GOUR MAHAVIDYALAYA,MANGALBARI,MALDA

DEPARTMENT: Zoology

ONLINE CLASS:01.07.2020 to 28.5.2021

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 20, TO SEPTEMBER 20	1ST SEMESTER (HONS.)	Dr Soumik Agarwal HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**ZOOL DC1:Non-Chordates I (Protists to Pseudo-coelomates)** Unit 1: Basics of Animal Classification: Six kingdom concept of classification (Carl Woese) Unit 2: Protista: General characteristics and classification up to phylum; Locomotion in Euglena, Paramoecium and Amoeba; Conjugation in Paramoecium; Life cycle and pathogenicity of Plasmodium vivax and Entamoeba histolytica. Unit 3: Porifera: General characteristics and classification up to classes; Canal system, cell types and spicules in sponges. **Unit 7: Nemathelminthes:** General characteristics and classification up to classes; Life cycle, pathogenicity, parasitic adaptations and control measures of *Ascaris lumbricoides* and *Wuchereria bancrofti* Practical:- Identification; **Staining/mounting**: Any protozoa/helminth from gut of cockroach.	18
	1ST SEMESTER (Gen)		**Discipline Core Courses (DC): Zoology for General Studies** **(A1)DC 1: Animal Diversity and Ecology** **Theory[(A1)-ZOOL-G-DC 1-T]:** **Group A: Biology of Non-Chordates(=10 marks)** **Unit 1: Basics of Animal Classification -** Six kingdom concept of classification (**Carl Woese).** **Unit 2: Protista and Metazoa -** Protozoa-general characteristics and classification up to phylum, locomotion in *Euglena*, *Paramoecium* and *Amoeba*, conjugation in *Paramoecium*. **Unit 3: Porifera -** General characteristics and classification up to classes, canal system in sponges. **Unit 4: Cnidaria -** General characteristics and classification up to classes, metagenesis in *Obelia*; corals and coral reef diversity, functions & conservation. **Unit 5: Ctenophora -** General characteristics and classification up to class. **Unit 6: Platyhelminthes -** General characteristics and classification up to classes; life cycle and pathogenicity and control measures of *Fasciola hepatica,* parasitic adaptation of *Fasciola* sp.	18
	3RD SEMESTER (HONS.)		**ZOOL DC5: Cell Biology and Principles of Genetics** **Group B: Principles of Genetics** **Unit 1: Mendelian Genetics and its Extension-(i)** Principles of inheritance, incomplete dominance and co-dominance, multiple alleles (with special reference to blood group), lethal alleles, pleiotropy, gene interactions, (ii) Sex-linked, sex-influenced and sex-limited inheritance, polygenic inheritance (brief idea). **Unit 2: Linkage, Crossing Over and Chromosomal Mapping-**Linkage, somatic crossing over, cytological basis of crossing over, molecular mechanism of crossing over.	45

			Group B: Principles of Genetics **Unit 1: Mendelian Genetics and its Extension-(i)** Principles of inheritance, incomplete dominance and co-dominance, multiple alleles (with special reference to blood group), lethal alleles, pleiotropy, gene interactions, (ii) Sex-linked, sex-influenced and sex-limited inheritance, polygenic inheritance (brief idea). **Unit 2: Linkage, Crossing Over and Chromosomal Mapping-**Linkage, somatic crossing over, cytological basis of crossing over, molecular mechanism of crossing over.	
	3RD SEMESTER (Gen)		**(A3)DC7 Physiology and Biochemistry** **Group A: Physiology (= 12.5 marks)** **Unit 1: Digestion and Absorption of Food-** Digestion and absorption of carbohydrates, fats and proteins. **Unit 2: Functioning of Excitable Tissue (Nerve and Muscle):** Structure of neuron, Propagation of nerve impulse (myelinated and non-myelinated nerve fibre); structure of skeletal muscle, Mechanism of muscle contraction, Neuromuscular junction, Synaptic transmission. Practical Group A: Experimentation Physiology i. Preparation of temporary mounts: Blood film. ii. Preparation of hemin and hemochromogen crystals iii. Estimation of haemoglobin using Sahli's haemoglobinometer.	18
	3RD Year (Hons)		***Paper: ZHT-VIII*** **Unit 1: Microbiology and Immunology** ***Paper: ZHT-XII*** **Unit 1: Molecular Biology** 1. Molecular structure of DNA and RNA (3) 2. DNA replication: basic rules and requirements; semiconservative mode of replication (Meselson's and Stahl's experiment); types— theta replication, rolling circle replication and linear eukaryotic replication. 3. DNA damage and repair: formation of thymine dimer; nucleotide excision repair and base excision repair.	45
	3RD Year (Gen)		***Paper: ZGT-V,*** **Unit 2: Microbiology, Parasitology and Immunology 25 marks** 1. Outline classification of bacteria and virus.(3g) 2. Food and water borne infections-cholera and typhoid. Paper: ZGP III: Laboratory course (Practical) 1. Study of human blood film: identification of leucocytes 2. Study of fecal smear/gut content smear of cockroach for parasites 3. Collection and identification of animals: preservation of any five parasites and five pests (major/minor)	9
2				
Oct20-Dec20	1ST SEMESTER (HONS.)		ZOOL DC2: Non-Chordates II (Coelomates) Unit 4: Onychophora: General characteristics and evolutionary significance. Unit 5: Mollusca: General characteristics and classification up to classes; Nervous system and torsion in	18

			Gastropoda; Feeding and respiration in Pila sp.	
	1ST SEMESTER (Gen)		Discipline Core (DC): Zoology for General Studies (A1)DC 1: Animal Diversity and Ecology Theory[(A1)-ZOOL-G-DC 1-T]: Unit 7: Aschelminthes - General characteristics and classification up to classes, life cycle, and pathogenicity and control measures of Ascaris lumbricoides; Parasitic adaptation of Ascaris sp. Unit 8: Annelida - General characteristics and classification up to classes, Excretion in Annelida. Unit 9: Arthropoda - General characteristics and classification up to classes, Respiration in arthropoda (gills in prawn and trachea in cockroach). Unit 10: Onychophora- General characteristics, body structure and evolutionary significance. Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and respiration in Pila sp. Page 5 of 23 Unit 12: Echinodermata: General characteristics and classification up to classes; water-vascular system in Asteroidea. Unit 13: Hemichordata: General characteristics of phylum Hemichordata; relationship with non-chordates and chordates.	18
	3RD SEMESTER (HONS.)		ZOOL DC5 Unit 3: Mutations- (i) Types of gene mutations (classification), types of chromosomal aberrations (classification with one suitable example of each), (ii) Non-disjunction and variation in chromosome number Unit 4: Sex Determination: (i)Mechanisms of sex determination in Drosophila, (ii) Sex determination in human, (iii) Dosage compensation in Drosophila & human Unit 5: Extra-chromosomal Inheritance and Maternal effect- (i) Criteria for extra chromosomal inheritance, (ii) Kappa particle in Paramoecium, (iii) Shell spiralling in snail. ZOOL-H-DC5-P Identification of chromosomal aberration in Drosophila and human (by photograph). Identification of various mutants of Drosophila. (by photographs only) Linkage maps based on data from crosses of Drosophila.(based on the three point test crosses) Pedigree analysis of some human inherited trait from the supplied data. Study of human karyotype (Subject to UGC guideline). Test for colour blindness in human from provided diagrams/ charts.	45
	3RD SEMESTER (Gen)		(A3)DC7 Physiology and Biochemistry Unit 3: Respiratory Physiology: Ventilation, external and internal respiration, transport of oxygen and carbon dioxide in blood. Unit 4: Renal Physiology: Functional anatomy of kidney, Mechanism of urine formation.	18
	3RD Year (Hons)		***Paper: ZHT-X11*** **Unit 1: Molecular Biology** 4. Mutation and mutagens: molecular basis— frame shift mutation, tautomeric shifts (ability to cause	45

			mutations); chemical and physical mutagenic agents. 5. Protein synthesis: stages, components and their functions. 6. Molecular biology of cancer: proto oncogenes and their activation; tumor suppressor genes; apoptosis mechanisms	
	3RD Year (Gen)		ZGT-V Unit-1 2. Chemical, biological, hormonal and pheromonal control mechanisms of pests. General idea about IPM	9
3				
Jan21-March21	2nd SEMESTER (HONS.)		DC3 **Unit 7: Reptilia: (**i) General characteristics and classification up to living Orders. (Young 1981),(ii) Poison apparatus and biting mechanism in snake, snake venom and method of treatment of snake biting,(ii) *Sphenodon*- present status **Unit 8: Aves: (i)** General characteristics and classification up to Sub-Classes. (Young, 1981), (ii) Exoskeleton and migration in birds, (ii) Principles and aerodynamics of flight, (iv) *Archaeopteryx*-a connecting link.	18
	2nd SEMESTER (Gen)		DC4 Unit 4: Circulatory System- General plan of circulation, comparative account of heart and aortic arches. Unit 5: Urinogenital System- Succession of kidney, Evolution of urinogenital ducts. DC4P i. **Study** of placoid, cycloid and ctenoid scales through permanent slides/photographs. ii. **Study** of disarticulated skeleton of toad, pigeon, fowl, guineapig and rabbit. iii. **Demonstration** of carapace and plastron of turtle.	18
	4th SEMESTER (HONS.)		DC9 Unit 7: Physiology of Heart - Structure of mammalian heart, coronary circulation, structure and working of conducting myocardial fibres, origin and conduction of cardiac impulses; ECG, cardiac cycle and cardiac output; blood pressure and its regulation Unit 8: Thermoregulation & Osmoregulation - Physiological classification based on thermal biology; thermoregulation of homeotherms; osmoregulation in aquatic vertebrates; extra renal osmoregulatory organs in vertebrates. Unit 9: Renal Physiology - Histology of kidney and nephrons, mechanism of urine formation, glomerular filtration, tubular secretion, plasma clearance and counter current mechanism	45
	4th SEMESTER (Gen)		DC10 Grp-B Unit 1: Life's Beginnings- Origin of life, Chemogeny Unit 2: Theory and concept of evolution - Historical review of evolutionary concepts, Lamarkism, Darwinism and Neo-Darwinism, Geological time scale, evolution of Horse.	18
	3RD Year (Hons)		**Unit 2: Biotechnology** 1. Recombinant DNA technology: role of restriction endonucleases in recombinant DNA formation and	45

			gene cloning; molecular vectors used in the rDNA technology and their importance (plasmid, cosmid, phagemid, yeast artificial chromosomes) 2. Biotechnological tools for protein and DNA analysis: Western and Southern blot analysis; PCR— requirements, types and application; DNA finger printing and cDNA library construction 3. Medical biotechnology: hybridoma technology and gene therapy— basic concept and application; vaccines and vaccination— concept and applications of attenuated (live) and inactivated (killed) vaccines, toxoid and DNA vaccines	
	3RD Year (Gen)		ZGT-V Unit-1 7. Dairy: Common Indian and foreign dairy breeds of mulching cows, Milk processing(Pasteurization) *5*. Parasitic adaptations of *Fasciola* and *Taenia* 6. Role of Mosquito, Sand fly, house fly, cyclops, cockroach, flea, ticks, mites and rats in transmission of diseases.	9
4				
April21-June21	2nd SEMESTER (HONS.)		DC3: Unit 9: Mammals: (i) General characters and classification up to living Infra class (Young,1981), (ii) Affinities of Prototheria, (iii) Adaptive radiation in mammals with reference to locomotory appendages, (iv) Echolocation in Chiropterans and Cetaceans. DC3P iv. Amphibia: Necturus, Bufo, Rana, Hyla, Alytes, Axoltl, Tylototriton, Ambystoma. v. Reptilia: Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Chamaeleon, Ophiosaurus, Draco, Bungarus, Vipera, Naja, Hydrophis, Crocodylus; Key for identification of poisonous and non-poisonous snakes. vi. Mammalia: Bat (insectivorous and frugivorous), Funambulus.	18
	2nd SEMESTER (Gen)		DC4 **Unit 6: Nervous System-** Comparative account of brain, cranial nerves in mammals. **Unit 7: Skeletal System-** Evolution of visceral arches. DC4P Grp-A iv. Identification of mammalian skulls*: Bufo, Rana, Columba, Cavia* and Dog.	18
	4th SEMESTER (HONS.)		DC10 Grp-A Unit 1: Definition of taxonomy, micro- and macro taxonomy, systematic, Linnean hierarchy, cladistics, hierarchy, taxonomic types Unit 2: Principles of Binomial nomenclature. Unit 3: Species concept: Types and modes, type concept,	45

			primary and secondary types-definition and application.	
	4th SEMESTER (Gen)		DC10 Grp-B Unit 3: Sources of variations - Types of variations and their role in evolution Unit 4: Population genetics - Hardy-Weinberg law, Natural selection; Genetic drift mechanism (Founder's effect, Bottleneck phenomenon);	18
	3RD Year (Hons)		**Paper-X** **Parasitology and Medical Zoology** 1. Parasites, parasitism and hyperparasitism: importance of hosts in parasitic development; parasitic adaptations 2. Mode of transmission,diagnosis and control measures of human malaria and taeniasis 3. Life-cycle, pathogenicity and treatment of parasitic infection to humans:*Schistosomahaematobium*,*Entamoebahystolytica* and*Trypanosomabrucei*Gambiense 4. General aspects of host-parasite interaction Paper: ZHT-XII Unit 2: Biotechnology 4. DNA sequencing and DNA microarray: techniques and applications 5. Cell culture techniques: primary and secondary cell cultures; cell lines: definition, development and maintenance; cryopreservation of cells and tissues 6. Environmental and food biotechnology: application of tools and techniques in bioremediation (pesticide only), water purification (drinking water) and food preparation (curd and cheese)	45
	3RD Year (Gen)		**ZGT-V** Unit-1: 8. Biostatistics: Sample, frequency distribution, histogram; definition and calculation of mean, median, mode, standard deviation and standard error (problems to be solved). Unit-2 9. Structure and mechanism of transmission of HIV 10. Principles of Vaccination and types of vaccines	9

S. Agarwal

ZOOLOGY LESSON PLAN OF ACCADEMIC YEAR 2020-2021

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES (HOURS)
JULY 20, TO SEPTEMBER 20	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),	**Sanchita Chakraborty** HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 1: Basics of Animal Classification: Six kingdom concept of classification (Carl Woese) Unit 2: Protista: General characteristics and classification up to phylum; Locomotion in Euglena, Paramoecium and Amoeba; Conjugation in Paramoecium; Life cycle and pathogenicity of Plasmodium vivax and Entamoeba histolytica.	30
			PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B) 1.Study of whole mount of Euglena, Amoeba and Paramoecium	8
			3RD SEMESTER (HONS): PAPER CODE: ZOOL-H-DC5-T: CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 1: Overview of Cells - Basic structure of prokaryotic and eukaryotic cells, viruses, viroid, Prion Unit 2: Plasma Membrane - (i) Ultra structure and composition of plasma membrane: Fluid mosaic model,(ii) Transport across membrane: active and passive transport, facilitated transport.	5
			PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis 2. Study of various stages of meiosis from grasshopper testis.	2
			3RD SEMESTER (GENERAL): PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 1: Carbohydrates- Structure of: monosaccharides, disaccharides,	15

			polysaccharides, carbohydrate metabolism: glycolysis, citric acid cycle, glycogenesis and glycogenolysis Unit 2: Lipids - Structure and significance: physiologically important saturated and unsaturated fatty acids, tri-acylglycerols, phospholipids, sphingolipid, glycolipids, steroids lipid metabolism: β-oxidation of fatty acids. PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): i. Qualitative tests of functional groups in carbohydrates, proteins **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 1. TAXONOMY AND ANIMAL BEHAVIOUR 1. Taxonomy (a) Taxonomy: micro and macro taxonomy; systematics: application in biology; classification: natural and cladistics; Hierarchy, Taxonomic types (b) Species concept: types and modes; type concept: primary and secondary types—definition and application (c) General idea of codes of zoological nomenclature; Principle of priority; synonym and homonym (d) Cytological, biochemical and molecular taxonomy: basic ideas PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5 20 5
OCTOBER 20, TO DECEMBER 20,	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),		**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 3: Porifera: General characteristics and classification up to classes; Canal system, cell types and spicules in sponges. Unit 4: Cnidaria: General characteristics and classification up to classes; General morphology and metagenesis in Obelia; Metagenesis in Aurelia; Polymorphism in Cnidaria; Corals and coral reef diversity, function & conservation. PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B): 3. Staining/mounting: Any protozoa/helminth from gut of cockroach. **3RD SEMESTER (HONS):** PAPER CODE: ZOOL-H-DC5-T:	30 8

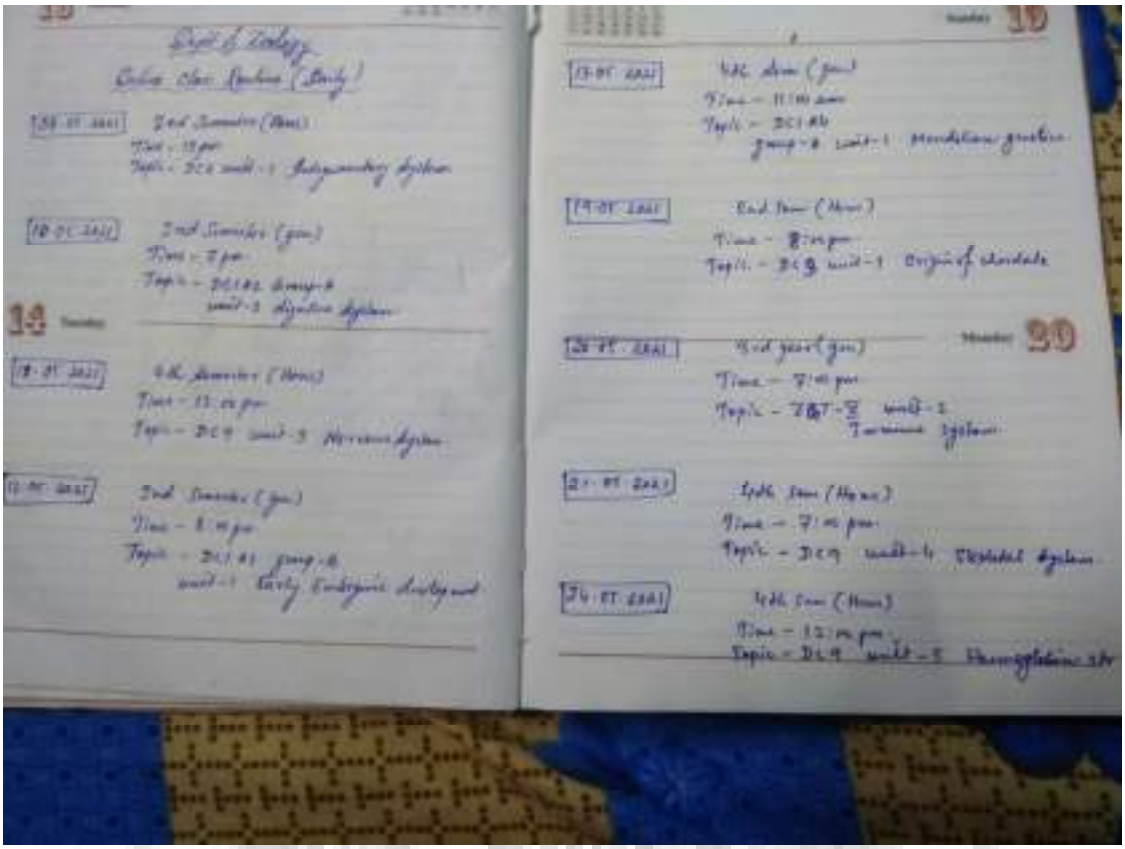
			CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 3: Cytoplasmic organelles - (i) Structure and functions: Endoplasmic reticulum, Golgi apparatus, Lysosomes, (ii) Protein sorting and mechanisms of vesicular transport, (iii) Mitochondria: Structure and function, semi-autonomous nature, endosymbiotic hypothesis, (iv) Centrosome: Structure and functions Unit 5: Cytoskeleton - Types, structure and functions of cytoskeleton. Unit 6: Nucleus - (i) Structure of nucleus: Nuclear envelope, nuclear pore complex, nucleolus, (ii) Chromatin: Euchromatin and hetrochromatin and packaging (nucleosome), (iii) Structure of chromosome, (iv) Introduction to polytene and lampbrush chromosome	8
			PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 3. Preparation of permanent slide to demonstrate: DNA by Feulgen reaction and cell viability study by trypan blue staining. 4. Permeability of plasma membrane: Effect of isotonic, hypotonic and hypertonic solutions on RBC.	2
			3RD SEMESTER(GENERAL): PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 3: Proteins - Classification, Secondary structure, Protein metabolism: Transamination, Deamination, Urea cycle	20
			PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): ii. Estimation of total protein in given solutions by Lowry's method	4
			3RD YEAR (HONS): PAPER CODE: ZHT-VII (THEORY): UNIT 1. TAXONOMY AND ANIMAL BEHAVIOUR 2. Animal behavior (a) Basic concept of classical ethology(fixed action pattern, sign stimulus); (orientation/kinesis), innate behavior, simple reflexes, motivation (b) Instinctive and learning behavior; fixed action pattern: communication in honeybees (dance Language and pheromone, sound/bird's singing) (c) Elements of Sociobiology: selfishness, cooperation, altruism and kinship (d) Social organization in termites: eusociality and castes (e) Parental investment (fishes): role of male and female in parental investment; effect, cost and benefit of parental investment; parent-offspring conflict; parental care in amphibians	25

			(f) Biological clocks/rhythm: photoperiod and circadian rhythm, fish and bird migration PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5
JANUARY 21, TO MARCH 21,	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) Unit 1: Introduction to Chordates: General characteristics and outline classification of Phylum Chordata (Young, 1981). Unit 2: Protochordata: (i) General Characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. (Young,1981), (ii) Retrogressive metamorphosis in Ascidia, (iii) Chordate Features and Feeding in Branchiostoma PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1. Identification of the following specimen: i. Protochordata: Balanoglossus, Herdmania, Branchiostoma, Doliolum. ii. Agnatha: Petromyzon, Myxine. **4TH SEMESTER(HONS):** PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY (THEORY) Unit 1: Carbohydrates - (i) Structure and biological importance: Monosaccharides, disaccharides, polysaccharides; Derivatives of monosachharides,(ii) Carbohydrate metabolism: Glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogenolysis and neoglucogenesis Unit 2: Lipids - (i) Structure and significance: Physiologically important saturated and unsaturated fatty acids, tri-acylglycerols, phospholipids, sphingolipid, glycolipids, steroids, eicosanoids and terpinoids, (ii) Lipid metabolism: β-oxidation of fatty acids PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 1. Qualitative tests of carbohydrates, proteins and lipids. 2. Paper chromatography of amino acids. **4TH SEMESTER (GENERAL):** PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP A: PRINCIPLES OF GEETICS: Unit 1: Mendelian Genetics and its Extension-Principles of Mendelian inheritance, Incomplete dominance and co-dominance, Multiple alleles,	30 5 8 2 20

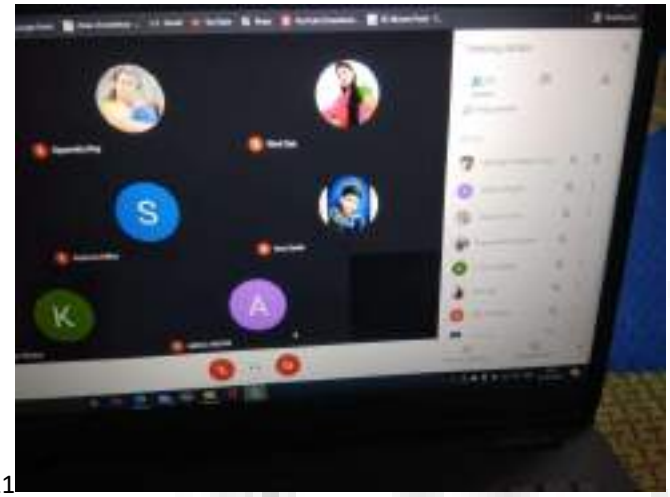
			Sex-linked characters, Sex- influenced and Sex-limited inheritance PAPER CODE: ZOOL-G-DC10-A4-P: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GEETICS: (PRACTICAL GROUP A+GROUP B) i. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test. **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 2: ADAPTATION AND EVOLUTION 1. Adaptation (a) Aquatic adaptation (b) Volant adaptation (c) Fossorial adaptation (d) Scansorial adaptation (e) Cursorial adaptation 2. Evolution (a) Concept of evolution: Hardy-Weinberg equilibrium, calculating allele and genotype frequencies; Founder effect and population bottleneck; genetic diversity and phylogenetic analysis (b) Barriers and dispersals: types and their impact on animal distribution; Zoogeographical realms: names, subdivisions, climatic features and vertebrate fauna PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5 25 2
APRIL 21, TO JUNE 21	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) Unit 3: Origin of Chordata:(i) Dipleurula concept and the Echinoderm theory of origin of chordates, (ii) Advanced features of vertebrates over Protochordata. Unit 4: Agnatha: General characteristics and classification of Cyclostomes up to Order, Ammoecoete larva. PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1.Identification of the following specimen: iii. Fishes: Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Clarias, Catla, Labeo, Cirrhinus, Puntius, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetrodon/Diodon, Anabas, Flat fish, Channa, Notopterus. **4TH SEMESTER(HONS):** PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY (THEORY)	30 4 8

			Unit 3: Proteins - (i) Amino acids: Structure, classification, general properties of α-amino acids; Physiological importance of essential and non-essential amino acid, (ii) Proteins: Bonds stabilizing protein structure; Levels of organization; Classification of protein , Protein metabolism: Transamination, deamination, urea cycle, fate of c-skeleton of glucogenic and ketogenic amino acids. PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 3. Colour tests of functional groups in protein solutions. **4TH SEMETER (GENERAL):** PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP A: PRINCIPLES OF GEETICS: Unit 2 : Linkage, Crossing Over and Chromosomal Mapping- Linkage and crossing over, molecular basis of crossing over, Steps in Chromosome mapping, Measuring recombination frequency. PAPER CODE: ZOOL-G-DC10-A4-P: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GEETICS: (PRACTICAL GROUP A+GROUP B) ii. Construction of linkage map using the data provided **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 2: ADAPTATION AND EVOLUTION 2. EVOLUTION (c) Origin of life: DNA world and RNA world; theory of evolution— Lamarckism, Darwinism; modern synthetic theory of evolution (d) Mimicry and colouration in animals: evolutionary significance; isolation— types and mechanisms; evolution of man; adaptive radiation with special reference to marsupials (e) Fossils and fossilization; importance of fossils and dating of fossils PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	2 20 5 25 4

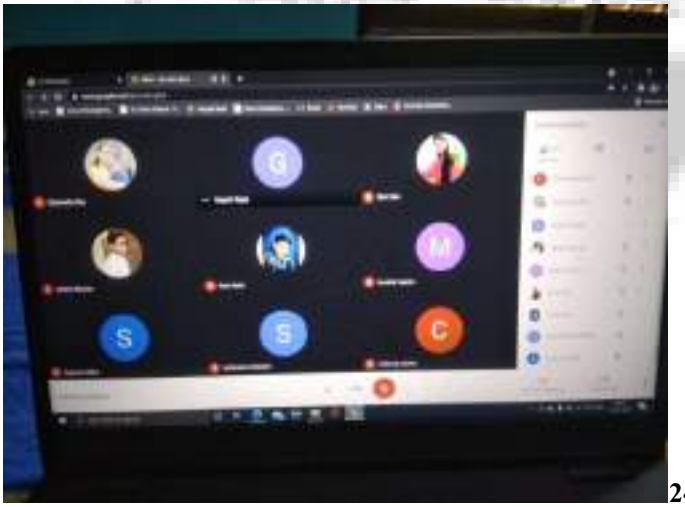
ONLINE CLASS DIARY OF SINGLE ONE SAMPLE COPY: MD NAZIR HOSSAIN



4 TH SEMESTER HONS SAMPLE COPY OF CLASSES:

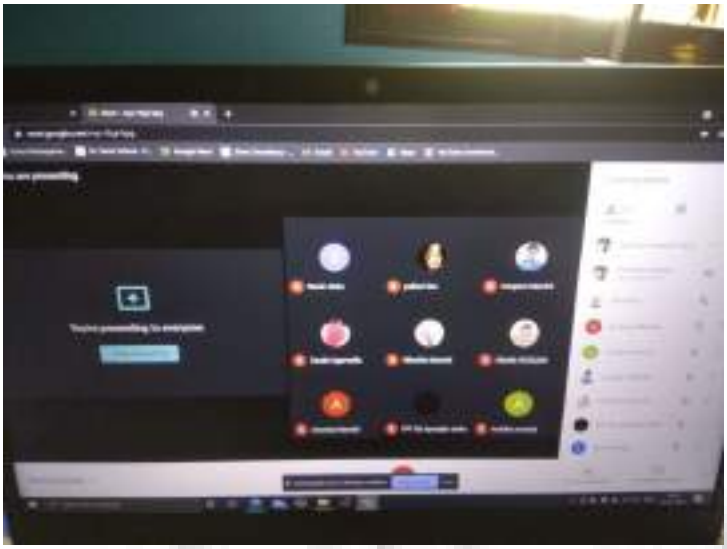
11.05.2021 

21.05.2021



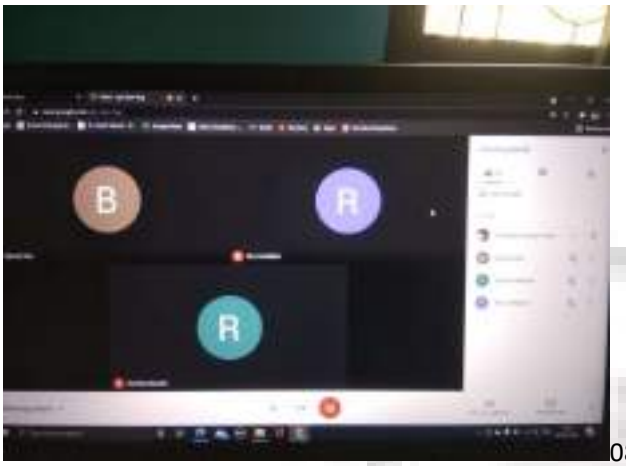
24.05.2021

4 TH SEMESTER GENERAL SAMPLE COPY OF CLASSES:

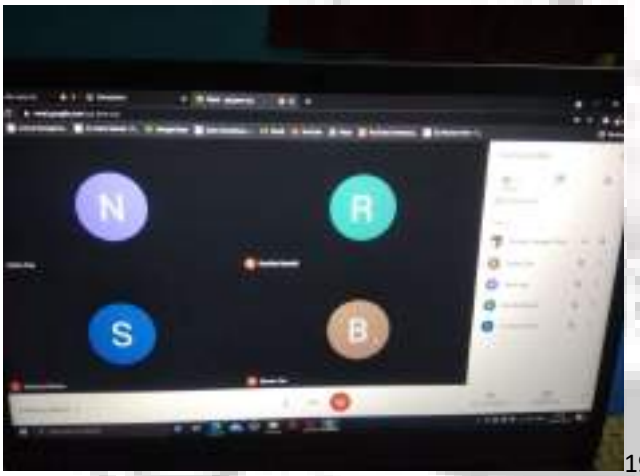


:13.05.2021

2ND SEMESTER HONS SAMPLE COPY OF CLASSES:



08.05.2021

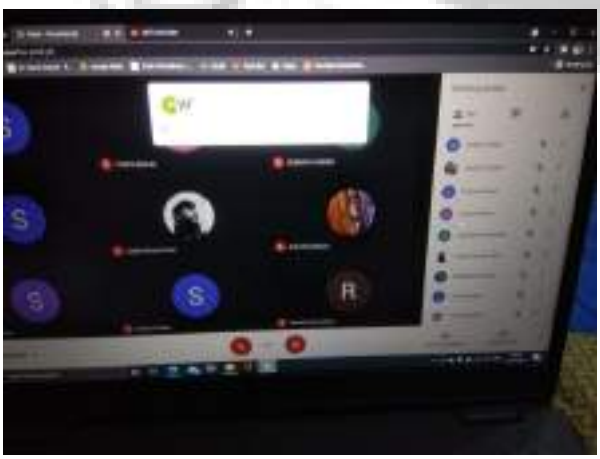


19.05.2021

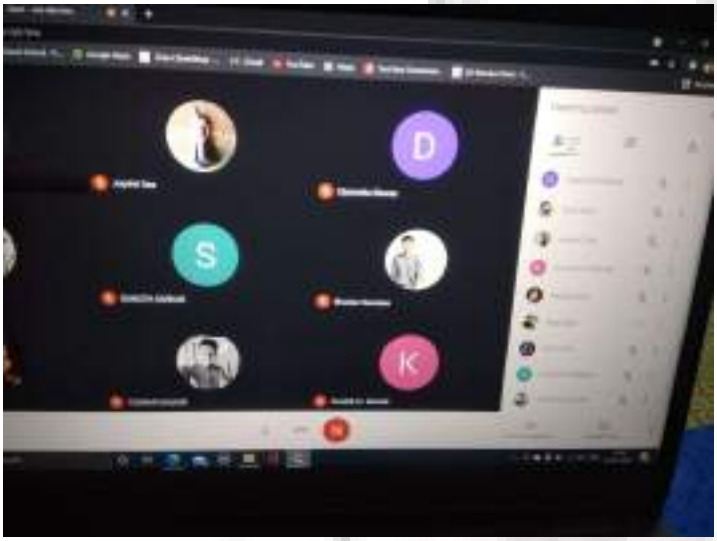
2ND SEMESTER GENERAL SAMPLE COPY OF CLASSES:

10.05.2021

12.05.2021



3 RD YEAR GENERAL SAMPLE COPY OF CLASSES:



20.05.2021

ZOOLOGY LESSON PLAN OF ACCADEMIC YEAR 2020-2021

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES (HOURS)
JULY 20, TO SEPTEMBER 20	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),	**MD NAZIR HOSSAIN, SACT.** HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 1: Basics of Animal Classification: Six kingdom concept of classification (Carl Woese) Unit 2: Protista: General characteristics and classification up to phylum; Locomotion in Euglena, Paramoecium and Amoeba; Conjugation in Paramoecium; Life cycle and pathogenicity of Plasmodium vivax and Entamoeba histolytica. PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B) 1.Study of whole mount of Euglena, Amoeba and Paramoecium **3RD SEMESTER (HONS):** PAPER CODE: ZOOL-H-DC5-T: CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 1: Overview of Cells - Basic structure of prokaryotic and eukaryotic cells, viruses, viroid, Prion Unit 2: Plasma Membrane - (i) Ultra structure and composition of plasma membrane: Fluid mosaic model,(ii) Transport across membrane: active and passive transport, facilitated transport. PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis 2. Study of various stages of meiosis from grasshopper testis. **3RD SEMESTER (GENERAL):** PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 1: Carbohydrates- Structure of: monosaccharides, disaccharides,	30 8 5 2 15

			polysaccharides, carbohydrate metabolism: glycolysis, citric acid cycle, glycogenesis and glycogenolysis Unit 2: Lipids - Structure and significance: physiologically important saturated and unsaturated fatty acids, tri-acylglycerols, phospholipids, sphingolipid, glycolipids, steroids lipid metabolism: β-oxidation of fatty acids. PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): i. Qualitative tests of functional groups in carbohydrates, proteins **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 1. TAXONOMY AND ANIMAL BEHAVIOUR 1. Taxonomy (a) Taxonomy: micro and macro taxonomy; systematics: application in biology; classification: natural and cladistics; Hierarchy, Taxonomic types (b) Species concept: types and modes; type concept: primary and secondary types—definition and application (c) General idea of codes of zoological nomenclature; Principle of priority; synonym and homonym (d) Cytological, biochemical and molecular taxonomy: basic ideas PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5 20 5
OCTOBER 20, TO DECEMBER 20,	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),		**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 3: Porifera: General characteristics and classification up to classes; Canal system, cell types and spicules in sponges. Unit 4: Cnidaria: General characteristics and classification up to classes; General morphology and metagenesis in Obelia; Metagenesis in Aurelia; Polymorphism in Cnidaria; Corals and coral reef diversity, function & conservation. PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B): 3. Staining/mounting: Any protozoa/helminth from gut of cockroach. **3RD SEMESTER (HONS):** PAPER CODE: ZOOL-H-DC5-T:	30 8

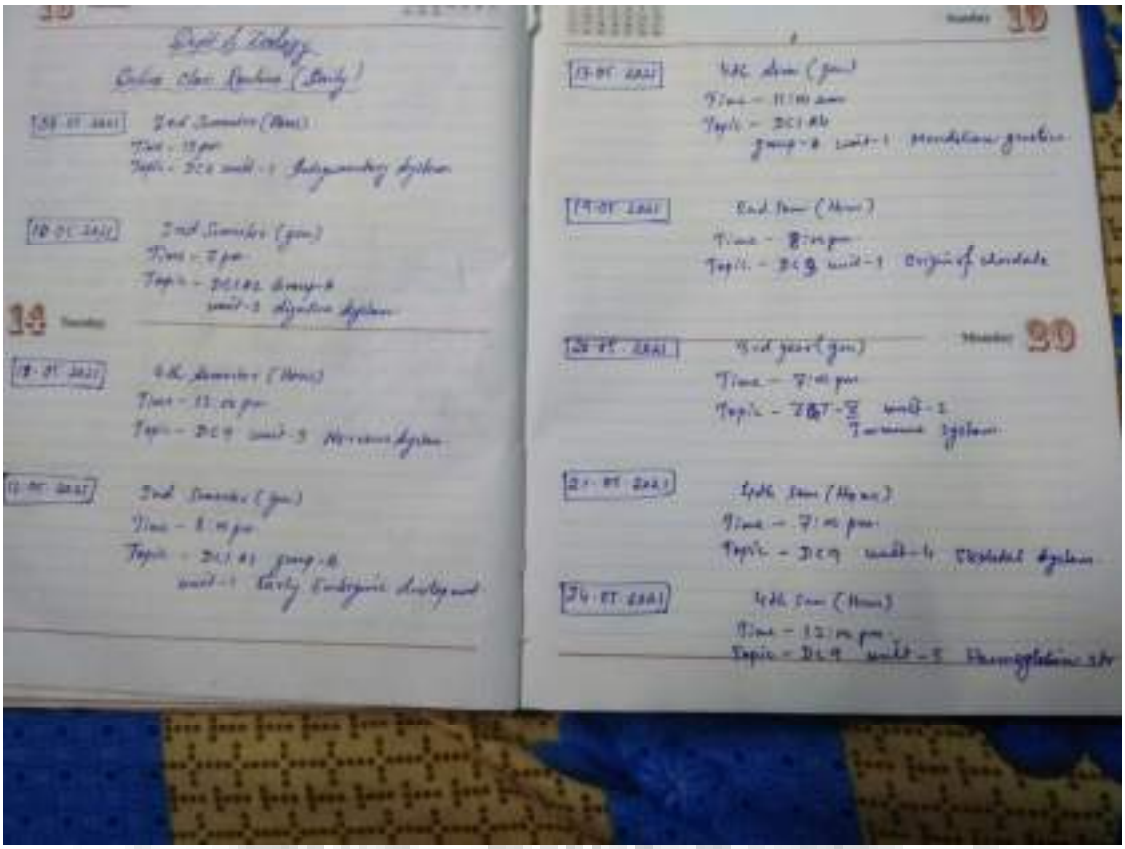
			CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 3: Cytoplasmic organelles - (i) Structure and functions: Endoplasmic reticulum, Golgi apparatus, Lysosomes, (ii) Protein sorting and mechanisms of vesicular transport, (iii) Mitochondria: Structure and function, semi-autonomous nature, endosymbiotic hypothesis, (iv) Centrosome: Structure and functions Unit 5: Cytoskeleton - Types, structure and functions of cytoskeleton. Unit 6: Nucleus - (i) Structure of nucleus: Nuclear envelope, nuclear pore complex, nucleolus, (ii) Chromatin: Euchromatin and hetrochromatin and packaging (nucleosome), (iii) Structure of chromosome, (iv) Introduction to polytene and lampbrush chromosome	8
			PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 3. Preparation of permanent slide to demonstrate: DNA by Feulgen reaction and cell viability study by trypan blue staining. 4. Permeability of plasma membrane: Effect of isotonic, hypotonic and hypertonic solutions on RBC.	2
			3RD SEMESTER(GENERAL): PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 3: Proteins - Classification, Secondary structure, Protein metabolism: Transamination, Deamination, Urea cycle	20
			PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): ii. Estimation of total protein in given solutions by Lowry's method	4
			3RD YEAR (HONS): PAPER CODE: ZHT-VII (THEORY): UNIT 1. TAXONOMY AND ANIMAL BEHAVIOUR 2. Animal behavior (a) Basic concept of classical ethology(fixed action pattern, sign stimulus); (orientation/kinesis), innate behavior, simple reflexes, motivation (b) Instinctive and learning behavior; fixed action pattern: communication in honeybees (dance Language and pheromone, sound/bird's singing) (c) Elements of Sociobiology: selfishness, cooperation, altruism and kinship (d) Social organization in termites: eusociality and castes (e) Parental investment (fishes): role of male and female in parental investment; effect, cost and benefit of parental investment; parent-offspring conflict; parental care in amphibians	25

			(f) Biological clocks/rhythm: photoperiod and circadian rhythm, fish and bird migration PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5
JANUARY 21, TO MARCH 21,	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) Unit 1: Introduction to Chordates: General characteristics and outline classification of Phylum Chordata (Young, 1981). Unit 2: Protochordata: (i) General Characteristics and classification of sub-phylum Urochordata and Cephalochordata up to Classes. (Young,1981), (ii) Retrogressive metamorphosis in Ascidia, (iii) Chordate Features and Feeding in Branchiostoma PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1. Identification of the following specimen: i. Protochordata: Balanoglossus, Herdmania, Branchiostoma, Doliolum. ii. Agnatha: Petromyzon, Myxine. **4TH SEMESTER(HONS):** PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY (THEORY) Unit 1: Carbohydrates - (i) Structure and biological importance: Monosaccharides, disaccharides, polysaccharides; Derivatives of monosachharides,(ii) Carbohydrate metabolism: Glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogenolysis and neoglucogenesis Unit 2: Lipids - (i) Structure and significance: Physiologically important saturated and unsaturated fatty acids, tri-acylglycerols, phospholipids, sphingolipid, glycolipids, steroids, eicosanoids and terpinoids, (ii) Lipid metabolism: β-oxidation of fatty acids PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 1. Qualitative tests of carbohydrates, proteins and lipids. 2. Paper chromatography of amino acids. **4TH SEMESTER (GENERAL):** PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP A: PRINCIPLES OF GEETICS: Unit 1: Mendelian Genetics and its Extension-Principles of Mendelian inheritance, Incomplete dominance and co-dominance, Multiple alleles,	30 5 8 2 20

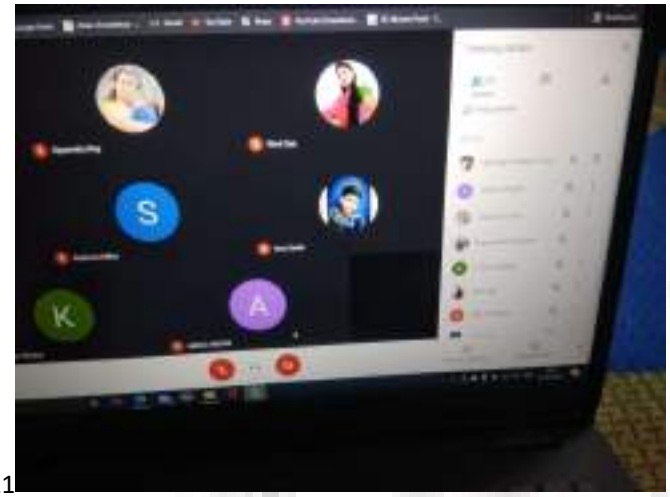
			Sex-linked characters, Sex- influenced and Sex-limited inheritance PAPER CODE: ZOOL-G-DC10-A4-P: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GEETICS: (PRACTICAL GROUP A+GROUP B) i. Study of Mendelian Inheritance and gene interactions (Non Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test. **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 2: ADAPTATION AND EVOLUTION 1. Adaptation (a) Aquatic adaptation (b) Volant adaptation (c) Fossorial adaptation (d) Scansorial adaptation (e) Cursorial adaptation 2. Evolution (a) Concept of evolution: Hardy-Weinberg equilibrium, calculating allele and genotype frequencies; Founder effect and population bottleneck; genetic diversity and phylogenetic analysis (b) Barriers and dispersals: types and their impact on animal distribution; Zoogeographical realms: names, subdivisions, climatic features and vertebrate fauna PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	5 25 2
APRIL 21, TO JUNE 21	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) Unit 3: Origin of Chordata:(i) Dipleurula concept and the Echinoderm theory of origin of chordates, (ii) Advanced features of vertebrates over Protochordata. Unit 4: Agnatha: General characteristics and classification of Cyclostomes up to Order, Ammoecoete larva. PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1.Identification of the following specimen: iii. Fishes: Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Clarias, Catla, Labeo, Cirrhinus, Puntius, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetrodon/Diodon, Anabas, Flat fish, Channa, Notopterus. **4TH SEMESTER(HONS):** PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY (THEORY)	30 4 8

			Unit 3: Proteins - (i) Amino acids: Structure, classification, general properties of α-amino acids; Physiological importance of essential and non-essential amino acid, (ii) Proteins: Bonds stabilizing protein structure; Levels of organization; Classification of protein , Protein metabolism: Transamination, deamination, urea cycle, fate of c-skeleton of glucogenic and ketogenic amino acids. PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 3. Colour tests of functional groups in protein solutions. **4TH SEMETER (GENERAL):** PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP A: PRINCIPLES OF GEETICS: Unit 2 : Linkage, Crossing Over and Chromosomal Mapping- Linkage and crossing over, molecular basis of crossing over, Steps in Chromosome mapping, Measuring recombination frequency. PAPER CODE: ZOOL-G-DC10-A4-P: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GEETICS: (PRACTICAL GROUP A+GROUP B) ii. Construction of linkage map using the data provided **3RD YEAR (HONS):** PAPER CODE: ZHT-VII (THEORY): UNIT 2: ADAPTATION AND EVOLUTION 2. EVOLUTION (c) Origin of life: DNA world and RNA world; theory of evolution— Lamarckism, Darwinism; modern synthetic theory of evolution (d) Mimicry and colouration in animals: evolutionary significance; isolation— types and mechanisms; evolution of man; adaptive radiation with special reference to marsupials (e) Fossils and fossilization; importance of fossils and dating of fossils PAPER CODE: ZHP-III (PRACTICAL): 1. Laboratory study of aggressive behavior of fighting fishes (killing of organisms not allowed)	2 20 5 25 4

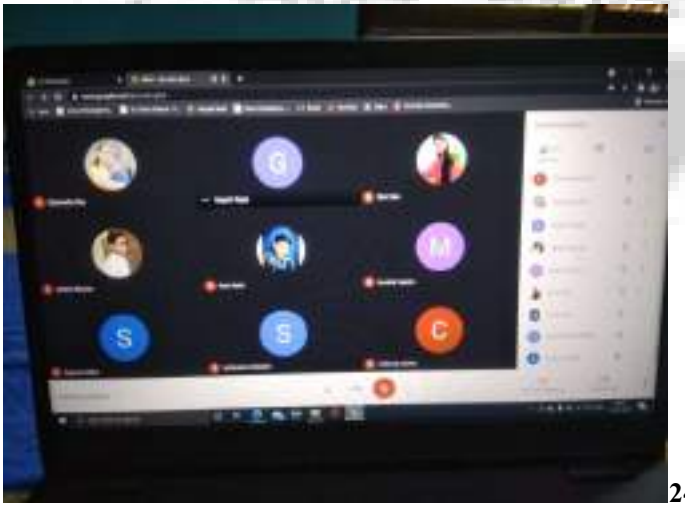
ONLINE CLASS DIARY OF SINGLE ONE SAMPLE COPY: MD NAZIR HOSSAIN



4 TH SEMESTER HONS SAMPLE COPY OF CLASSES:

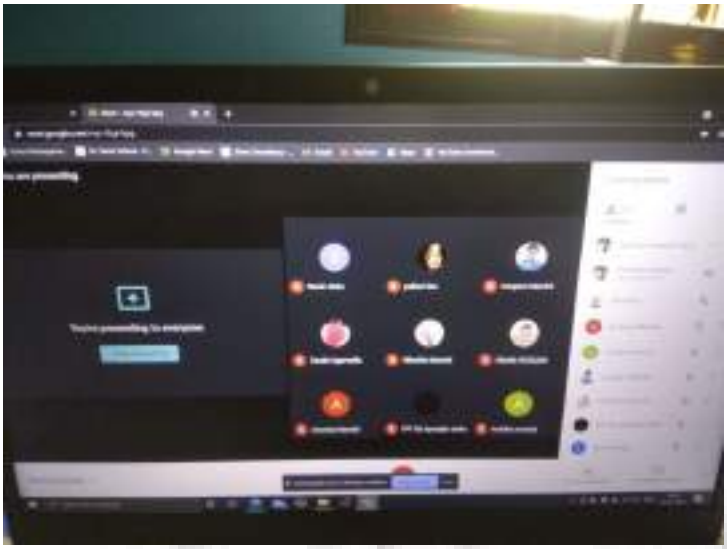
11.05.2021 

21.05.2021



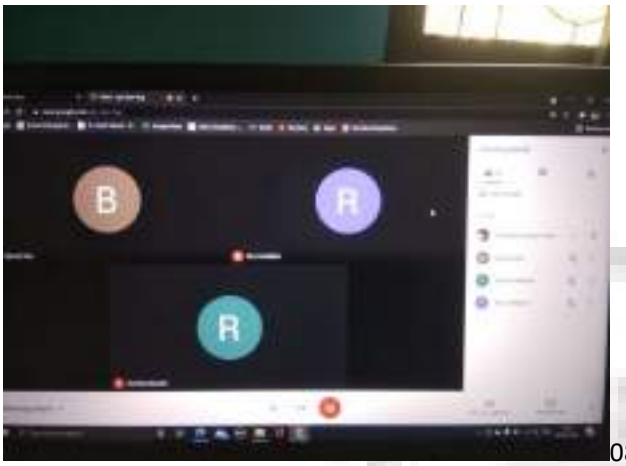
24.05.2021

4 TH SEMESTER GENERAL SAMPLE COPY OF CLASSES:

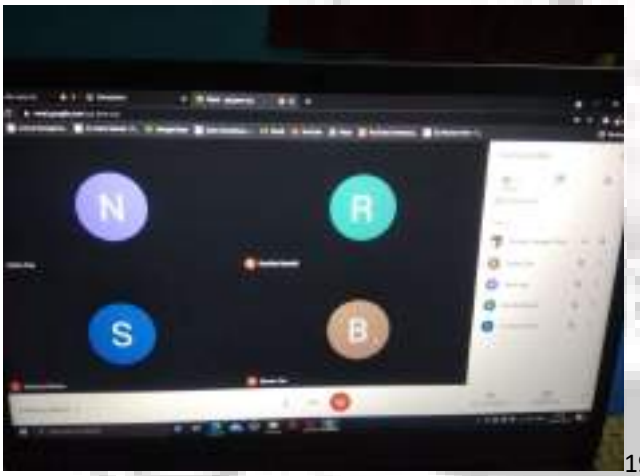


:13.05.2021

2ND SEMESTER HONS SAMPLE COPY OF CLASSES:



08.05.2021

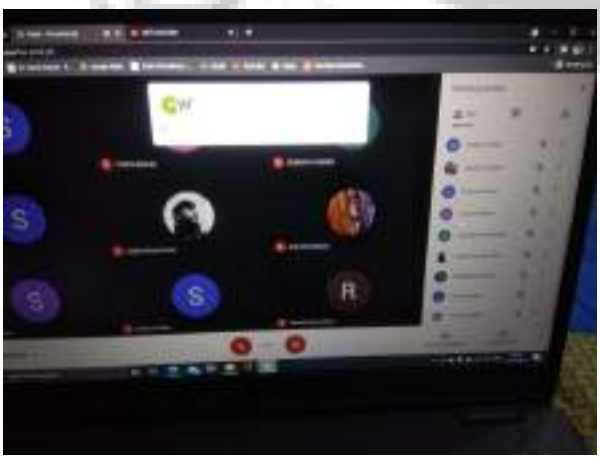


19.05.2021

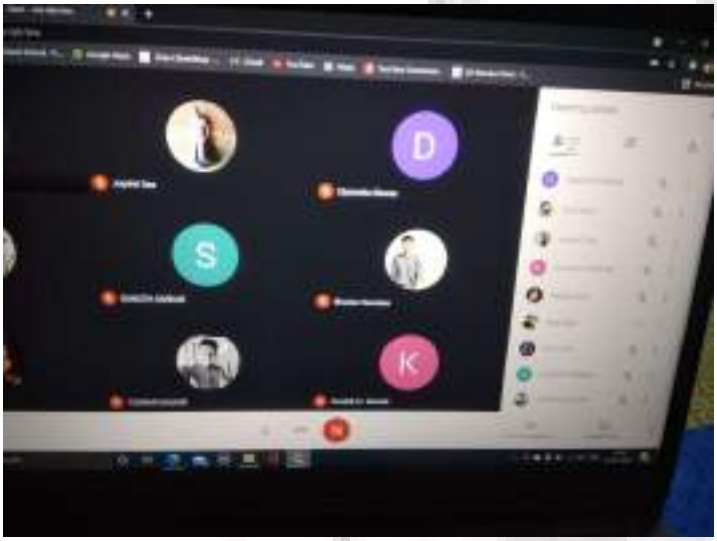
2ND SEMESTER GENERAL SAMPLE COPY OF CLASSES:

10.05.2021

12.05.2021



3 RD YEAR GENERAL SAMPLE COPY OF CLASSES:



20.05.2021

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 20, TO SEPTEMBER 20	1ST SEMESTER (HONS.)	TITU KARMAKAR HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**ZOOL DC2: Non-Chordates II (Coelomates)** Unit 1: Introduction: Evolution of coelom and metamerism. Unit 2: Annelida: General characteristics and classification up to classes: Type study of Pheretima sp. (morphology, locomotion, circulation and reproduction), Excretion in Annelida. • **Practical (Full marks = 15) [ZOOL-H-DC2-P]** 1. Study of following specimens: a. Annelids - Aphrodite, Nereis, Heteronereis, Sabella, Serpula, Chaetopterus, Pheretima, Hirudinaria	18
	1ST SEMESTER (Gen)		**(A1) DC 1: Animal Diversity and Ecology (=50 marks)** Group B: Biology of Chordates (=10 marks) Unit 1: Introduction to Chordates- General characteristics and outline classification of phylum Chordata. Unit 2: Protochordata (invertebrate chordate) - General characteristics and classification of sub-phylum Urochordata and Cephalochordata up to classes; retrogressive metamorphosis in Ascidia; chordate features and feeding in Branchiostoma **Practical (=15 marks) [(A1)-ZOOL-G-DC 1-P]:** • Biology of Chordates i. Identification: a. Protochordata: Balanoglossus, Herdmania, Branchiostoma;Agnatha- Petromyzon, Myxine.	18
	3RD SEMESTER (HONS.)		**ZOOL DC7: Developmental Biology and Reproductive Biology** Unit 1: Introduction- Basic concepts: Phases of development, cell-cell interaction, differentiation and growth, differential gene expression. Unit 2: Early Embryonic Development- Gametogenesis, spermatogenesis, oogenesis; types of eggs, egg membranes; fertilization in sea urchin, role of yolk in cleavage, blocks to polyspermy; planes and patterns of cleavage; fate maps (frog and chick); early development of frog and chick up to gastrulation; embryonic induction and organizers.	45

			Unit 3: Late Embryonic Development-Fate of germ layers; extra-embryonic membranes in chick, placenta (structure, types and functions of placenta) **Practical (Full marks = 15) [ZOOL-H-DC7-P]:** 1. Study of whole mounts of developmental stages of chick through permanent slides: Primitive streak 24, 48, 72, and 96 hours of incubation 2. Study of the developmental stages and life cycle of Drosophila from stock culture. 3. Study of different sections of placenta (photomicropgraph/slides). 4. Project report on Drosophila culture/Chick embryo development/ Metamorphosis of Frog (Subject to UGC guideline).	
	3RD Year (Hons)		**Paper: ZHT-XI** **Unit 1: Developmental Biology and Teratology** 1. Gametogenesis: Process of spermatogenesis and oogenesis, structure of male and female gametes 2. Fertilization: External fertilization; physical and chemical events of fertilization in sea urchin; capacitation and prevention of polyspermy in mammals; in vitro fertilization **Paper ZHP-IV:Laboratory course(Practical)** 6. Demonstration for preparation and identification of whole mounts of chick embryo 24, 48, 72 and 96 h)	45
	3RD Year (Gen)		**Paper: ZGT-V** **Unit 2: Microbiology, Parasitology and Immunology** 1.Outline classification of bacteria and virus. 2. Food and water borne infections-cholera and typhoid. 3. Interspecific associations-symbiosis, commensalism, mutualism and parasitism. **Paper: ZGP III: Laboratory course (Practical)** 1. Study of human blood film: identification of leucocytes	9
2				
Oct20-Dec20	1ST SEMESTER (HONS.)		ZOOL DC2: Non-Chordates II (Coelomates) Unit 4: Onychophora: General characteristics and evolutionary significance. Unit 5: Mollusca: General characteristics and classification up to classes; Nervous system and torsion in Gastropoda; Feeding and respiration in Pila sp. **Practical (=15 marks) [ZOOL-H-DC 2-P]:** • Biology of Chordates b. Arthropods - Limulus, Palamnaeus, Palaemon, Daphnia, Balanus, lepas, Sacculina, Carcinus, Eupagurus, Buthus, Scolopendra, Julus, Bombyx, Periplaneta, termites and honey bees,Peripatus, c. Onychophora	18
	1ST SEMESTER (Gen)		**(A1) DC 1: Animal Diversity and Ecology (=50 marks)** Unit 3: Agnatha- General characteristics and classification of Cyclostomes up to order. Unit 4: Pisces: General characteristics and classification of Chondrichthyes and Osteichthyes up to subclasses, accessory respiratory organ in fishes. **Practical (=15 marks) [(A1)-ZOOL-G-DC 1-P]:**	18

			• Biology of Chordates c. Amphibia: Necturus, Bufo, Hyla, Axolotl, Tylototriton. d. Reptilia: Chelone, Hemidactylus, Varanus, Uromastix, Chamaeleon, , Vipera, Naja,;	

	3RD SEMESTER (HONS.)		**ZOOL DC7: Developmental Biology and Reproductive Biology** Unit 4: Post Embryonic Development-(i) Development of brain and eye in chick, (ii) Regeneration: Modes of regeneration, epimorphosis, morphallaxis and compensatory regeneration (with one example each). Unit 5: Implications of Developmental Biology-(i) Teratogenesis: Teratogenic agents and their effects on embryonic development; in vitro fertilization, stem cell (ESC), amniocentesis Unit 6: Reproductive Endocrinology- (i) Mechanism of action of steroids and glycoprotein hormones. hypothalamo – hypophyseal – gonadal axis, regulation of gonadotrophin secretion in human (male and female),(ii) Reproductive system: development and differentiation of gonads, genital ducts and external genitalia. Unit 7: Reproductive Health- (i) Infertility in male and female: causes, diagnosis and management, (ii) Assisted reproductive technology: sex selection, sperm banks, frozen embryos, in vitro fertilization,(iii) Modern contraceptive technologies **Practical (Full marks = 15) [ZOOL-H-DC7-P]:** 5. Study of live gametes of white rat (Subject to UGC guideline). 6. Examination of vaginal smear from rats (Subject to UGC guideline). 7. Examination of histological sections from photomicrographs/permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems; Sections of ovary, fallopian tube (Subject to UGC guideline).	45
	3RD Year (Hons)		**Paper: ZHT-XI** **Unit 1: Developmental Biology and Teratology** 3. Eggs: classification based upon the amount and distribution of yolk and presence and absence of shell; egg membranes 4. Cleavage: types with examples based on plane of division and amount of yolk; development and patterns of cleavage; parthenogenesis: types and significance **Paper ZHP-IV:Laboratory course(Practical)** 7. Identification: prepared slides of embryological tissue sections(chick embryo)	45
	3RD Year (Gen)		**Paper: ZGT-V** **Unit 2: Microbiology, Parasitology and Immunology** 5. Parasitic adaptations of Fasciola and Taenia 6. Role of Mosquito, Sand fly, house fly, cyclops, cockroach, flea, ticks, mites and rats in transmission of diseases. **Paper: ZGP III: Laboratory course (Practical)** 2. Study of fecal smear/gut content smear of cockroach for parasites	9
3				
Jan21-March21	2nd SEMESTER (HONS.)		DC3 **Unit 7: Reptilia: (**i) General characteristics and classification up to living Orders. (Young 1981),(ii)	18

			Poison apparatus and biting mechanism in snake, snake venom and method of treatment of snake biting,(ii) *Sphenodon*- present status **Unit 8: Aves: (i)** General characteristics and classification up to Sub-Classes. (Young, 1981), (ii) Exoskeleton and migration in birds, (ii) Principles and aerodynamics of flight, (iv) *Archaeopteryx*-a connecting link.	
	2nd SEMESTER (Gen)		DC4 Unit 4: Circulatory System- General plan of circulation, comparative account of heart and aortic arches. Unit 5: Urinogenital System- Succession of kidney, Evolution of urinogenital ducts. DC4P i. **Study** of placoid, cycloid and ctenoid scales through permanent slides/photographs. ii. **Study** of disarticulated skeleton of toad, pigeon, fowl, guineapig and rabbit. iii. **Demonstration** of carapace and plastron of turtle.	18
	4th SEMESTER (HONS.)		**DC9** Unit 1: Tissues - (i) Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue. Unit 2: Bone and Cartilage -Structure and types of bones and cartilages, ossification Unit 3: Nervous System - Structure of neuron, resting membrane potential, origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, synaptic transmission and neuromuscular junction; Reflex action and its types Unit 4: Muscular system - Ultra structure of skeletal muscle; Characteristics of muscle fiber; Molecular and chemical basis of muscle contraction; Characteristics of muscle fibre Unit 5: Physiology of Respiration - Mechanism of breathing, respiratory volumes and capacities, transport of oxygen and carbon dioxide in blood, dissociation curves and the factors influencing it, respiratory pigments; carbon monoxide poisoning, control of transpiration	45
	3RD Year (Hons)		**Paper: ZHT-XI** **Unit 1: Developmental Biology and Teratology** 6. Development of chick: structure of egg, cleavage, blastulation and fate map, gastrulation; development and function of extra-embryonic membranes 7. Development of heart, kidney, eye and brain in chick	45
	3RD Year (Gen)		**Paper: ZGT-V** **Unit 2: Microbiology, Parasitology and Immunology** 7. Concept of Innate and adaptive immunity 8. Basic idea of antigens, types and structure of immunoglobulins, antigen- antibody reactions	9
4				
April21-June21	2nd SEMESTER (HONS.)		DC3: Unit 9: Mammals: (i) General characters and classification up to living Infra class (Young,1981), (ii) Affinities of Prototheria, (iii) Adaptive radiation in mammals with reference to locomotory appendages, (iv) Echolocation in Chiropterans and Cetaceans.	18

			DC3P iv. Amphibia: Necturus, Bufo, Rana, Hyla, Alytes, Axoltl, Tylototriton, Ambystoma. v. Reptilia: Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Chamaeleon, Ophiosaurus, Draco, Bungarus, Vipera, Naja, Hydrophis, Crocodylus; Key for identification of poisonous and non-poisonous snakes. vi. Mammalia: Bat (insectivorous and frugivorous), Funambulus.	
	2nd SEMESTER (Gen)		DC4 **Unit 6: Nervous System-** Comparative account of brain, cranial nerves in mammals. **Unit 7: Skeletal System-** Evolution of visceral arches. **DC4P Grp-A** iv. Identification of mammalian skulls*: Bufo, Rana, Columba, Cavia* and Dog.	18
	4th SEMESTER (HONS.)		**DC9** Unit 7: Physiology of Heart - Structure of mammalian heart, coronary circulation, structure and working of conducting myocardial fibres, origin and conduction of cardiac impulses; ECG, cardiac cycle and cardiac output; blood pressure and its regulation Unit 8: Thermoregulation & Osmoregulation - Physiological classification based on thermal biology; thermoregulation of homeotherms; osmoregulation in aquatic vertebrates; extra renal osmoregulatory organs in vertebrates. Unit 9: Renal Physiology - Histology of kidney and nephrons, mechanism of urine formation, glomerular filtration, tubular secretion, plasma clearance and counter current mechanism	45
	3RD Year (Hons)		**Paper: ZHT-XI** **Unit 1: Developmental Biology and Teratology** 8. Major endocrine glands in mammals and their hormonal functions (pituitary, thyroid, pancreas, adrenal, testis and ovary) 9. Classification of hormones and elementary idea about mechanism of hormone action 10. Insect endocrine gland (in brief)	45
	3RD Year (Gen)		**Paper: ZGT-V** **Unit 2: Microbiology, Parasitology and Immunology** 9. Structure and mechanism of transmission of HIV 10. Principles of Vaccination and types of vaccines **Paper: ZGP III: Laboratory course (Practical)** 6. Identification of microfilaria larva; type specimen: Taenia solium, Scirpophaga incertulus, Sitophilus oryzae, Leptocorisa, Epilachna, Coccinella, Lepisma, Termite, Bandicota sp., Labeo rohita, L. bata, Catla catla, Cirrhinus mrigala, Hypophthalmicthyes molitrix, Ciprinus carpio, Ctenopharyngodon idela, Tenualosa (=Hilsa) ilisha, Penaeus, Macrobrachium rosenbrgi	9

ZOOLOGY LESSON PLAN OF ACCADEMIC YEAR 2020-2021

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES (HOURS)
JULY 20, TO SEPTEMBER 20	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),	**ATINDRIYA SEN** HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 5: **Ctenophpra :**General characteristics and evolutionary significance. Unit 6: **Platyhelminthes**: General characteristics and classification up to classes; life cycle, pathogenicity, parasitic adaptations and control measures of *Faciola hepatica* and *Taeniasolium*.	30
			PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B) 2. Identification	6
			3RD SEMESTER (HONS): PAPER CODE: ZOOL-H-DC5-T: CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 5**: Cytoskeleton :** Types, structure and function of cytoskeleton. Unit 6: **Nucleus** - (i) Structure of nucleus: Nuclear envelope, nuclear pore complex, nucleolus. (ii) **Chromatin** : Euchromatin and Heterochromatin and packaging (nucleosome) (iii) Structure of chromosome (iv) Introduction to polytene and lampbrush chromosome.	30
			PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 6. Cytochemical demonstration(Preparetion of permanent slides) (i) DNA by Feulgen reaction (ii) Mucopolysaccharides by PAS reaction. (iii) Proteins by Mercurobromophenol blue. (iv) DNA and RNA by Methyl Green Pyronin. 7. Chi-square analysis (based on di-hybrid cross) 8. Identification of chromosomal aberration in *Drosophilla*and human (by photograph). 9. Identification of various mutants of *Drosophilla*(by photographs only). 11. Pedigree analysis of some human inherited	10

			trait from the supplied data. **3RD SEMESTER (GENERAL):** PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 4 : **Nucleic acid :** DNA is the genetic material, Structure of purines and pyrimidines, nucleosides, nucleic acids, types of DNA and RNA PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): iii. Study of activity of salivary amylase under optimum condition. **3RD YEAR (HONS):** PAPER CODE: ZHT-IX (THEORY): UNIT 1: **MOLECULAR BIOLOGY** 1. Molecular structure of DNA and RNA 2. DNA replication: basic rules and requirements, semiconservative model of replication (Meselson's and Stahl's experiment); types- theta replication, rolling circle replication and linear eukaryotic replication. 3. DNA damage and repair: formation of thymine dimer, nucleotide excision repair and base excision repair. PAPER CODE: ZHP-III (PRACTICAL): 6. Gel electrophorasis : submarine and vertical.	10 2 20 5
OCTOBER 20, TO DECEMBER 20,	1ST SEMESTER (HONS.), 3RD SEMESTER (HONS.), 3RD SEMESTER (GENERAL), 3RD YEAR (HONS.),		**1ST SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC1-T: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (THEORY) Unit 7: **Nemathelminthes :**General characteristics and classification upto classes; Life cycle, pathogenicity, parasitic adaptations and control measures of *Ascarislumbricoides* and *Wuchereriabancrofti.* PAPER CODE: ZOOL-H-DC1-P: NON CHORDATE-I: PROTIST TO PSEUDOCOEOMATE (PRACTICAL GROUP A+GROUP B): 2. c. Identification of adult *Fasciola hepatica*, *Taeniasoliumand Ascarislumbricoides.* **3RD SEMESTER (HONS):** PAPER CODE: ZOOL-H-DC5-T: CELL BIOLOGY AND PRINCIPLES OF GENETICS (THEORY) Unit 7: **Cell division**- (i) Cell Cycle and its regulation (ii) Mitosis and meiosis: Basic process and their significance.	25 5 35

			Unit 8: **Cell signalling-**(i) Cell signalling transduction pathways, Types of signalling molecules and receptors. (ii) GPCR and role of second messenger (cAMP) (iii) Extracellular matrix-cell interactions. PAPER CODE: ZOOL-H-DC5-P: CELL BIOLOGY AND PRINCIPLES OF GENETICS (PRACTICAL GROUP A+GROUP B) 1. Preparation of temporary stained squash of onion root tip to study various stages of mitosis. 2. Study of various stages of meiosis from grasshopper testis. **3RD SEMESTER(GENERAL):** PAPER CODE: ZOOL-G-DC7-A3-T: GROUP B: BIOCHEMISTRY (THEORY) Unit 5: **Enzymes**- Nomenclature and classification; Mechanism of enzyme action. PAPER CODE: ZOOL-G-DC7-A3-P: GROUP B: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B): iii. Study of activity of salivary amylase under optimum condition. **3RD YEAR (HONS):** PAPER CODE: ZHT-IX (THEORY): UNIT 1. ECOLOGY 4. Community ecology: Biotic community- definition, characteristics and classification, species diversity, fluctuations, stratification, succession, ecotone and edge effect. 5. Population interactions: Intraspecific and interspecific associations- positive and negative interactions: mutualism, commensalism, parasitism, predation and competition. PAPER CODE: ZHP-IV (PRACTICAL): 3. Studies on zooplankton/zoogeographical fauna. 4. Preparation of curd, cheese, and lassi (demonstration), pasteurization of milk.	5 10 5 20 5

JANUARY 21, TO MARCH 21,	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) **Unit 5: Pisces:(i)** General characteristics and classification of Chondrichthyes and Osteichthyes up to Subclasses. (Romer, 1959), (ii) Accessory respiratory organs in fishes (iii) Dipnoi-distribution characteristic features and evolutionary significance and migration,(iii) Swim bladder and scales in fishes. **Unit 6: Amphibia:** General characteristics and classification up to living Orders (Duellman and Trueb 1986), (ii) Metamorphosis , neoteny and paedogenesis	30
			PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1. Identification of the following specimen: iii. **Fishes**: Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Clarias, Catla, Labeo, Cirrhinus, Puntius, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetrodon/Diodon, Anabas, Flat fish, Channa, Notopterus. iv. **Amphibia:**Necturus, Bufo, Rana, Hyla, Alytes, Axoltl, Tylototriton, Ambystoma.	5
			4TH SEMESTER(HONS): PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY (THEORY) **Unit 4: Nucleic Acids** - (i) Structure: Purines and pyrimidines, nucleosides, nucleotides, nucleic acids ii) Basic concept of nucleotide metabolism. **Unit 5: Enzymes** - (i) Nomenclature and classification; Cofactors and co-enzymes; Specificity of enzyme action; Isozymes, (ii) Mechanism of enzyme action; Enzyme kinetics; derivation of Michaelis-Menten equation, Lineweaver-Burk plot,(iii) Factors affecting rate of enzyme-catalyzed reactions; Enzyme inhibition; Regulatory enzymes.	32
			PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 2. Paper chromatography of amino acids. 6. To study the salivary amylase action. 7. Effect of pH on the action of salivary amylase.	8
			4TH SEMESTER (GENERAL): PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP B: PRINCIPLES OF GENETICS:	20

			Unit 3: Mendelian Genetics and its Extension- Principles of Mendelian inheritance, Incomplete dominance and co-dominance, Multiple alleles, Sex-linked characters, Sex- influenced and Sex-limited inheritance PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GENETICS: **Unit 3: Mutations** - Types of gene mutations (classification), Types of chromosomal aberrations (classification with one suitable example of each), Non-disjunction and variation in chromosome number, Molecular basis of mutations in relation to UV light and chemical mutagens. PRACTICAL GROUP A iii. Study of Human Karyotypes (normal and abnormal). **3RD YEAR (HONS):** PAPER CODE: ZHT-IX (THEORY): UNIT 2: ENVIRONMENTAL BIOLOGY AND TOXICOLOGY 1. Pollution: Source and effects of major pollutants of air, water and soil 2. Toxicants and public health hazards (a) Toxic chemicals (pesticide, automobile emissions, heavy metals and fertilizers) (b) Level of toxicity— acute, sub acute, chronic; LD50, LC50 PAPER CODE: ZHP-III (PRACTICAL): Determination of toxicity of permissible agents:(a) LC50 against stored grain pests/mosquito larvae; (b) LD50 against air breathing fishes (demonstration only) (graphical presentation required in both cases)	5 20 5
APRIL 21, TO JUNE 21	2ND SEMESTER (HONS.), 4TH SEMESTER (HONS.), 4TH SEMESTER (GENERAL), 3RD YEAR (HONS.),		**2ND SEMESTER (HONS.):** PAPER CODE: ZOOL-H-DC3-T: DIVERSITY OF CHORDATES (THEORY) **Unit 7: Reptilia:** (i) General characteristics and classification up to living Orders. (Young 1981),(ii) Poison apparatus and biting mechanism in snake, snake venom and method of treatment of snake biting, (ii) Sphenodon- present status **Unit 8: Aves**: (i) General characteristics and classification up to Sub-Classes. (Young, 1981), (ii) Exoskeleton and migration in birds, (ii) Principles and aerodynamics of flight, (iv) Archaeopteryx-a connecting link. PAPER CODE: ZOOL-H-DC3-P: DIVERSITY OF CHORDATES (PRACTICAL GROUP A+GROUP B) 1.Identification of the following specimen: **Reptilia:** Chelone, Trionyx, Hemidactylus,	25 5

			Varanus, Uromastix, Chamaeleon, Ophiosaurus, Draco, Bungarus, Vipera, Naja, Hydrophis, Crocodylus; Key for identification of poisonous and non-poisonous snakes.	
			4TH SEMESTER(HONS): PAPER CODE: ZOOL-H-DC8-T: BIOCHEMISTRY **(THEORY)** **Unit 6: Oxidative Phosphorylation**- Redox systems; Review of mitochondrial respiratory chain, inhibitors and un-couplers of electron transport system.	35
			PAPER CODE: ZOOL-H-DC8-P: BIOCHEMISTRY (PRACTICAL GROUP A+GROUP B) 8. To perform the Acid and Alkaline phosphatase assay from serum/ tissue.	5
			4TH SEMETER (GENERAL): PAPER CODE: ZOOL-G-DC10-A4-T: GENETICS AND EVOLUTIONARY BIOLOGY (THEORY) GROUP A: PRINCIPLES OF GEETICS: **Unit 4: Sex Determination**- Mechanisms of sex determination in Drosophila and human	25
			PAPER CODE: ZOOL-G-DC10-A4-P: GENETICS AND EVOLUTIONARY BIOLOGY GROUP A: PRINCIPLES OF GEETICS: (PRACTICAL GROUP A+GROUP B) iv. Blood group typing.	4
			3RD YEAR (HONS): PAPER CODE: ZHT-IX (THEORY): UNIT 2: ENVIRONMENTAL BIOLOGY AND TOXICOLOGY 3. **Man and Environment**- (a) Sustainable development (general concept) (b) Destruction of habitat and its consequences- wetland, paddy fields, forest, river encroachment, ecological impacts of tourism. (c) EIA (environmental impact assessment): concept 4. **Botulism: common bacterial poisoning**	20
			PAPER CODE: ZHP-IV (PRACTICAL): 1. Determination of toxicity of permissible agents:(a) LC50 against stored grain pests/mosquito larvae; (b) LD50 against air breathing fishes (demonstration only) (graphical presentation required in both cases.	5

<u>Online Class Diary Of a Single Page Sample Copy:</u> Atindriya Sen

Dept. Of Zoology
Online Class Routine
(Daily)

[illegible] — 4th Sem. (H)
Time — [illegible] a.m. on Google Meet
Topic — Oxidative Phosphorylation.

[illegible] — 4th Sem. (G)
Time — [illegible] pm on Google Meet
Topic — Sex Determination — Mechanisms of Sex determination in [illegible]

[illegible] — 2nd Sem. (H)
Time — [illegible] a.m. on Google Meet
Topic — Reptilia — Snake venom and method of treatment of snake biting.

[illegible] — 3rd Year (H)
Time — [illegible] pm
Topic — Man and Environment — Ecological impacts of [illegible]

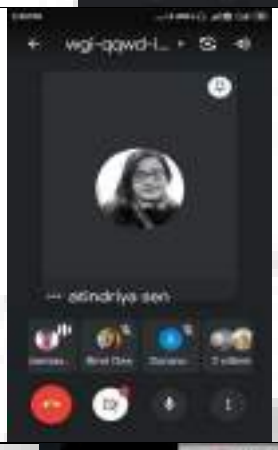
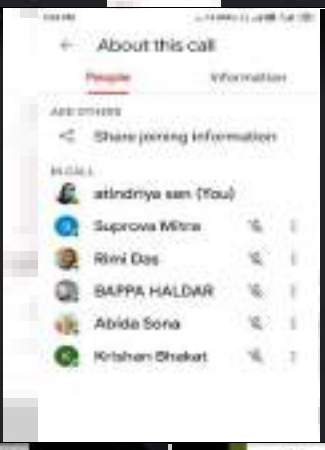
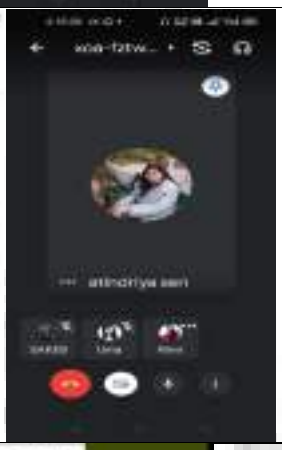
[illegible] — 3rd Year (H)
Time — [illegible] a.m.
Topic — EIA concept — Environmental impact assessment process.

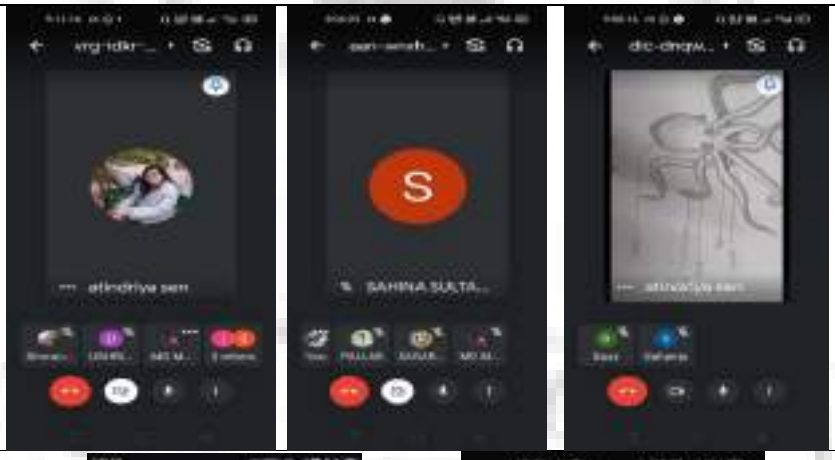
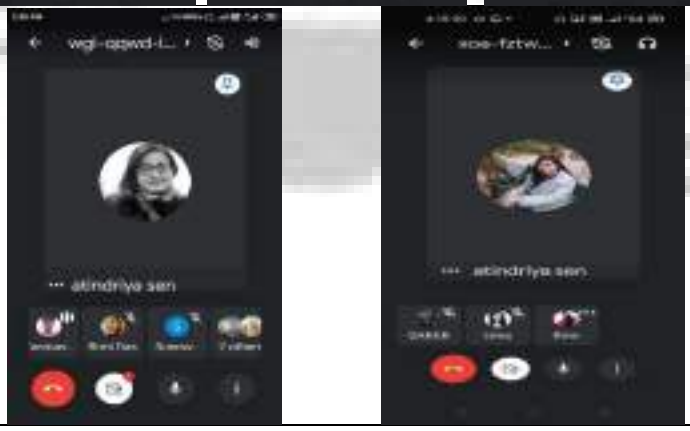
[illegible] — 4th Sem. (H)
Time — [illegible] a.m.
Topic — [illegible] of electron transport system.

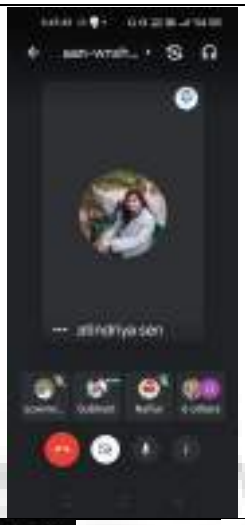
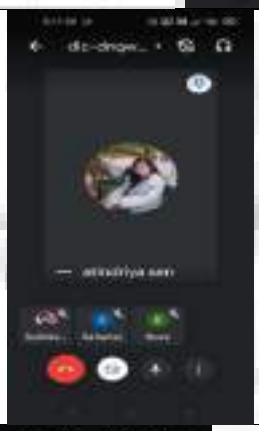
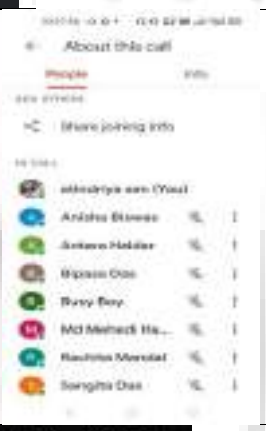
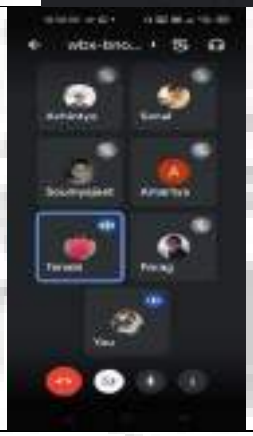
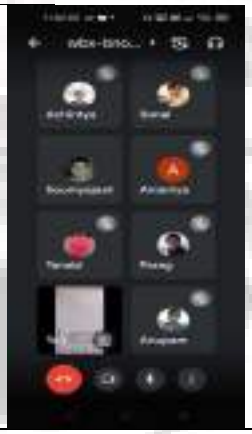
[illegible] — 4th Sem. (G)
Time — [illegible] a.m.
Topic — Basic concept and fundamental process of Blood Group Typing.

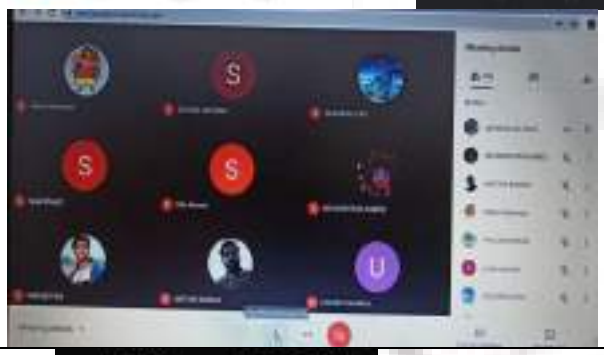
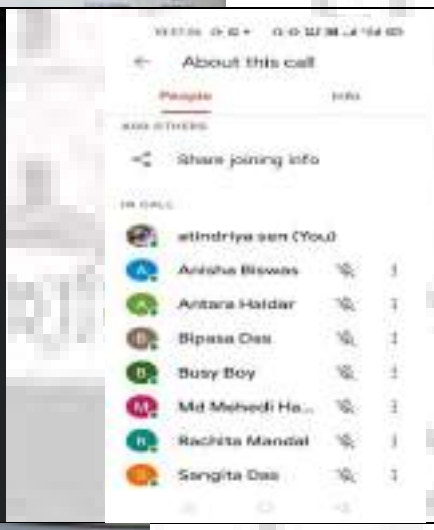
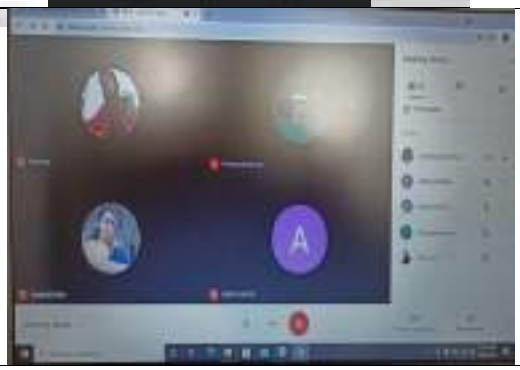
[illegible] — 2nd Sem. (H)
Time — 10 a.m.
Topic — Reptilia — [illegible] of Sphenodon. Aves — [illegible] characteristics.

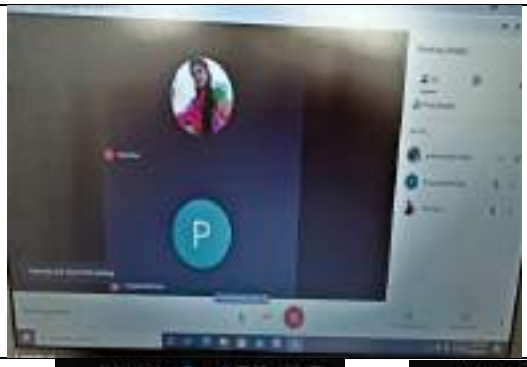
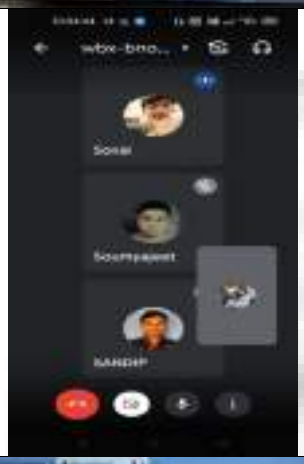
Sample Copy Of Online class records By Atindriya Sen:

Academic quarter	Class	Documents
July '20-Sept '20	1st Semester Hons.	 
"	3rd Semester Hons.	  
"	3rd Semester General	 

“	3rd year Hons.	
Academic quarter	**Class**	**Documents**
October ’20-December ‘20	1st Semester Hons.	
“	3rd Semester Hons.	

“	3rd year Hons.	  
January ’21 – March ‘21	2nd Semester Hons.	 
“	4th Semester General	 

“	3rd year Hons.	  
April ’21-June ‘21	2nd Semester Hons.	 
“	4th Semester Hons.	

		
"	4th Semester General	 
"	3rd year Hons.