ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 19, TO SEPTEMBER 19	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
	1STSEMESTER 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
	2ND YEAR HONS		**Paper ZHT-IV** Unit 1: Histology and Histochemistry 25 marks 1. Histology (a) Fixatives and fixation: principle, types and procedure (b) Dyes and stains used in histology (classification, composition and properties); principle of staining: double and triple staining methods of histological tissue sections; mordents and metachromatic dyes (c) Histological and functional aspects of lung, liver, Kidney, pituitary, thyroid, adrenal, testis and ovary in mammals **Paper ZHP-II:** 1. Demonstration for determination of human blood pressure 2. Differential counts of WBC and total counts of WBC and RBC in human blood; estimation of haemoglobin in human blood; ABO blood grouping; CT and BT determination (human subject: demonstration only)	45

	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 25 marks 1. Basic idea about common fixatives and dyes used in routine histological procedure **Paper: ZGP II: Laboratory course (Practical)** 1. Differential count of human WBCs 2. Blood pressure measurement in humans	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				
Oct19-Dec19	1ST YEAR 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.	18
	1ST YEAR 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	18

			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.	
	2ND YEAR HONS		Paper ZHT-IV Unit 1: Histology and Histochemistry (c) Histological and functional aspects of lung, liver, Kidney, pituitary, thyroid, adrenal, testis and ovary in mammals (d) Histological organization of different parts of mammalian alimentary canal Paper ZHP-II: Laboratory course (Practical) 3. Human pedigree chart analysis 4. Squash preparation and study of cell division stages: onion root tip (mitotic) and grasshopper (meiotic)	45
	2ND YEAR GEN		**Paper: ZGT-III** 3. Ultrastructure and function of plasma membrane, GERL system, ribosome and mitochondria. 4. Chromosome structure and nucleosome concept **Paper: ZGP II: Laboratory course (Practical)** 3. Determination of haemoglobin in human blood 4. Determination of human blood group: ABO system including Rh factor	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 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	45
	3RD Year (Gen)		ZGT-V Unit-1 2. Chemical, biological, hormonal and pheromonal control mechanisms of pests. General idea about IPM	9
3				
Jan20-March20	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.	18

			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.	
	2ND YEAR HONS		**Paper ZHT-IV** (e) Tissue structure and function: brain, skin, blood, lymph node, bone and muscles 2. Histochemistry (a) Histochemistry as a tool in morphological analysis: tissue sampling, fixation, staining and assessment **Paper ZHP-II: Laboratory course (Practical)** 5. Qualitative tests for proteins/carbohydrates/lipids; quantitative estimation of protein 6. pH measurement of various samples (soil and water) using pH meter	45
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 5. Cell cycle: phases and regulation 6. Elements of heredity: Mandel's monohybrid and dihybrid crosses **Paper: ZGP II: Laboratory course (Practical)** 5. Identification with reasons: histological slides of mammalian stomach, ilieum, thyroid, liver, pancreas, kidney, testis, ovary, spleen, lung; chick embryo slides: 24, 48, 72 and 96 hours	18
	3RD YEAR HONS		**Unit 2: Biotechnology** 1. Recombinant DNA technology: role of restriction endonucleases in recombinant DNA formation and 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	45
	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				
April20-June20	2ND SEMESTER HONS		DC3: Unit 9: Mammals: (i) General characters and classification up to living Infra class (Young,1981),	18

			(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.	
	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
	2ND YEAR HONS		**Paper ZHT-IV** (b) Histochemical staining for carbohydrates (PAS), protein (Millon's staining method), lipids (Sudan black-B method); histochemical study of mucosubstances. (c) Fuelgen nuclear staining technique for DNA. (d) Immunohistochemistry: techniques of immunohistochemical staining and applications. **Paper ZHP-II: Laboratory course (Practical)** 7. Microtomy; tissue fixation, cutting, stretching, affixation, staining, microscopic observation and identification (laboratory bred animal)	45
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 7. Linkage: definition, Complete and Incomplete linkage with examples 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome **Paper: ZGP II: Laboratory course (Practical)** 6. Biostatics: problems to be set based on the theoretical syllabus	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:	45

			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)	
	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

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 19, TO SEPTEMBER 19	1ST SEMESTER HONS	**Sanchita Chakraborty** HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	**ZOOL DC1:Non-Chordates I (Protists to Pseudo-coelomates)** . Unit 3: Porifera: General characteristics and classification up to classes; Canal system, cell types and spicules in sponges.	9
	1STSEMESTER 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 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
	2ND YEAR HONS		**Paper ZHT-IV** Unit 1: Histology and Histochemistry 25 marks 1. Histology (a) Fixatives and fixation: principle, types and procedure **Paper ZHP-II:** 1. Demonstration for determination of human blood pressure	10
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology **Paper: ZGP II: Laboratory course (Practical)** 1. Differential count of human WBCs	10
	3RD YEAR HONS		***Paper: ZHT-VIII*** **Unit 1: Microbiology and Immunology** ***Paper: ZHT-XII*** **Unit 1: Molecular Biology**	10

			1. Molecular structure of DNA and RNA (3) 2. DNA replication: basic rules and requirements; semiconservative mode of replication	
	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)	10
2				
Oct19-Dec19	1ST YEAR HONS		ZOOL DC2: Non-Chordates II (Coelomates) Unit 4: Onychophora: General characteristics and evolutionary significance.	4
	1ST YEAR 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).	10
	2ND YEAR HONS		Paper ZHT-IV Unit 1: Histology and Histochemistry (c) Histological and functional aspects of lung, liver, Kidney, pituitary, thyroid, adrenal, testis and ovary in mammals (d) Histological organization of different parts of mammalian alimentary canal Paper ZHP-II: Laboratory course (Practical) 3. Human pedigree chart analysis	10
	2ND YEAR GEN		**Paper: ZGT-III** 3. Ultrastructure and function of plasma membrane, GERL system, ribosome and mitochondria. **Paper: ZGP II: Laboratory course (Practical)** 3. Determination of haemoglobin in human blood	10
	3RD YEAR HONS		***Paper: ZHT-X11*** **Unit 1: Molecular Biology** 4. Mutation and mutagens: molecular basis— frame shift mutation, tautomeric shifts (ability to cause mutations); chemical and physical mutagenic agents.	18

	3RD Year (Gen)		ZGT-V Unit-1 2. Chemical, biological, hormonal and pheromonal control mechanisms of pests. General idea about IPM	10
3				
Jan20-March20	2ND SEMESTER HONS		DC3 **Unit 7: Reptilia: (**i) General characteristics and classification up to living Orders. (Young 1981),	10
	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.	10
	2ND YEAR HONS		**Paper ZHT-IV** (e) Tissue structure and function: brain, skin, blood, lymph node, bone and muscles 2. Histochemistry (a) Histochemistry as a tool in morphological analysis: tissue sampling, fixation, staining and assessment **Paper ZHP-II: Laboratory course (Practical)** 5. Qualitative tests for proteins/carbohydrates/lipids; quantitative estimation of protein	10
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 5. Cell cycle: phases and regulation 6. Elements of heredity: Mandel's monohybrid and dihybrid crosses	10
	3RD YEAR HONS		**Unit 2: Biotechnology** 1. Recombinant DNA technology: role of restriction endonucleases in recombinant DNA formation and gene cloning; molecular vectors used in the rDNA technology and their importance	10
	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, i. **Study** of placoid, cycloid and ctenoid scales through permanent slides/photographs.	10
4				
April20-June20	2ND SEMESTER HONS		DC3: Unit 9: Mammals: (i) General characters and classification up to living Infra class (Young,1981), DC3P	10

			iv. Amphibia: Necturus, Bufo, Rana, Hyla, Alytes, Axoltl, Tylototriton, Ambystoma.	
	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.	10
	2ND YEAR HONS		**Paper ZHT-IV** (b) Histochemical staining for carbohydrates (PAS), protein (Millon's staining method), lipids (Sudan black-B method); histochemical study of mucosubstances. **Paper ZHP-II: Laboratory course (Practical)** 7. Microtomy; tissue fixation, cutting, stretching, affixation, staining, microscopic observation and identification (laboratory bred animal)	10
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 7. Linkage: definition, Complete and Incomplete linkage with examples 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome **Paper: ZGP II: Laboratory course (Practical)** 6. Biostatics: problems to be set based on the theoretical syllabus	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 **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	18
	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). 8. Crossing over and recombination (genetic and cytological proof)	9

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 19, TO SEPTEMBER 19	1ST SEMESTER HONS	**Md Nazir Hossain** 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.	18
	1STSEMESTER 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 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
	2ND YEAR HONS		**Paper ZHT-IV** Unit 1: Histology and Histochemistry 25 marks 1. Histology (a) Fixatives and fixation: principle, types and procedure (b) Dyes and stains used in histology (classification, composition and properties); principle of staining: double and triple staining methods of histological tissue sections; mordents and metachromatic dyes **Paper ZHP-II:** 1. Demonstration for determination of human blood pressure 2. Differential counts of WBC and total counts of WBC and RBC in human blood; estimation of haemoglobin in human blood; ABO blood grouping;	18
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 25 marks 1. Basic idea about common fixatives and dyes used in routine histological procedure **Paper: ZGP II: Laboratory course (Practical)** 1. Differential count of human WBCs	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.	18
	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	18
2				
Oct19-Dec19	1ST YEAR 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;	18
	1ST YEAR 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	18
	2ND YEAR HONS		Paper ZHT-IV Unit 1: Histology and Histochemistry (c) Histological and functional aspects of lung, liver, Kidney, pituitary, thyroid, adrenal, testis and ovary in mammals (d) Histological organization of different parts of mammalian alimentary canal Paper ZHP-II: Laboratory course (Practical) 3. Human pedigree chart analysis	18
	2ND YEAR GEN		**Paper: ZGT-III** 3. Ultrastructure and function of plasma membrane,	18

			GERL system, ribosome and mitochondria. 4. Chromosome structure and nucleosome concept **Paper: ZGP II: Laboratory course (Practical)** 3. Determination of haemoglobin in human blood	
	3RD YEAR HONS		***Paper: ZHT-X11*** **Unit 1: Molecular Biology** 4. Mutation and mutagens: molecular basis— frame shift mutation, tautomeric shifts (ability to cause mutations); chemical and physical mutagenic agents. 5. Protein synthesis: stages, components and their functions.	18
	3RD Year (Gen)		ZGT-V Unit-1 2. Chemical, biological, hormonal and pheromonal control mechanisms of pests. General idea about IPM	9
3				
Jan20-March20	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
	2ND YEAR HONS		**Paper ZHT-IV** (e) Tissue structure and function: brain, skin, blood, lymph node, bone and muscles 2. Histochemistry (a) Histochemistry as a tool in morphological analysis: tissue sampling, fixation, staining and assessment **Paper ZHP-II: Laboratory course (Practical)** 5. Qualitative tests for proteins/carbohydrates/lipids; quantitative estimation of protein	18
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 5. Cell cycle: phases and regulation 6. Elements of heredity: Mandel's monohybrid and dihybrid crosses **Paper: ZGP II: Laboratory course (Practical)** 5. Identification with reasons: histological slides of mammalian stomach, ilieum, thyroid, liver, pancreas, kidney, testis, ovary, spleen, lung; chick embryo slides.	18

	3RD YEAR HONS		**Unit 2: Biotechnology** 1. Recombinant DNA technology: role of restriction endonucleases in recombinant DNA formation and 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	18
	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, 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
4				
April20-June20	2ND SEMESTER HONS		DC3: Unit 9: Mammals: (i) General characters and classification up to living Infra class (Young,1981), 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.	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

	2ND YEAR HONS		**Paper ZHT-IV** (b) Histochemical staining for carbohydrates (PAS), protein (Millon's staining method), lipids (Sudan black-B method); histochemical study of mucosubstances. **Paper ZHP-II: Laboratory course (Practical)** 7. Microtomy; tissue fixation, cutting, stretching, affixation, staining, microscopic observation and identification (laboratory bred animal)	18
	2ND YEAR GEN		**Paper: ZGT-III** Unit 1: Histology, Cell Biology and Genetics 7. Linkage: definition, Complete and Incomplete linkage with examples 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome **Paper: ZGP II: Laboratory course (Practical)** 6. Biostatics: problems to be set based on the theoretical syllabus	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* **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	18
	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). 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome	18

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 19, TO SEPTEMBER 19	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
	1STSEMESTER 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
	2ND YEAR HONS		Paper ZHT-VI Unit 1: Animal Physiology 25 marks 1. Physiology of respiration: mechanism of breathing; transport of O2 and CO2 in mammals, Oxy-haemoglobin dissociation curves; Bohr's effect and Haldane effect, chloride shift 2. Cardiovascular system: erythropoiesis; haemoglobin— structure, function and disorders; electrocardiogram and echocardiography—	45

			concept and application; blood pressure: hypo- and hypertension; body fluid and edema	
	2ND YEAR GEN		Paper: ZGT-III 1. Spermatogenesis, oogenesis and their hormonal regulation 2. Fertilization in Sea-urchin 3. Cleavage: types and pattern, process of cleavage in frog and chick **Paper: ZGP II: Laboratory course (Practical)** 1. Differential count of human WBCs 2. Blood pressure measurement in humans	18
	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				
Oct19-Dec19	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.	18
	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	18

			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.	
	2ND YEAR HONS		Paper ZHT-VI Unit 1: Animal Physiology 3. Renal physiology: physiology of urine formation; glomerular filtration, tubular secretion, plasma clearance, and counter current mechanism 4. Neurophysiology: propagation of nerve impulse through nerve fibres; orthodromic and antidromic nerve impulse; pathophysiology of Alzheimer's disease and multiple sclerosis; sleep and sleep disorders; yoga and meditationPaper ZHP-II: Laboratory course (Practical) 1. Demonstration for determination of human blood pressure	45
	2ND YEAR GEN		Paper: ZGT-IIIUnit 2: Developmental Biology and Endocrinology 4. Gastrulation in frog and chick 5. Basic idea about the role of Organizer and induction mechanism during the process of embryonic development Paper: ZGP II: Laboratory course (Practical) 3. Determination of haemoglobin in human blood	18
	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				
Jan20-March20	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.	18

			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.	
	2ND YEAR HONS		Paper ZHT-VI Unit 1: Animal Physiology 5. Special sense: physiology of vision and hearing in mammals; pain— causes, components and types Paper ZHP-II: Laboratory course (Practical) 2. Differential counts of WBC and total counts of WBC and RBC in human blood; estimation of haemoglobin in human blood; ABO blood grouping; CT and BT determination (human subject: demonstration only)	45
	2ND YEAR GEN		Paper: ZGT-III Unit 2: Developmental Biology and Endocrinology 6. Extra-embryonic membranes in Chick 7. Placenta: types and functions 8. Major endocrine glands in mammals and their hormonal functions (pituitary, thyroid, pancreas, adrenal, testis and ovary) **Paper: ZGP II: Laboratory course (Practical)** 4. Determination of human blood group: ABO system including Rh factor	18
	3RD YEAR HONS		**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	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				
April20-June20	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
	2ND YEAR HONS		Paper ZHT-VI Unit 1: Animal Physiology 5. Special sense: physiology of vision and hearing in mammals; pain— causes, components and types 6. Physiology of muscle contraction Paper ZHP-II: Laboratory course (Practical)	45
	2ND YEAR GEN		**Paper: ZGT-III** Unit 2: Developmental Biology and Endocrinology 9. Classification of hormones and elementary idea about mechanism of hormone action 10. Insect endocrine gland (in brief)	18
	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

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 19, TO SEPTEMBER 19	1ST SEMESTER HONS HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	ATINDRIA SEN	**ZOOL DC2: Non-Chordates II (Coelomates)** Unit 1: Unit 3: Arthropoda: General characteristics and classification up to classes; Respiration in Arthropoda (gills in prawn and trachea in cockroach), Metamorphosis in Lepidopteran insects, Vision in insects. 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. Unit 6: Echinodermata: General characteristics and classification up to classes; Water-vascular system in Asteroidea; Larval forms in Echinodermata; Affinities with Chordates. Unit 7: Hemichordata: General characteristics of phylum Hemichordata; Relationship with non-chordates and chordates. • **Practical (Full marks = 15) [ZOOL-H-DC2-P]** 1. Study of following specimens: a. Arthropods - Limulus, Palamnaeus, Palaemon, Daphnia, Balanus, lepas, Sacculina, Carcinus, Eupagurus, Buthus, Scolopendra, Julus, Bombyx, Periplaneta, termites and honey bees,,Peripatus. b. Onychophora c. Molluscs - Chiton, Dentalium, Pila, Doris, Helix, Unio, Mytilus, Ostrea, Pinctada, Sepia, Octopus, Nautilus, Loligo. d. Echinodermates - Pentaceros/Asterias, Ophiura, Clypeaster, Echinus, Cucumaria and Antedon.	18
	1STSEMESTER 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)**	18

			Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and respiration in Pila. **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. **Practical (=15 marks) [(A1)-ZOOL-G-DC 1-P]:** •Identification**:** f. Molluscs : Chiton, Doris, Unio, Sepia, Octopus, Nautilus, Loligo. Mytilus. g. Echinodermate: Pentaceros/Asterias, Ophiura, Echinus, Cucumaria and Antedon. • Ecology: i. Study of an aquatic ecosystem: determination of pH, and Dissolved Oxygen content (Winkler's method) and CO2 in water. ii. Report on a one-day visit to Sanctuary/Zoo/Sericulture station/Fishery/apiculture station/pond ecosystem/agro-ecosystem.	
	2^{ND} YEAR HONS		**Paper ZHT-V** **Unit 2: Genetics** 25 marks 1. Basic principles of heredity: Mendel's law segregation and concept of dominance; Mendel's dihybrid crosses and law of independent assortment. 2. Criteria of genetic materials: DNA as the genetic material (experiments of Griffith; Hershey and Chase experiment, and experimental protocol of Avery, MacLeod and McCarty) 3. Sex determination and dosage compensation in Drosophila and man. 4. Linkage and crossing over; sex linked inheritance in man and Drosophilamelanogaster; sex limited characters and cytoplasmic inheritance. 5. Chromosomal aberrations: structural variations in chromosomes (deletion, duplication, inversion and translocation); variation in chromosome number (aneuploidy, euploidy and polyploidy)	45

			6. Chromosomal basis of genetic disorder and diseases: Down, Turner's and Klinefelter syndromes. **Paper ZHP-II:** Laboratory course (Practical) 50 marks 1. Human pedigree chart analysis.	
	2ND YEAR GEN		**Paper: ZGT-III** **Unit 1: Histology, Cell Biology and Genetics** 6. Elements of heredity: Mandel's monohybrid and dihybrid crosses 7. Linkage: definition, Complete and Incomplete linkage with examples 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome 10. Sex determination in Drosophila and Man 11. Inheritance of sex linked and autosomal genes in man-haemophilia and Thalassemia **Paper: ZGP II: Laboratory course (Practical)** 1. Determination of haemoglobin in human blood.	18
	3RD YEAR HONS		**Paper ZHT-VII** **Unit 2: Adaptation and Evolution. 25 marks** 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 (c) Origin of life: DNA world and RNA world; theory of evolution— Lamarckism, Darwinism; modern	45

			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: ZHT-IX Unit 1: Ecology 25 marks 1. Ecosystem,ecology and energetics: energy flow and energetic of ecosystem; energy transformations and energy transfer; Law of thermodynamics 2. Biogeochemical cycles: gaseous cycle- carbon and nitrogen cycles; sedimentary cycle 3. Population ecology: properties of population-density, natality,mortality, age distribution, biotic potential, environmental resistance and carrying capacity, population growth forms, J and S shaped curves, migration, emigration and immigration 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 ZHP-IV:Laboratory course(Practical) 50 marks** 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). 2. Determination of dissolved oxygen and carbon dioxide in water.	
	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.	9

			3. Interspecific associations-symbiosis, commensalism, mutualism and parasitism. **Paper: ZGP III: Laboratory course (Practical)** 1. Study of human blood film: identification of leucocytes	
2				
Oct19-Dec19	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.	18
	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
	2ND YEAR HONS		Paper ZHT-VI Unit 1: Animal Physiology 3. Renal physiology: physiology of urine formation; glomerular filtration, tubular secretion, plasma clearance, and counter current mechanism 4. Neurophysiology: propagation of nerve impulse through nerve fibres; orthodromic and antidromic nerve impulse; pathophysiology of Alzheimer's disease and multiple sclerosis; sleep and sleep disorders; yoga and meditationPaper ZHP-II: Laboratory course (Practical) 1. Demonstration for determination of human blood pressure	45
	2ND YEAR GEN		Paper: ZGT-IIIUnit 2: Developmental Biology and Endocrinology 4. Gastrulation in frog and chick 5. Basic idea about the role of Organizer and induction mechanism during the process of embryonic development Paper: ZGP II: Laboratory course (Practical) 3. Determination of haemoglobin in human blood	18
	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	45

			patterns of cleavage; parthenogenesis: types and significance **Paper ZHP-IV:Laboratory course(Practical)** 7. Identification: prepared slides of embryological tissue sections(chick embryo)	
	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				
Jan20-March20	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
	2ND YEAR HONS		**Paper ZHT-V** **Unit 2: Genetics 25 marks** 1. Basic principles of heredity: Mendel's law segregation and concept of dominance; Mendel's dihybrid crosses and law of independent assortment. 2. Criteria of genetic materials: DNA as the genetic material (experiments of Griffith; Hershey and Chase experiment, and experimental protocol of Avery, MacLeod and McCarty) 3. Sex determination and dosage compensation in Drosophila and man. 4. Linkage and crossing over; sex linked inheritance in man and Drosophilamelanogaster; sex limited characters and cytoplasmic inheritance 5. Chromosomal aberrations: structural variations in chromosomes (deletion, duplication, inversion and translocation); variation in chromosome number	45

			(aneuploidy, euploidy and polyploidy) 6. Chromosomal basis of genetic disorder and diseases: Down, Turner's and Klinefelter syndromes **Paper ZHP-II: Laboratory course (Practical) 50 marks** 3. Human pedigree chart analysis	
	2ND YEAR GEN		Paper: ZGT-III Unit 1: Histology, Cell Biology and Genetics 6. Elements of heredity: Mandel's monohybrid and dihybrid crosses 7. Linkage: definition, Complete and Incomplete linkage with examples 8. Crossing over and recombination (genetic and cytological proof) 9. Mutation: Chromosomal changes (structuraland numerical) , point mutation, Down's syndrome, Klinefelter syndrome 10. Sex determination in Drosophila and Man 11. Inheritance of sex linked and autosomal genes in man-haemophilia and Thalassemia **Paper: ZGP II: Laboratory course (Practical)** 4. Determination of human blood group: ABO system including Rh factor	18
	3RD YEAR HONS		**Paper: Paper ZHT-VII** 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 (f) Biological clocks/rhythm: photoperiod and circadian rhythm, fish and bird migration Unit 2: Adaptation and Evolution **Paper: ZGP III: Laboratory course (Practical)**	45

			2. Study of fecal smear/gut content smear of cockroach for parasites	
	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				
April20-June20	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

	2ND YEAR HONS		**Paper ZHT-V** **Unit 2: Genetics** 25 marks 1. Basic principles of heredity: Mendel's law segregation and concept of dominance; Mendel's dihybrid crosses and law of independent assortment. 2. Criteria of genetic materials: DNA as the genetic material (experiments of Griffith; Hershey and Chase experiment, and experimental protocol of Avery, MacLeod and McCarty) 3. Sex determination and dosage compensation in Drosophila and man. 4. Linkage and crossing over; sex linked inheritance in man and Drosophilamelanogaster; sex limited characters and cytoplasmic inheritance 5. Chromosomal aberrations: structural variations in chromosomes (deletion, duplication, inversion and translocation); variation in chromosome number (aneuploidy, euploidy and polyploidy) 6. Chromosomal basis of genetic disorder and diseases: Down, Turner's and Klinefelter syndromes **Paper ZHP-II: Laboratory course (Practical)** 3. Human pedigree chart analysis	45
	2ND YEAR GEN		**Paper: ZGT-IV** Unit 1: Molecular Biology and Biotechnology 7. Enzymes used in genetic engineering; concepts of plasmids and cosmids 8. Basic idea about Cell and embryo cloning and their applications 9. Principles of DNA fingerprinting and its use 10. Scope of Genetic engineering for human welfare **Paper: ZGP II: Laboratory course (Practical)** **4.** Determination of human blood group: ABO system including Rh factor	18
	3RD Year (Hons)		Paper: Paper ZHT-VII 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	45

			(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 Paper: Paper ZHT-VII 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 (f) Biological clocks/rhythm: photoperiod and circadian rhythm, fish and bird migration Unit 2: Adaptation and Evolution Paper: ZGP III: Laboratory course (Practical) 2. Study of fecal smear/gut content smear of cockroach for parasites	
	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