Hirudinaria</i>	PM, SS	60

			<p>b. Arthropods - Limulus, Palaemon, Balanus, Eupagurus, Scolopendra, Peripatus, Silkworm – life history stages, Termite – members of a colony and Honey bee – members of the colony</p> <p>c. Molluscs - Dentalium, Patella, Chiton, Pila, Achatina, Pinctada, Sepia, Octopus, Nautilus</p> <p>d. Echinoderms - Asterias, Ophiura, Clypeaster, Echinus, Cucumaria and Antedon</p>		
			Anatomy study: Nervous system, Reproductive system (Male & female), Mouth parts & Salivary apparatus in Periplaneta sp	DD	
		CC2-4-TH	Unit 1: Plasma Membrane	SC	07
		Cell Biology	Unit 2: Cytoplasmic Organelles I	SC	05
			Unit 3: Cytoplasmic Organelles II	SK	07
			Unit 4: Cytoskeleton	SK	05
			Unit 5: Nucleus	SK	08
			Unit 6: Cell Cycle	SK	10
			Unit 7: Cell Signalling	DD	08
			CC-2-4-P	Preparation of temporary stained squash of onion/arum root tip to study various stages of mitosis	SK
			Study of various stages of meiosis from grasshopper testis	SK	
			Preparation of permanent slide to show the presence of Barr body in human female blood cells/cheek cells.	SK	
			Preparation of permanent slide to demonstrate: a. DNA by Feulgen reaction b. Cell viability study by Trypan Blue staining	SK	
	GENERAL	CC2-2-TH Comparative Anatomy & Developmental Biology	Unit 1: Integumentary System	SC	04
			Unit 2: Digestive System	SC	04
			Unit 3: Respiratory System	SC	06
			Unit 4: Circulatory System	SC	06
			Unit 5: Urino-genital System	SC	06
			Unit 6: Early Embryonic Development	PM	14
			Unit 7: Late Embryonic Development	PM	10
		CC2-2-P Comparative Anatomy & Developmental Biology	Osteology: Limb bones, girdle and vertebra of Pigeon & Guineapig, Mammalian skulls: One herbivorous; Guinea pig and one carnivorous; Dog.	PM & SC	60
			Larval stages: Veliger, Nauplius, Trochophore, Mysis.	SC	

			Study of the different types of placenta- histological sections through photomicrographs.	PM	
			Developmental stages of chick embryo: 24 Hrs., 48 Hrs, 72 Hrs., 96 Hrs.	PM	
3	HONS	CC3-5-TH Chordata	Unit 1: Introduction to Chordates	PM	02
			Unit 2: Protochordata	SS	07
			Unit 3: Agnatha	SS	02
			Unit 4: Pisces	SS	07
			Unit 5: Amphibia	PM	07
			Unit 6: Reptilia	PM	08
			Unit 7: Aves	PM	08
			Unit 8: Mammals	SK	09
		CC-3-5-P Chordata	Identification with Reasons a) Protochordata : <i>Balanoglossus</i> , <i>Branchiostoma</i> b) Agnatha : <i>Petromyzon</i> c) Fishes : <i>Scoliodon</i> , <i>Sphyrna</i> , <i>Pristis</i> , <i>Torpedo</i> , <i>Mystus</i> , <i>Heteropneustes</i> , <i>Labeo rohita</i> , <i>Exocoetus</i> , <i>Hippocampus</i> , <i>Anabas</i> , Flat fish d) Amphibia : <i>Necturus</i> , <i>Bufo</i> (<i>Duttaphrynus</i>) <i>melanostictus</i> , <i>Rana</i> (<i>Hoplobatrachus</i>) <i>tigerinus</i> , <i>Hyla</i> , <i>Tylotriton</i> , Axolotl larva e) Reptilia : <i>Chelone</i> , <i>Trionyx</i> , <i>Hemidactylus</i> , <i>Varanus</i> , <i>Calotes</i> , <i>Chamaeleon</i> , <i>Draco</i> , <i>Vipera</i> , <i>Naja</i> , <i>Hydrophis</i> , f) Mammalia : Bat (Insectivorous and Frugivorous), <i>Funambulus</i> (Indian Palm squirrel)	PM, SS	60 Hrs
			2. Dissection of brain and pituitary – <i>ex situ</i> , digestive and Urino-genital system of <i>Tilapia</i>	SK	
			3. Pecten from Fowl head	PM	
			4. Power point presentation on study of habit, habitat or behaviour of any one animal by student – for internal assessment only	PM, SS, DD, SC, SK	
		CC3-6-TH Animal Physiology	Unit 1: Tissues	PM	04
			Unit 2: Bone and Cartilage	SS	04
			Unit 3: Nervous System	SS	10
			Unit 4: Muscular System	SK	10
			Unit 5: Reproductive System	DD	06
Unit 6: Endocrine System	DD		16		
CC3-6-P Animal Physiology	1. Recording of cardiac and simple muscle twitch with electrical stimulation	SK	60 Hrs		

			2. Preparation of temporary mounts: Squamous epithelium, Striated muscle fibres and nerve cells	SK		
			3. Study of permanent slides of Mammalian Skin, Spinal cord, Pancreas, Testis, Ovary, Adrenal, Lung, pyloric stomach, cardiac stomach, Thyroid, small intestine and large intestine of mammal (white rat)	DD		
			4. Microtomy: Preparation of permanent slide of any five mammalian (Goat/white rat) tissues	DD		
		CC3-7-TH	Unit 1: Carbohydrates	SC	08	
		Fundamentals of Biochemistry	Unit 2: Lipids	SC	07	
			Unit 3: Proteins	SC	10	
			Unit 4: Nucleic Acids	SK	10	
			Unit 5: Enzymes	DD	13	
			Unit 6: Oxidative Phosphorylation	SC	02	
		CC-3-7-P	1. Qualitative tests for carbohydrates, proteins and lipids	SC	60 Hrs	
		Fundamentals of Biochemistry	2. Qualitative estimation of Urea & Uric acid	SC		
			3. Paper chromatography of amino acids.	SK		
			4. Quantitative estimation of water soluble proteins following Lowry Method	DD		
		SEC(A)-3-2-TH	Unit 1: Introduction	SS	06	
		Sericulture	Unit 2: Biology of Silkworm	SC	04	
			Unit 3: Rearing of Silkworm	PM	10	
			Unit 4: Pest and Diseases	DD	07	
			Unit 5: Entrepreneurship in Sericulture	SK	03	
	GENERAL	CC3-3-TH	Unit 1: Nerve and Muscle	SC	08	
		Physiology & Biochemistry	Unit 2: Digestion	SC	06	
			Unit 3: Respiration	SC	06	
			Unit 4: Cardio-vascular system	SC	06	
			Unit 5: Excretion	SC	06	
			Unit 6: Reproduction and Endocrine Glands	SC	10	
			Unit 7: Carbohydrate Metabolism	SC	02	
			Unit 8: Lipid Metabolism	SC	02	
			Unit 9: Protein Metabolism	SC	04	
			Unit 10: Enzyme	SC	02	
			CC3-3-P	1. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland.	DD	60 Hrs
		Physiology & Biochemistry	2. Study of permanent histological sections of mammalian duodenum, liver, lung, kidney.	SS		

			3. Qualitative test for carbohydrate samples.	SS	
		SEC-A-3-1-TH Apiculture	Unit 1: Biology of Bees	SC	02
			Unit 2: Rearing of Bees	SS	14
			Unit 3: Diseases and Enemies		06
			Unit 4: Bee Economy	SC	02
			Unit 5: Entrepreneurship in Apiculture	SK	06
4	HONS	CC4-8-TH Comparative Anatomy of Vertebrates	Unit 1: Integumentary System	PM	10
			Unit 2: Digestive System	PM	06
			Unit 3: Respiratory System	SS	06
			Unit 4: Circulatory System	DD	07
			Unit 5: Urinogenital System	DD	05
			Unit 6: Nervous system and sense organs	SS	08
			Unit 7: Skeletal System	PM&SS	08
		CC4-8-P Comparative Anatomy of Vertebrates	1. Study of placoid, cycloid and ctenoid scales through permanent slides/photographs	SC	60 Hrs
			2. Study of disarticulated skeleton of toad, Pigeon, Guineapig (limb bones, vertebrae, limb and girdle)	PM	
			3. Comparative study of heart and brain, with the help of model/picture	SS	
			4. Identification of skulls: Pigeon, one herbivore (Guineapig) and one carnivore (Dog) animal	PM	
		CC4-9-TH Animal Physiology	Unit 1: Physiology of Digestion	SC	10
			Unit 2: Physiology of Respiration	SC	10
			Unit 3: Physiology of Circulation	SC	08
			Unit 4: Physiology of Heart	SC	08
			Unit 5: Thermoregulation and Osmoregulation	PM	06
			Unit 6: Renal Physiology	PM	08
		CC4-9-P Animal Physiology	1. Determination of ABO Blood group	DD	60 Hrs
			2. Estimation of haemoglobin using Sahli's haemoglobin meter	SC	
			3. Identification of blood cells from human blood	PM	
			4. Preparation of haemin crystals and haemochromogen crystals	SK	
			5. Identification of blood cells from cockroach haemolymph		
			6. Demonstration of blood pressure by digital meter	SC	
CC4-10-TH Immunology	Unit 1: Overview of Immune System	DD	03		
	Unit 2: Innate and Adaptive Immunity	DD	09		
	Unit 3: Antigen	DD	06		
	Unit 4: Immunoglobulins	DD	10		
	Unit 5: Major Histocompatibility Complex	DD	06		
	Unit 6: Cytokines	DD	03		

			Unit 7: Complement System	DD	05
			Unit 8: Hypersensitivity	DD	04
			Unit 9: Vaccines	DD	04
		CC4-10-P Immunology	1. Demonstration of lymphoid organs (by picture).	DD	60 Hrs
			2. Histological study of Bursa fabricius, spleen, thymus and lymph nodes through slides/ Photographs	DD	
			3. Demonstration of ELISA	DD	
		SEC(B)-4-1-TH Aquarium Fishery	Unit 1: Introduction to Aquarium Fish Keeping	SS	02
			Unit 2: Biology of Aquarium Fishes	SS	10
			Unit 3: Food and Feeding of Aquarium Fishes	SS	08
			Unit 4: Fish Transportation	SS	05
			Unit 5: Maintenance of Aquarium	SS	05
	GENERAL	CC4-4-TH Genetics & Evolutionary Biology	Unit 1: Mendelian Genetics and Its Extension	SK	10
			Unit 2: Linkage, Crossing Over	SK	08
			Unit 3: Mutation	SK	08
			Unit 4: Sex Determination	SK	08
			Unit 5: Origin of Life	SK	02
			Unit 6: Evolutionary Theories	SK	06
			Unit 7: Process of Evolutionary Changes	SK	04
			Unit 8: Speciation	SK	04
		CC4-4-P Genetics & Evolutionary Biology	1. Verification of Mendelian Ratio using Chi square test.	SK	60 Hrs
			2. Identification of Human Aneuploidy using photograph of karyotype.	SK	
			3. Phylogeny of horse with diagram of limb and skull.	SK	
			4. Study and identification of Darwin Finches from photographs.	SK	
			5. Visit to natural history museum and submission of report.	PM/SS/ DD/SC/S K	

Lesson Plan: Zoology Honours (2019-20)

Name: Patralekha Mukhopadhyay

Dept: Zoology

Semester	Programme	Course and Name of the Paper	Topic	Teacher	No of hrs
I	1 st yr Hons.	CC 1 – 1 Non-chordates (Theory)	<u>Unit 1: Basics of Animal Classification</u>	PM	04
			<u>Unit 2: Metazoa</u>	PM	02
			Evolution of symmetry and segmentation of Metazoa		
			<u>Unit 3: Porifera</u>	PM	02
			General Features & Classification of Phylum Porifera		
		Canal System in sponges	PM	04	
		CC 1 – 1 Non-chordates (Practical)	Study of Whole mount of <i>Euglena</i> , <i>Amoeba</i> and <i>Paramecium</i>	PM	06
			Identification of <i>Amoeba</i> , <i>Euglena</i> , <i>Paramecium</i>	PM	02
			Identification of <i>Sycon</i> , <i>Potterion</i>	PM	02
	CC1-2 Molecular Biology (Practical)	Demonstration of polytene and lampbrush chromosome	PM	02	
	1 st yr General	CC-1/GE-1 (Theory)	<u>Unit 1: Porifera</u>	PM	02
			General Features & Classification of Phylum Porifera		
			Canal System of <i>Sycon</i>	PM	01
<u>Unit 7: Arthropoda</u>			PM	04	
Classification Phylum Arthropoda					
Eye in Cockroach	PM	01			

			Metamorphosis in Lepidoptera	PM	02
			<u>Unit 14: Reptilia</u>	PM	03
			General Features & Classification of Class Reptilia		
			Poisonous & Non-Poisonous snakes	PM	01
			Biting Mechanism	PM	02
		CC-1/GE-1 (Practical)	Identification of <i>Echinus, Cucumaria, Antedon</i>	PM	02
			Identification of <i>Balanoglossus, Branchiostoma, Petromyzon, Torpedo, Labeo rohita, Exocoetus</i>	PM	04
			Identification of <i>Salamandra, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja</i>	PM	06
			Identification of Bat, <i>Funambulus</i>	PM	02
			Key making for Identification of poisonous & non-poisonous snakes	PM	04
			Study of anatomy of digestive system & salivary gland of Cockroach	PM	06
			Preparation of “animal album”	PM	06
II	1 st yr Hons.	CC2-3 Non-Chordates (Theory)	Unit 1: Introduction	PM	02
			Evolution of coelom		
			<u>Unit 3: Arthropoda</u>	PM	06

			General characteristics and Classification Phylum Arthropoda		
			Insect Eye	PM	02
			Respiration in Prawn	PM	02
			Respiration in Cockroach	PM	02
			Metamorphosis in Lepidopteran Insects	PM	02
			Social life in Termite	PM	02
		CC2-3 Non-Chordates (Practical)	<u>Study of Annelids:-</u> <i>Aphrodite, Nereis, Chaetopterus, Earthworm, Hirudinaria</i>	PM	02
			<u>Study of Arthropods:-</u> <i>Limulus, Palaemon, Balanus, Eupagurus, Scolopendra, Peripatus</i>	PM	04
			Study of Silkworm life history stages, colony members of termite & honey bee	PM	04
	1 st yr General	CC-2/GE-2 (Theory)	<u>Unit 6: Early Embryonic Development</u>		
			Spermatogenesis	PM	01
			Oogenesis	PM	02
			Fertilization in Sea urchin	PM	02
			Structure of egg & its membranes	PM	02
			Patterns of cleavage	PM	04
			Fate map & formation of gastrula	PM	04
			Types of morphogenetic movements	PM	01

			Fate of germ layers	PM	01
			<u>Unit 7: Late Embryonic Development</u>		
			Placenta types & function	PM	04
			Metamorphosis in frog	PM	02
			Hormonal regulation of Metamorphosis in frog	PM	01
		CC-2/GE-2	Study of Skull of Dog	PM	02
		(Practical)	Study of vertebrae of Pigeon	PM	12
			Study of different types of placenta- histological sections	PM	08
			Study of Developmental stages of chick embryo	PM	08
III	2 nd yr Hons.	CC3-5 (Theory)	<u>Unit 5: Amphibia</u> General characteristics & Classification of Class Amphibia	PM	02
			Metamorphosis in Amphibia	PM	02
			Paedomorphosis in Amphibia	PM	02
			Parental care in Amphibia	PM	01
			<u>Unit 6: Reptilia</u> General characteristics & Classification of Class Reptilia	PM	04
			Poisonous & Non poisonous snakes	PM	02
			Poison apparatus & Biting mechanism in snake	PM	02
			<u>Unit 7: Aves</u> General characteristics & Classification of Class Aves	PM	01
			Exoskeleton in birds	PM	03
			Migration in birds	PM	02

			Principles & aerodynamics in flight of birds	PM	02
		CC3-5 (Practical)	Identification of <i>Necturus, Bufo melanostictus, Rana tigrina, Tylostotriton, Axolotl</i> larva	PM	03
			Identification of <i>Chelone, Trionyx, Hemidactylus, Varanus, Calotes, Chamaeleon, Draco, Vipera, Hydrophis</i>	PM	06
			Identification of Bats, <i>Funambulus</i>	PM	03
			Dissection of pecten from Fowl head	PM	02
		SEC (A)-3-2	<u>Unit 3: Rearing of Silkworms</u> Selection of mulberry variety and establishment of mulberry garden	PM	01
			Rearing house & rearing appliances	PM	02
			Disinfectants	PM	01
			Silkworm rearing technology	PM	04
			Types of mountages	PM	01
			Spinning, harvesting and storage of cocoons	PM	01
IV	2 nd yr Hons.	CC4-8 (Theory)	<u>Unit 1: Integumentary system</u> Histological organization of skin of amphibians & mammals	PM	04
			Mucous & Poison glands in amphibians	PM	02
			Uropygeal & Salt glands in birds	PM	01
			Sweat & Sebaceous glands in mammals	PM	03
			<u>Unit 2: Digestive system</u> Ruminant stomach of Bos & Camel	PM	02

			General anatomical description of tooth in mammals	PM	02
			Types of dentitions in mammals	PM	02
			<u>Unit 7: Skeletal system</u> Overview of axial & appendicular skeleton of pigeon	PM	06
			Jaw suspension in mammals	PM	02
		CC4-8 (Practical)	Identification of Skulls of Pigeon, Guineapig & Dog	PM	06
			Identification of Vertebrae of toad, pigeon & guineapig	PM	12
			Identification of girdle bones of toad, pigeon & guineapig	PM	12
			Identification of Limb bones of toad, pigeon & guineapig	PM	18
		CC4-9 (Theory)	<u>Unit 5:</u> <u>Thermoregulation & Osmoregulation</u> Thermal regulation in Camel	PM	02
			Thermal regulation in Polar bear	PM	02
			Osmoregulation in Fishes	PM	02
			<u>Unit 6: Renal Physiology</u> Structure of kidney & its functional unit	PM	03
			Mechanism of urine formation	PM	03
		CC4-9 (Practical)	Regulation of acid-base balance	PM	02
			Identification of blood cells from human blood	PM	06

1+1+1 system (2019-20)

Year	Paper	Unit	Topic	No. of lectures	Session
3 Hons (Syllabus 2016)	5	II (Microbiology)	1. Characterization & classification of bacteria 2. Microorganism culture techniques 3. Control of microorganisms 4. Cholera & Shigella	4 2 2 2	July to Pre-Puja
	6	I	1. Insect hormones	3	
	6	II (Applied Zoology)	1. Sericulture 2. Apiculture 3. Integrated Pest management	4 4 2	July to Pre-Puja
	7	(Practical)	1. Gram staining 2. Determination of human blood group	4 2	July to Pre-Puja
	8	(Practical)	1. Demonstration of autoclave	2	July to Pre-Puja

3 rd	VI	II	<p>1. Concept of Ecosystem</p> <p>a) Introduction – Definition of Ecology and Environmental Biology – Why Scientists are giving much emphasis on the study of Ecology? – Concept of isolated, closed and open type of systems-ecosystem as an open system – Definition of Ecosystem</p> <p>b) Structural composition and functioning of an Ecosystem</p> <p>i) Abiotic factors-climatic regime, inorganic substances, organic substances.</p> <p>ii) Biotic factors – producers, consumers, decomposers</p> <p>iii) Trophic levels- producers, primary consumers, secondary consumers, tertiary consumers and top consumers.</p> <p>iv) Food chain – definition, types with examples, significance</p> <p>v) Food web – definition, example, significance</p> <p>vi) Comparison between food chain and food web.</p> <p>vii) Ecological pyramids-definition, description with examples, importance, type-pyramid of number, biomass and energy.</p>	3	pre - Puja
3 rd	VI	II	<p>2. Energy flow in the ecosystem</p> <p>i) Concept of energy</p> <p>ii) Source and different forms of energy in the ecosystem.</p> <p>iii) Energy transfer in the ecosystem obey the laws of thermodynamics</p> <p>iv) Concept of productivity - primary productivity -gross and net productivity - secondary productivity -gross and net productivity</p> <p>v) Lindeman’s trophic dynamic concept to understand ecological efficiencies, types of ecological efficiencies</p>	4	pre - Puja

			<p>vi) Energy flow models – single channel and y-shaped model.</p> <p>vii) Factors regulating amount of energy flow.</p> <p>3. Wetland as ecosystem service provider</p> <p>d. Definition—Ramsar site</p> <p>e. Classification and description</p> <p>f. Importance</p> <p>i) functions</p> <ul style="list-style-type: none"> -ground water recharge and discharge - storage of water - storage of flood water - shoreline stabilization by soil erosion control. - nutrient retention and removal -retention and removal of pollutants - support for food chain - fisheries production <p>ii) Values</p> <ul style="list-style-type: none"> - Economic value - Conservation value - Aesthetic and recreational value - Natural heritage value. 	2	
			<p>4. Population ecology:</p> <p>a) Definition of population</p> <p>b) Aim of studying population ecology</p> <p>c) Properties of a population</p> <ul style="list-style-type: none"> i) Population age structure ii) Distribution of population iii) Density and fluctuation in density –Dispersal and dispersion iv) Survivorship curves <p>d) Population growth models:</p> <p>i) natality and mortality—definition, -- types and comparison between different types</p> <p>ii) exponential and logistic growth forms—mathematical expressions and comparison</p> <p>iii) Population density—definition, fluctuations in population density and its natural regulation, regulating factors-climatic (density independent) factors and biotic (density-dependent) factors, inverse density-dependent factors, Allee’s growth factor</p>	6	pre - Puja

3 rd	VI	II	<p>5. Community ecology:</p> <p>a) Definition and concept—assamblage, guild, edge effect</p> <p>b) types--</p> <p>i) depending on size-major, minor</p> <p>ii) Depending on climatic conditions - tundra, temperate, tropical</p> <p>iii) Depending on trophic status- produce, consumer (herbivore, carnivore, predator, prey, parasite)</p> <p>iv) Depending on successional stage-seral and climax community</p> <p>c) Characters</p> <p>i) structural -analytical (qualitative and quantitative and synthetic</p> <p>ii) functional -succession or community dynamics</p> <p>d) habitat and niche concept</p> <p>i)definition of habitat and niche</p> <p>ii) types of habitat-macro and micro,</p> <p>iii) types of niche – spatial, trophic, hypervolume or multidimensional</p> <p>iv) comparison between habitat and niche</p> <p>e) Resource partitioning</p> <p>i)Concept of resource</p> <p>ii)Resource partitioning -competition hypothesis, niche overlapping, niche shift, Gause’s exclusion principle, limiting similarity, co-existence.</p>	6	
3 rd	VI	II	<p>6. Environmental factors—</p> <p>a) Definition</p> <p>b) Regulating factors</p> <p>i) Abiotic—climatic factors like light and temperature andb their effects on organisms</p> <p>ii) Biotic—Intra and interspecific associations.</p> <p>7. Ecological succession:</p> <p>a) Definition</p> <p>b) Causes</p> <p>c) Process- nudation, invasion, competition and reaction, stabilization or climax.</p> <p>d) Important parameters of succession</p> <p>e) Trends of succession</p>	3	Post puja to test
				6	

			<p>f) Types – primary, secondary, autogenic, allogenic, autotrophic, heterotrophic, induced, retrogressive, cycle.</p> <p>g) Concept of climax, types – cyclic climax, polyclimax, transient climax.</p> <p>h) Regulatory factors of succession -soil nutrients, moisture, slope, exposure to sunlight, grazing pressure etc.</p> <p>i) Examples – terrestrial (xerarch)) and aquatic (hydrarch) successions.</p> <p>j) Animal’s space and resource use:</p> <p>a) Resource partitioning</p> <p>i)Concept of resource</p> <p>ii)Resource partitioning -competition hypothesis, niche overlapping, niche shift, Gause’s exclusion principle, limiting similarity, co-existence.</p> <p>8. Biodiversity:</p> <p>a) Concept – Definition, explanation and extent of biodiversity</p> <p>b) Type— i) according to extent-- genetic diversity, species diversity, ecosystem diversity and agro-biodiversity</p> <p>ii) according to geographical scale – alpha, beta and gamma diversity.</p> <p>c) biodiversity and human welfare</p> <p>i) Anthropocentric values of biodiversity- sources of food, wood, clothing, medicine and also have recreational and educational values</p> <p>ii) Ecosystem -oriented values- restriction of pollution, prevention of soil erosion, protection of watershed, crop protection, protection from adverse condition, maintenance of ecosystem stability</p> <p>iii) National heritage value – enrichment of aesthetic senses and culture.</p>	4	Post puja to test
3rd	VII	I	<p>1. Aquaculture :</p> <p>a. Fisheries Resources of India</p> <p>b. Induced breeding and seed production of carps</p> <p>c. Polyculture of fin fish</p>	8	Post puja to test

			<p>d. Exotic fishes and their role</p> <p>e. Fish diseases, symptoms and control</p> <p>f. Fresh water and brakish water prawn culture</p> <p>g. Fish byproducts and their uses</p> <p>h. Pearl culture.</p>		
3rd	VIII	I (Practical)	<p>1. Identification and comment on their economic importance of the following animals :</p> <p><i>Penaeus sp., Macrobrachium sp., Labeo rohita, Labeo bata, Cirrhinus mrigala, Mugil parsia, Lates calcarifer</i></p> <p>2. Study of aquatic community (microarthropod)</p> <p>3. Use of pH meter for estimation of pH of soil and water sample.</p> <p>Practical copy check and practice classes</p>	6 2 4 4	pre-puja
3rd	VIII	II (Practical)	<p>1. Identification (systematic position up to class and specimen characters only) of the following animals :</p> <p><i>Scypha sp., Neptune's cup, Aurelia sp., Pennatula sp., Sea anemone, Beroe sp., Madrepora sp.</i></p> <p>2. Identification (systematic position up to class and specimen characters only) of the following animals :</p> <p><i>Branchiostoma, Ascidia, Petromyzon, Myxine, Torpedo, Sphyrna, Hippocampus, Ichthyophis, Tylototriton, Axolotl, Cryptobranchus, Hyla.</i></p> <p>Practical copy check</p>	4 6 2	Post puja to test

1. Aquaculture:

- a) Principles, definition and scope, Fisheries resources of India (inland and off-shore) and their important ichthyofauna
- b) Exotic fishes—their merits and demerits
- c) Basic principles of different aquaculture systems (polyculture and integrated farming)

			<p>d) Marine pearl culture—sites, species involved and processes.</p> <p>e) Prawn and shrimp culture—sites, species involved and processes.</p> <p>2. Lac culture—Host plants and life cycle of the insect, sites of culture, harvesting of crop, collection and processing of lac, uses</p>	<p>2</p> <p>4</p>	<p>Post puja to test</p>
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LESSON PLAN FOR 3RD YEAR (HONS.) THEORY
Concerned Teacher: Dr. Debjani Das (Ghosh) (Asst. Prof.)

Paper V, Unit-I, Group-B & C of 3rd Year (Hons.) theory syllabus involves mainly **Parasitology & Immunology**. Humans have suffered greatly through the centuries because of parasites. Malaria have sent untold millions to their graves. Even today after successful campaigns against malaria still are prevalent in the world. Parasitic diseases as Leishmaniasis, Ascariasis, malaria are the prime killers of humans. Serious infections occur in tropical regions, particularly in less-developed countries, so most dwellers within tropical, industrialized regions are unaware of the magnitude of the problem. Parasites are also responsible for staggering

monoclonal antibodies. Basic understanding about cytokine, adjuvant & complement is overviewed. An insight is provided regarding B-cell generation, activation and differentiation, T-cell maturation and activation along with the concept of T & B cell co-operation, types and roles of macrophage. A comprehensive understanding is provided to the students accompanied by power point presentation, artwork with a concise and structural style of presentation in order to ensure basic understanding of the subject and educates not intimidates or overwhelms them.

Paper-VII, Unit-I, Group-B includes **Biostatistics** which includes application of statistical methodology to collect, analyze and interpretation of data (derived from biological sciences) in order to measure central tendencies as mean, median, mode.

Paper ,Unit & Group	Course No.	Item Or Chapter	Topic	No . of lectures	Session
V-I,B	ZHT -09	Microbiology ,Parasitology & Immunology	1. Animal association: Symbiosis, commensalisms, mutualism, parasitism and zoonosis. 2. Life cycle, pathogenecity, clinical features & control of a) <u>Plasmodium</u> sp. b) <u>Entamoeba histolytica</u> , c) <u>Leishmania donovani</u> , d) <u>Wuchereria bancrofti</u> , e) <u>Fasciola</u> sp. f) <u>Ascaris</u> sp. 3. Vector biology: mosquito and ticks.	4 12 4	July to Pre-Puja July to Pre-Puja and Post-Puja to Winter vacation Do
V-I,B	ZHT -09	Microbiology ,Parasitology & Immunology	4. Cells and organs of immune system, innate and adaptive immunity. 5. Antigens: characteristics, antigenic determinants, antigen processing and presentation. 6. Antibody: Structure, classes, binding site, polyclonal and monoclonal antibodies. 7. Cytokines, adjuvant & complements. 8. B cell generation, activation and differentiation, co-operation, macrophage. 6. T cell maturation and activation.	5 2 4 4 4 5	Post-Winter Vacation to Test examination Do Do Do Do
VII-I,B	ZHT -13	Biostatistics	Mean, Median and Mode	6	Post-Winter Vacation to Test examination

LESSON PLAN FOR 3RD YEAR (HONS.) PRACTICAL
Concerned Teacher: Dr. Debjani Das (Ghosh) (Asst. Prof.)

Paper, Unit & Group	Course No.	Item Or Chapter	Topic	No. of Classes	Session
VII-II	ZHP-14	Laboratory Course	1. Study of gut contents of cockroach for protozoa (fixation, staining & identification). 2. Collection of helminth parasites from vertebrates (their fixation, staining & identification). (Goat and fowl). 3. Identifications and clinical importance: <i>Entamoeba</i> , <i>Giardia</i> , <i>Trypanosoma</i> , <i>Plasmodium vivax</i> , <i>Plasmodium falciparum</i> , <i>Leishmania</i> , <i>Ascaris</i> , <i>Wuchereria bancrofti</i> .	3x8 3x3 3x5	July-Pre winter vacation Do Do
VIII-I	ZHP-16	Laboratory Course	1. Identification & economic importance- <u>Culex</u> , <u>Anopheles</u> , <u>Aedes</u>	3x3	Post winter vacation till Test exam
VIII-II,A	ZHP-16	Laboratory Course	1. Identifications- <i>Nereis</i> and <i>Aphrodite</i>	3x2	

LESSON PLAN FOR 3RD YEAR (Gen) THEORY

Concerned Teacher: Dr. Debjani Das (Ghosh) (Asst. Prof.)

Paper IV-A of 3RD Year (Gen) theory concerned with **Applied Zoology**. This portion of the General syllabus is incorporated keeping in mind so that General Students can be aware of the immense importance of Zoology in revenue earning.

Chapter 1, involves Lac culture, including Lac insects, composition of lac, strains of lac insect, cultivation of lac, lac host plants, processing of lac and its uses.

Chapter 2 deals with Parasitology and Immunology which includes parasitism and other inter-specific interactions. Life history, pathogenecity and clinical features of certain parasites, Chapter 3, revolves in the outline structure, classification of Immunoglobulin, antigen-antibody reaction along with basic principle of vaccination.

Paper & Group	Course No.	Item Or Chapter	Topic	No. of lectures	Session
IV-A	ZG-08	Applied Zoology	1. Lac culture: Lac insects, composition of lac, strains of lac insect, cultivation of lac, lac host plants, processing of lac and its uses.	6	July-Sept.

IV-B	ZG-09	Parasitology & Immunology	<p>2. Parasitism and other interspecific (Symbiosis, commensalism, mutualism) interactions.</p> <p>3. Life history, pathogenicity and clinical features of :</p> <p>i. <i>Entamoeba histolytica</i>, <i>Plasmodium vivax</i>, <i>Plasmodium falciparum</i>, <i>Ascaris</i> sp., <i>Fasciola hepatica</i>.</p> <p>4. Biotechnology & Immunology: outline structure and classification of Immunoglobulin, antigen-antibody reaction, basic principle of vaccination.</p>	<p>3</p> <p>8</p> <p>5</p>	<p>Sept.-till pre winter vacation</p> <p>Do</p> <p>Post winter vacation till Test exam</p>
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Sumallya Karmakar
Assistant Professor, Dept. of Zoology

Year	Paper	Unit	Group	Topic	No. of lectures	Session	
3 Hons	5	2	A	1. Gene and cistron concept: One gene one polypeptide, (sickle cell anemia, Thalassemia)	04	July to Pre-Puja	
				2. Split gene, RNA splicing and Editing	05		
					3. Genetics of cell cycle.	04	
					4. Cancer: types, causes- genetic and others	04	
					5. Repair mechanism, direct reversal repair, Excision repair, Mismatch repair, Repair defects and human diseases	04	
	6	1	A	1. Concept of evolution: Emergence of evolutionary thoughts	06	post-Puja to Test examination	
a. Variation and sources of variation in a population							
b. Forces altering Hardy-Weinberg equilibrium, calculating allele & genotype frequency (multiple allele, sex linked excluded), (non random mating, mutation, migration, genetic drift and natural selection), Founder effect and population bottleneck							
				c. Genetic diversity and phylogenetic analysis			
				2. Regulation of gene expression: <i>lac</i> and <i>trp</i> operons, epigenetic regulation	06		
				3. Elementary idea of Repetative DNA, Transposable genetic element, LINES, SINES, Alu	03		
	5	2		4. Benzer's RII locus (idea of complementation and non-complementation)	03		
	8	1		1. Chi-Square test and t-test	12	July to Pre-Puja	
(Prac)			1. DNA isolation from goat liver	04	post-Puja to Test examination		

Year	Paper	Group	Topic	No. of lectures	Session
3 Gen		C	1. Anatomical and Physiological adaptations: Aquatic, Desert and Volant animals	03	July to Pre-Puja
			2. Zoogeographical realms & their subdivisions with characteristic fauna	03	
		C	1. Hardy-Weinberg equilibrium in relation to natural selection- a brief idea	04	post-Puja to Test examination
	7	D (Prac)	1. Estimation of dissolved O ₂ content of water.	04	July to Pre-Puja
			2. Estimation of free CO ₂ content of water	04	
		3. Measurement of water pH and handling of pH meter	04		
		1. Pedigree analysis: sex linked recessive, autosomal recessive and dominant.	02	post-Puja to Test examination	
		2. Identification and economic importance of the following: <i>Sitophilus sp, Apion sp, Leptocorisa sp, Scirpophaga sp, Hispa sp, Leucinodes sp, Bandicota sp,</i> silkworm life history stages, members of bee colony, members of termite colony, lac insect, <i>Culex, Anopheles, Aedes, Penaeus sp, Macrobrachium sp, Labeo rohita, Labeo bata, Cirrhinus mrigala, Mugil parsia, Lates calcarifers</i>	02		

Lesson Plan- Zoology 2019-2020

Name – Mrs. Suchona Mitra Chakraborty

Semester	Programme		Course and Name of the paper	Topic	No. Of hours	Period
III (Hons)	5	Unit II	B	1)i.Gene cloning technique ii.cDNA library iii.PCR 2)DNA polymorphism ... RFLP,RAPD,VNTR DNA fingerprint 3)Medical & forensic biotechnology	3 1 1 5 1	July to pre puja
	6	I	A	i)Origin of life(chemical) ii)Barrier, dispersal & their impact on animal distribution iii) Zoogeography	2 2 2	
III (Hons)			B	i)Instinctive & learned behavior ii)FAP iii)Communication in honey bees(dance & pheromones) iv)Parental care in fish, Parent offspring conflict	2 1 2 3	Post puja to winter vacation

6	II	B	i)Management of wildlife ... conservation areas & their role,..reduction of man animal conflict ii)Biomonitoring of environment iii) EIA	2 2 1 1	Post puja to winter vacation
7	I	A	i)Environmental toxicology ... LD 50, LC50, chronic & acute toxicity	2	Post puja to winter vacation
		B	i)Biostatistics... corelation	2	Post winter to test exam
8	I		i)Determination of dissolved O2 of water	6	July to pre puja
			i)Determination of dissolved free carbondioxide of water	5	Post puja to winter vacation