ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 22, TO SEPTEMBER 22	1 ST SEMESTER (HONS.)	Dr Soumik Agarwal HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	COOL DC1:Non-Chordates I (Protists to Pseudocoelomates) 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	18
	1 ST 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	18
	3 RD SEMESTER (HONS.)		hepatica, parasitic adaptation of Fasciola sp. 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. 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	45

	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.	
3 RD SEMESTER	(A3)DC7 Physiology and Biochemistry	18
(Gen)	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	
5/6	impulse (myelinated and non-myelinated nerve fibre);	
	structure of skeletal muscle, Mechanism of muscle	
	contraction, Neuromuscular junction, Synaptic	
-8	transmission.	
10000000	Practical Group A: Experimentation Physiology	
1.90 (6.00)	i. Preparation of temporary mounts: Blood film.	
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	ii. Preparation of hemin and hemochromogen crystals	
	iii. Estimation of haemoglobin using Sahli's	
	haemoglobinometer.	
5 th SEMESTER	ZOOL DC11: Histology and Endocrinology	45
(Hons)	Unit1: Muscular system-Histology of different types	
11/20/10/10	of muscle, Ultra structure of skeletal muscle.	
7,270,4767	Unit:2: Histo-architechture of liver and its function.	
14.73	Unit 3: Introduction to Endocrinology- General idea of	
	endocrine systems, classification, characteristic and	
	transport of hormones, neurosecretions and	
	neurohormones.	
	Unit 4: Epiphysis, Hypothalamo-hypophysial Axis-(i)	
	Structure of pineal gland, secretions and their	
	functions in biological rhythms and reproduction, (ii)	
- 12	Structure and functions of hypothalamus and	
. 20,01	hypothalamic nuclei, regulation of neuro-endocrine	
	glands, feedback mechanisms, (iii) Structure of	
	pituitary gland, hormones and their functions,	
1000	hypothalamo-hypophysial portal system, disorders of	
and the second s	pituitary gland.	
to all the periods in the con-	Practical (Full marks = 15)	
(A)	1. Study of animal house: set up and maintenance of	
THE SMACH CRASS	basic animal house, breeding techniques, care taken	
	for normal and experimental animals.	
The second second second	2. Examination of vaginal smear rats from live	
	animals (Subject to UGC guideline).	
	3. Tissue fixation, embedding in paraffin, microtomy	
The second secon	and slide preparation of any endocrine gland (Subject	
	to UGC guideline).	
	4. Examination of sections of mammalian skin,	
	Cartilage, Bone, Spinal cord, Nerve cell, Pituitary,	
	Pancreas, Testis, Ovary, Adrenal, Thyroid and	
	Parathyroid (Subject to UGC guideline).	
	5. 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, Uterus (Subject to UGC guideline).	
-TH		
5 TH SEMESTER	DSE1A:CellBiologyandAnimal Biotechnology(=50	9
5 TH SEMESTER (Gen)	marks), Group A: Cell Biology (=12.5 marks)	9
		9

		model) and function of plasma membrane. Practical (=15 marks) i. Genomic DNA isolation from E.coli. ii. Plasmid DNA isolation (pUC 18/19) from E.coli	
Oct22- Dec22	1 ST 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	18
	1 ST 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-	18
	3 RD SEMESTER (HONS.)	chordates and chordates. 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).	45

		Test for colour blindness in human from provided	
		diagrams/ charts.	
	3 RD SEMESTER	(A3)DC7 Physiology and Biochemistry	18
	(Gen)	Unit 3: Respiratory Physiology: Ventilation, external	
		and internal respiration, transport of oxygen and	
		carbon dioxide in blood.	
		Unit 4: Renal Physiology: Functional anatomy of	
	5 TH SEMESTER	kidney, Mechanism of urine formation.	
	(Hons)	ZOOL DC11: Histology and Endocrinology	45
	(2200)	Unit 4: Epiphysis, Hypothalamo-hypophysial Axis-(i) Structure of pineal gland, secretions and their	
		functions in biological rhythms and reproduction, (ii)	
	100	Structure and functions of hypothalamus and	
	365	hypothalamic nuclei, regulation of neuro-endocrine	
		glands, feedback mechanisms, (iii) Structure of	
	The second second	pituitary gland, hormones and their functions,	
	1000	hypothalamo-hypophysial portal system, disorders of	
	170060	pituitary gland. Unit 5: Peripheral Endocrine Glands-	
	0.755000	(i) Structure, hormones, functions and regulation of	
		thyroid gland, parathyroid, adrenal, pancreas, ovary	
		and testis, (ii) Hormones in homeostasis, disorders of	
		endocrine glands Practical (=15 marks)	
	Carlo Unit	4. Examination of sections of mammalian skin,	
	14	Cartilage, Bone, Spinal cord, Nerve cell, Pituitary,	
	1.154.10	Pancreas, Testis, Ovary, Adrenal, Thyroid and	
	10.77	Parathyroid (Subject to UGC guideline). 5.	
		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, Uterus (Subject to UGC guideline). 6. Double	
		staining of prepared histological slides (Subject to	
	STH OF COTED	UGC guideline)	
	5 TH SEMESTER (Gen)	DSE1A:CellBiologyandAnimal Biotechnology(=50	9
	(Gen)	marks), Group A: Cell Biology (=12.5 marks)	
		Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell	
	and the second second second	organelles- Structure and function of Mitochondria,	
	Sec. 112.00	Nucleus, Golgi complex, ER, Ribosomes.	
	CD THE PART -	Practical (=15 marks)	
	30 m 11 m 2 m 2	iv. To study following techniques through	
		photographs: (i) Southern Blotting,(ii) Northern	
		Blotting, (iii) Western Blotting, (iv) DNA Sequencing	
		(Sanger's Method) Page 14 of 23 PCR, (v) DNA	
		fingerprinting. v. Seminar on tools and techniques of	
		Biotechnology. vi. Study/ Identification of different	
		stages of mitosis and meiosis.	
3			
Jan23-	2 nd SEMESTER	DC3	18
March23	(HONS.)	Unit 7: Reptilia: (i) General characteristics and	
	776	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) <i>Archaeopteryx</i> -a	
		connecting link.	
	<u> </u>	connecting mix.	<u> </u>

2 nd SEMESTER	DC4	4.0
(Gen)	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
4 th SEMESTER (HONS.)	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
4 th 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
6 TH SEMESTER (Hons)	ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks) Unit 1: Introduction to parasitology- Brief introduction of Parasitism, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship. Unit 2: Parasitic Protists: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani. Group A: Laboratory Experimentation 1. Study of life stages of Giardia intestinalis, Trypanosoma gambiense and Leishmania donovani through permanent slides/micro photographs. 2. Study of adult and life stages of Schistosoma haematobium and Taenia saginata through permanent slides/micro photographs. 3. Study of adult and life stages of Ancylostoma duodenale, Brugia malayi and Trichinella spiralis through permanent slides/micro photographs. 4. Study of Pediculus humanus, Xenopsylla cheopis and Cimex lectularius ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 1. Basic idea on variables, frequency distribution and sampling. 2. Measures of central tendency: mean, median, mode. 3. Measures of distributions: variance, standard deviation and standard error— problems and application	45

		Practical (=15 marks) 1. Frequency distribution, bar diagram, histogram, Pie	
		diagram, Cumulative frequency curve, Principal Component analysis, Correlation matrix	
	6 TH SEMESTER (Gen)	DSE 4A: Aquatic Biology(=50 marks) Unit 1: Aquatic Biomes- Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), estuaries, intertidal zones, and coral reefs. Unit 2: Freshwater Biology- (i) Lakes: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico—chemical Characteristics: Light, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity; dissolved gases (Oxygen, Carbon dioxide). (ii) Streams: Different stages of stream development, Physico-chemical environment, Practical (=15 marks) i. Determine the area of a lake using graphimetric and gravimetric method. ii. Identify the important macrophytes, phytoplanktons and zooplanktons present in a lake ecosystem.	9
4 April23-	2 nd SEMESTER (HONS.)	DC3: Unit 9: Mammals: (i) General characters and	18
June23	71178	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.	
	2 nd SEMESTER	DC4	18
13	(Gen)	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: <i>Bufo, Rana, Columba, Cavia</i> and Dog.	Ŋ
	4 th 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, primary and secondary types-definition and application.	45
	4 th SEMESTER (Gen)	DC10 Grp-B Unit 3: Sources of variations - Types of variations and their role in evolution	18

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	Unit 4: Population genetics - Hardy-Weinberg law,	
	Natural selection; Genetic drift mechanism (Founder's	
	effect, Bottleneck phenomenon);	
6 TH SEMESTER (Hons)	ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 4. Test of significance: t-test, ANOVA, Chi-square test. 5. Correlation and regression analysis. 6. Probability distribution and significance. Practical (=15 marks) 2. Chi-square test, t-test, ANOVA, Correlation analysis from data provided. ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks) Unit 3: Parasitic Platyhelminthes: Study of Morphology, Life Cycle, Prevalence, Epidemiology,	45
	Pathogenicity, Diagnosis, Prophylaxis and Treatment of Schistosoma haematobium, Taenia saginata. Unit 4: Parasitic Nematodes: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Ancylostoma duodenale, and Trichinella spiralis, Brugia malayi, Meloidogyne incognita, Heterodera rostochiensis-Life-Cycle, symptoms and control. Practical (=15 marks) Unit 5: Parasitic Arthropods: Biology, importance and control of Ticks, Mites, Lice, Flea and Bug Practical (=15 marks) 5. Study of nematode/cestode parasites from the intestines of Poultry bird (Intestine can be procured from poultry/market as a by-product). 6. Submission of a brief report on parasitic vertebrates. 7. Study of rectal parasites of Periplaneta sp. / Bufo sp. 8. Demonstration of lymphoid organs. 9. Histological study of spleen, thymus and lymph nodes through slides/ photographs 10. Preparation of stained blood film to study various types of blood cells. 11. Antigen antibody reaction by immune-diffusion. 12. Demonstration of human blood group	
6 TH SEMESTER (Gen)	DSE 4A: Aquatic Biology (=50 marks) Unit 3: Marine Biology- Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Unit 4: Management of Aquatic Resources- Causes of pollution: Agricultural,	9
	Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment Water quality assessment- BOD and COD. Practical (=15 marks)	n
	iv. Observation on the Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their significance. v. A Project Report on a visit to a Sewage treatment plant/Marine bio-reserve/ Fisheries Institutes/ any aquatic habitat/ aquaculture farm.	7

ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 22, TO SEPTEMBER 22	1 ST SEMESTER (HONS.)	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.	10
	1 ST 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 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.	10
18	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, Group B: Principles of Genetics Unit 2: Linkage, Crossing Over and Chromosomal Mapping-Linkage, somatic crossing over, cytological basis of crossing over, explorator processing over prolocular mechanism of grossing over.	10
	3RD SEMESTER (Gen)		over, molecular mechanism of crossing over. (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	10

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		skeletal muscle, Mechanism of muscle	
		contraction, Neuromuscular junction,	
		Synaptic transmission. Practical Group A: Experimentation	
		Physiology	
	5 th SEMESTER	ZOOL DC11: Histology and	10
	(Hons)	Endocrinology	
		Unit1: Muscular system-Histology of	
		different types of muscle, Ultra structure of	
		skeletal muscle. Unit:2: Histo-architechture of liver and its	
		function. Unit 3: Introduction to	
		Endocrinology- General idea of endocrine	
		systems, classification, characteristic and	
		transport of hormones, neurosecretions and	
		neurohormones.	
		Practical (Full marks = 15)	
	C 100	Study of animal house: set up and maintenance of basic animal house, breeding	
	100	techniques, care taken for normal and	
	- 18 may 1877	experimental animals.	
		1000	
	TH	The Control of the Co	
	5 TH SEMESTER	DSE1A:CellBiologyandAnimal	10
	(Gen)	Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks)	
	` /	Unit 1: Cell types- Prokaryotic and	
		eukaryotic cell	
		Unit 2: Plasma membrane- Structure (Fluid	
	1.75 (1.81)	mosaic model) and function of plasma	
		membrane.	
		1. Study of animal house: set up and	
		maintenance of basic animal house, breeding techniques, care taken for normal and	
		experimental animals.	
	1000	2. Examination of vaginal smear rats from	
	1.760-1	live animals (Subject to UGC guideline).	
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Oct22-	1 ST SEMESTER	ZOOL DC2: Non-Chordates II (Coelomates)	10
Dec22	(HONS.)	Unit 4: Onychophora: General characteristics	
	1 ST SEMESTER	and evolutionary significance.	10
1.0	(Gen)	Discipline Core (DC): Zoology for General Studies	10
		(A1)DC 1: Animal Diversity and Ecology	
		Theory[(A1)-ZOOL-G-DC 1-T]:	. 1704
11.19		Unit 7: Aschelminthes - General	41.11
		characteristics and classification up to	
40.00		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 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.	
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SEMESTER (HONS.) SEMESTER (Gen) SEMESTER (Gen) SEMESTER (Gen) SEMESTER (Hons.) SEMESTER (Hons.)		,		
SEMESTER (Gen) 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. ZOOL DCI1: Histology and Endocrinology Unit 4: Epiphysis, Hypothalamon-hypophysial Axis-(i) Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, (ii) Structure and functions of hypothalamic anatomy of kidney feedback mechanisms, (iii) Structure and functions of hypothalamic and hypothalamic nuclei, regulation of neuro-endocrine glands, feedback mechanisms, (iii) Structure of pituitary gland, hormones and their functions, hypothalamon-hypophysial portal system, disorders of pituitary gland. Practical (=15 marks) 4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. Examination of histological sections from photomicrographs' permanent slides of rat/human: testis, epiddymis and accessory glands of male reproductive systems; Sections of ovary, Fallopian tube, SEMESTER (Gen) SEMESTER (Gen) DSELA:CellBiologyandAnimal Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks) Unit 2: Plasma membrane-Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell organelles-Structure and function of Mitochondria, Nucleus, Golgi complex, ER, Ribosomes. Practical (=15 marks) iv. To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Northern Blotting, (iii) Northern Blotting, (iv) DNA Sequencing (Sanger's Method) Page 14 of 22 PCR, (v) DNA fingerprinting, v. Seminar on tools and techniques of Biotechnology. vi. Study! Identification of different stages of mitosis and meiosis.		SEMESTER (HONS.)	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 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)	
Endocrinology Unit 4: Epiphysis, Hypothalamo- hypophysial Axis-(i) Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, (ii) Structure and functions of hypothalamus and hypothalamic nuclei, regulation of neuro- endocrine glands, feedback mechanisms, (iii) Structure of pituitary gland, hormones and their functions, hypothalamo-hypophysial portal system, disorders of pituitary gland, Practical (=15 marks) 4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. Examination of histological sections photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems; Sections of ovary, Fallopian tube, Settions of ovary, Fallopian tube, Settions of ovary, Fallopian tube, Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell organelles- Structure and function of Mitochondria, Nucleus, Golgi complex, ER, Ribosomes. Practical (=15 marks) iv. To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Western Blotting, (iv) DNA Seaguencing (Sanger's Method) Page 14 of 23 PCR, (v) DNA fingerprinting. v. Seminar on tools and techniques of Biotechnology. vi. Study/ Identification of different stages of mitosis and meiosis.		(Gen)	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.	
SEMESTER (Gen) Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks) Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell organelles- Structure and function of Mitochondria, Nucleus, Golgi complex, ER, Ribosomes. Practical (=15 marks) iv. To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Western Blotting, (iv) DNA Sequencing (Sanger's Method) Page 14 of 23 PCR, (v) DNA fingerprinting. v. Seminar on tools and techniques of Biotechnology. vi. Study/ Identification of different stages of mitosis and meiosis.		SEMESTER	Endocrinology Unit 4: Epiphysis, Hypothalamo- hypophysial Axis-(i) Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, (ii) Structure and functions of hypothalamus and hypothalamic nuclei, regulation of neuro- endocrine glands, feedback mechanisms, (iii) Structure of pituitary gland, hormones and their functions, hypothalamo-hypophysial portal system, disorders of pituitary gland. Practical (=15 marks) 4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. Examination of histological sections from photomicrographs/ permanent slides of rat/human: testis, epididymis and accessory glands of male reproductive systems;	10
3	L	SEMESTER	DSE1A:CellBiologyandAnimal Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks) Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell organelles- Structure and function of Mitochondria, Nucleus, Golgi complex, ER, Ribosomes. Practical (=15 marks) iv. To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Western Blotting, (iv) DNA Sequencing (Sanger's Method) Page 14 of 23 PCR, (v) DNA fingerprinting. v. Seminar on tools and techniques of Biotechnology. vi. Study/ Identification of	10
	3			

Jan23-	2 nd	DC3	10
March23	SEMESTER (HONS.)	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) <i>Archaeopteryx</i> -a connecting link.	
	2 nd SEMESTER (Gen)	Unit 4: Circulatory System- General plan of circulation, comparative account of heart and aortic arches.	10
		Unit 5: Urinogenital System- Succession of kidney, Evolution of urinogenital ducts. DC4P i. Study of placoid, cycloid and ctenoid	
	- 1	scales through permanent slides/photographs. ii. Study of disarticulated skeleton of toad,	
	4 th SEMESTER	pigeon, fowl, guineapig and rabbit. iii. Demonstration of carapace and plastron of turtle.	
	(HONS.)	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	10
		cardiac output; blood pressure and its regulation Unit 8: Thermoregulation & Osmoregulation - Physiological	
	1/40	classification based on thermal biology; Unit 9: Renal Physiology - Histology of kidney and nephrons, mechanism of urine formation, glomerular filtration, tubular secretion, plasma clearance and counter	
		current mechanism	
1	4 th SEMESTER (Gen)	DC10 Grp-B Unit 1: Life's Beginnings- Origin of life, Chemogeny Unit 2: Theory and concept of evolution -	10
[]	CTH.	Historical review of evolutionary concepts, Lamarkism, Darwinism and Neo- Darwinism, Geological time scale, evolution of Horse.	Ŋ
	6 TH SEMESTER (Hons)	ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks) Unit 1: Introduction to parasitology- Brief	10
		introduction of Parasitism, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship.	
		Unit 2: Parasitic Protists: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis,	
		Prophylaxis and Treatment of Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani. Group A: Laboratory Experimentation	
		Study of life stages of Giardia intestinalis, Trypanosoma gambiense and Leishmania	

		donovani through permanent slides/micro photographs. 2. Study of adult and life stages of Schistosoma haematobium and Taenia saginata through permanent slides/micro photographs. ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 1. Basic idea on variables, frequency distribution and sampling. 2. Measures of central tendency: mean, median, mode. 3. Measures of distributions: variance, standard deviation and standard error—problems and application	
	6 TH SEMESTER (Gen)	DSE 4A: Aquatic Biology(=50 marks) Unit 1: Aquatic Biomes- Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), estuaries, intertidal zones, and coral reefs. Unit 2: Freshwater Biology- (i) Lakes: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physicochemical Characteristics: Light, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates,	10
April23- June23	2 nd 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.	10
14	SEMESTER (Gen)	DC4 Unit 6: Nervous System- Comparative account of brain, cranial nerves in mammals. Unit 7: Skeletal System- Evolution of visceral arches.	10
Ľ	4 th SEMESTER (HONS.)	DC10 Grp-A Unit 1: Definition of taxonomy, micro- and macro taxonomy, systematic, Linnean hierarchy, cladistics, hierarchy, taxonomic types	10
	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);	10
	SEMESTER (Hons)	ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 4. Test of significance: t-test, ANOVA, Chisquare test. 5. Correlation and regression analysis. 6. Probability distribution and significance. Practical (=15 marks)	10

	2. Chi-square test, t-test, ANOVA, Correlation analysis from data provided. ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks) Unit 3: Parasitic Platyhelminthes: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Schistosoma haematobium, Taenia saginata. Practical (=15 marks) Unit 5: Parasitic Arthropods: Biology, importance and control of Ticks, Mites, Lice, Flea and Bug	
6 TH SEMESTER (Gen)	DSE 4A: Aquatic Biology(=50 marks) Unit 3: Marine Biology- Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Unit 4: Management of Aquatic Resources- Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment Water quality assessment- BOD and COD.	10



ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 22, TO SEPTEMBER 22	1 ST SEMESTER (HONS.)	HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	ZOOL DC1:Non-Chordates I (Protists to Pseudocoelomates) 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 7: Nemathelminthes: General characteristics and classification up to classes; Life cycle, pathogenicity, parasitic adaptations and control measures of Ascaris lumbricoides and Wuchereria bancrofti	18
	1 ST 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.	18
	3 RD 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). 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
	3 RD SEMESTER		(A3)DC7 Physiology and Biochemistry	18

	(Gen)	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. iii. Estimation of haemoglobin using Sahli's haemoglobinometer.	
	5 th SEMESTER (Hons)	ZOOL DC11: Histology and Endocrinology Unit1: Muscular system-Histology of different types of muscle, Ultra structure of skeletal muscle. Unit:2: Histo-architechture of liver and its function. Unit 3: Introduction to Endocrinology- General idea of endocrine systems, classification, characteristic and transport of hormones, neurosecretions and neurohormones. Practical (Full marks = 15) 1. Study of animal house: set up and maintenance of basic animal house, breeding techniques, care taken for normal and experimental animals. 2. Examination of vaginal smear rats from live animals (Subject to UGC guideline). 3. Tissue fixation, embedding in paraffin, microtomy and slide preparation of any endocrine gland (Subject to UGC guideline).	18
	5 TH SEMESTER (Gen)	DSE1A:CellBiologyandAnimal Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks) Unit 1: Cell types- Prokaryotic and eukaryotic cell Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. 1. Study of animal house: set up and maintenance of basic animal house, breeding techniques, care taken for normal and experimental animals. 2. Examination of vaginal smear rats from live animals (Subject to UGC guideline). 3. Tissue fixation, embedding in paraffin, microtomy and slide preparation of any endocrine gland (Subject to UGC guideline). Practical (=15 marks) i. Genomic DNA isolation from E.coli. ii. Plasmid DNA isolation (pUC 18/19) from E.coli	18
2	1ST GENEGTED	TOOL DOO N. C. L. W.C. L. XV.	
Oct22- Dec22	1 ST 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
	1 ST SEMESTER (Gen)	Discipline Core (DC): Zoology for General Studies (A1)DC 1: Animal Diversity and Ecology	18

			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.	
	3 RD 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)	45
4	3 RD SEMESTER (Gen) 5 TH SEMESTER	Ø.	(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
	(Hons)		Unit 4: Epiphysis, Hypothalamo-hypophysial Axis-(i) Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, (ii) Structure and functions of hypothalamus and hypothalamic nuclei, regulation of neuro-endocrine glands, feedback mechanisms, (iii) Structure of pituitary gland, hormones and their functions, hypothalamo-hypophysial portal system, disorders of pituitary gland. Practical (=15 marks) 4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. Examination of histological sections from photomicrographs/ permanent slides of rat/human:	45

		testis, epididymis and accessory glands of male reproductive systems; Sections of ovary, Fallopian tube,	
	5 TH SEMESTER (Gen)	DSE1A:CellBiologyandAnimal Biotechnology(=50 marks), Group A: Cell Biology (=12.5 marks) Unit 2: Plasma membrane- Structure (Fluid mosaic model) and function of plasma membrane. Unit3: Cell organelles- Structure and function of Mitochondria, Nucleus, Golgi complex, ER, Ribosomes. Practical (=15 marks) iv. To study following techniques through photographs: (i) Southern Blotting, (ii) Northern Blotting, (iii) Western Blotting, (iv) DNA Sequencing (Sanger's Method) Page 14 of 23 PCR, (v) DNA fingerprinting. v. Seminar on tools and techniques of Biotechnology. vi. Study/ Identification of different stages of mitosis and meiosis.	18
3	(Brack)		
Jan23- March23	2 nd SEMESTER (HONS.)	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
	2 nd SEMESTER (Gen)	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
j	4 th SEMESTER (HONS.) 4 th SEMESTER	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; Unit 9: Renal Physiology - Histology of kidney and nephrons, mechanism of urine formation, glomerular filtration, tubular secretion, plasma clearance and counter current mechanism DC10 Grp-B	18
	(Gen)	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
	6 TH SEMESTER (Hons)	ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks)	18

	6 TH SEMESTER (Gen)	Unit 1: Introduction to parasitology- Brief introduction of Parasitism, Parasite, Parasitoid and Vectors (mechanical and biological vector) Host parasite relationship. Unit 2: Parasitic Protists: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Giardia intestinalis, Trypanosoma gambiense, Leishmania donovani. Group A: Laboratory Experimentation 1. Study of life stages of Giardia intestinalis, Trypanosoma gambiense and Leishmania donovani through permanent slides/micro photographs. 2. Study of adult and life stages of Schistosoma haematobium and Taenia saginata through permanent slides/micro photographs. ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 1. Basic idea on variables, frequency distribution and sampling. 2. Measures of central tendency: mean, median, mode. 3. Measures of distributions: variance, standard deviation and standard error—problems and application Practical (=15 marks) 1. Frequency distribution, bar diagram, histogram, Pie diagram, Cumulative frequency curve, Principal Component analysis, Correlation matrix DSE 4A: Aquatic Biology(=50 marks) Unit 1: Aquatic Biomes- Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), estuaries, intertidal zones, and coral reefs. Unit 2: Freshwater Biology-(i) Lakes: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico-chemical Characteristics: Light, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Practical (=15 marks) i. Determine the area of a lake using graphimetric and gravimetric method. ii. Identify the important	18
	and the second	macrophytes, phytoplanktons and zooplanktons present in a lake ecosystem.	
4	7-01115	ALCOHOLD BY LONG AND A STREET	
April23- June23	2 nd 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

and are marre		
2 nd 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
4 th 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, primary and secondary types-definition and application.	18
4 th 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
6 TH SEMESTER (Hons)	ZOOL DSE: 2 Biostatistics (OR) Bioinformatics 4. Test of significance: t-test, ANOVA, Chi-square test. 5. Correlation and regression analysis. 6. Probability distribution and significance. Practical (=15 marks) 2. Chi-square test, t-test, ANOVA, Correlation analysis from data provided. ZOOL DC13: Parasitology and Immunology, Group A: Parasitology (=12.5 marks) Unit 3: Parasitic Platyhelminthes: Study of Morphology, Life Cycle, Prevalence, Epidemiology, Pathogenicity, Diagnosis, Prophylaxis and Treatment of Schistosoma haematobium, Taenia saginata. Practical (=15 marks) Unit 5: Parasitic Arthropods: Biology, importance and control of Ticks, Mites, Lice, Flea and Bug Practical (=15 marks) 5. Study of nematode/cestode parasites from the intestines of Poultry bird (Intestine can be procured from poultry/market as a by-product). 6. Submission of a brief report on parasitic vertebrates. 7. Study of rectal parasites of Periplaneta sp. / Bufo sp. 8. Demonstration of lymphoid organs. 9. Histological study of spleen, thymus and lymph nodes through slides/ photographs 10. Preparation of stained blood film to study various types of blood cells.	18
6 TH SEMESTER (Gen)	DSE 4A: Aquatic Biology(=50 marks) Unit 3: Marine Biology- Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Unit 4: Management of Aquatic Resources- Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment Water quality assessment-BOD and COD. Practical (=15 marks) iv. Observation on the Instruments used in limnology (Secchi disc, Van Dorn Bottle, Conductivity meter, Turbidity meter, PONAR grab sampler) and their	18

significance. v. A Project Report on a visit to a
Sewage treatment plant/Marine bio-reserve/ Fisheries
Institutes/ any aquatic habitat/ aquaculture farm.



ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 22, TO SEPTEMBER 22	1 ST 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
	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 subphylum 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. Unit 3: Late Embryonic Development-Fate of germ layers; extra-embryonic membranes in chick, placenta (structure, types and functions of placenta)	45

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	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	
3 RD	(A3)DC7 Physiology and Biochemistry	18
SEMESTER	Group A: Physiology (= 12.5 marks)	
(Gen)	Unit 1: Digestion and Absorption of Food-	
	Digestion and absorption of carbohydrates, fats and proteins.	
1.00	Unit 2: Functioning of Excitable Tissue (Nerve	
	and Muscle): Structure of neuron, Propagation	
197	of nerve impulse (myelinated and non-	
	myelinated nerve fibre); structure of skeletal	
	muscle, Mechanism of muscle contraction,	
- 100	Neuromuscular junction, Synaptic transmission.	
	Practical Group A: Experimentation Physiology	
100	i. Preparation of temporary mounts: Blood film.	
14 994 4	ii. Preparation of hemin and hemochromogen	
54331	crystals	
	iii. Estimation of haemoglobin using Sahli's	
	haemoglobinometer.	
5 th SEMESTER	ZOOL DC11: Histology and Endocrinology	45
(Hons)	Unit1: Muscular system-Histology of different	
(Trens)	types of muscle, Ultra structure of skeletal	
. 100-0	muscle.	
13,777-5	Unit:2: Histo-architechture of liver and its	
	function. Unit 3: Introduction to Endocrinology-	
	General idea of endocrine systems, classification,	
100	characteristic and transport of hormones,	
1.4	neurosecretions and neurohormones.	
1.4	Unit 4: Epiphysis, Hypothalamo-hypophysial	100
and the second	Axis-(i) Structure of pineal gland, secretions and	
(L.)	their functions in biological rhythms and	
1.27	reproduction, (ii) Structure and functions of	41
The second second	hypothalamus and hypothalamic nuclei,	
	regulation of neuro-endocrine glands, feedback	0.6
	mechanisms, (iii) Structure of pituitary gland,	
	hormones and their functions, hypothalamo-	
	hypophysial portal system, disorders of pituitary	
	gland.	
	Practical (Full marks = 15)	
	1. Study of animal house: set up and maintenance	
	of basic animal house, breeding techniques, care	
	taken for normal and experimental animals.	
	2. Examination of vaginal smear rats from live	
	animals (Subject to UGC guideline).	
	3. Tissue fixation, embedding in paraffin,	
	microtomy and slide preparation of any	
	endocrine gland (Subject to UGC guideline).	

2		4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. 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, Uterus (Subject to UGC guideline).	
Oct22-Dec22	1 ST 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
	1 ST 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
ile	3 RD SEMESTER	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. ZOOL DC7: Developmental Biology and Reproductive Biology	45
	(HONS.)	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	

		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).	
	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.	
	5 TH	ZOOL DC11: Histology and Endocrinology	45
	SEMESTER (Hons)	Unit 4: Epiphysis, Hypothalamo-hypophysial Axis-(i) Structure of pineal gland, secretions and their functions in biological rhythms and reproduction, (ii) Structure and functions of hypothalamus and hypothalamic nuclei, regulation of neuro-endocrine glands, feedback mechanisms, (iii) Structure of pituitary gland, hormones and their functions, hypothalamo-hypophysial portal system, disorders of pituitary gland. Unit 5: Peripheral Endocrine Glands- (i) Structure, hormones, functions and regulation of thyroid gland, parathyroid, adrenal, pancreas, ovary and testis, (ii) Hormones in homeostasis, disorders of endocrine glands Practical (=15 marks) 4. Examination of sections of mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid (Subject to UGC guideline). 5. 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, Uterus (Subject to UGC guideline). 6. Double staining of prepared histological slides (Subject to UGC guideline)	
3	and	DC2	10
Jan23-March23	2 nd SEMESTER (HONS.)	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) <i>Sphenodon</i> - present status Unit 8: Aves: (i) General characteristics and classification up to Sub-Classes. (Young, 1981),	

		(") F1-1	
		(ii) Exoskeleton and migration in birds, (ii)	
		Principles and aerodynamics of flight, (iv)	
		Archaeopteryx-a connecting link.	
	2 nd	DC4	18
	SEMESTER	Unit 4: Circulatory System- General plan of	
	(Gen)	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	
	4th	turtle.	4.5
	4 th	DC9 Unit 7: Physiology of Heart Structure of	45
	SEMESTER	Unit 7: Physiology of Heart - Structure of mammalian heart, coronary circulation, structure	
	(HONS.)	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	
	1.00	and nephrons, mechanism of urine formation,	
		glomerular filtration, tubular secretion, plasma	
		clearance and counter current mechanism	
	6 TH	ZOOL DC13: Parasitology and Immunology,	45
	SEMESTER	Group A: Parasitology (=12.5 marks)	
	(Hons)	Unit 1: Introduction to parasitology- Brief	
	1.30-6	introduction of Parasitism, Parasite, Parasitoid	
	0.000	and Vectors (mechanical and biological vector)	
		Host parasite relationship.	
		Unit 2: Parasitic Protists: Study of Morphology,	
100	100000000000000000000000000000000000000	Life Cycle, Prevalence, Epidemiology,	
	7737 1535	Pathogenicity, Diagnosis, Prophylaxis and	
	100	Treatment of Giardia intestinalis, Trypanosoma	
		gambiense, Leishmania donovani.	
100		Group A: Laboratory Experimentation	
		1. Study of life stages of Giardia intestinalis,	
		Trypanosoma gambiense and Leishmania	
		donovani through permanent slides/micro	6.8
		photographs.	
		2. Study of adult and life stages of Schistosoma	
		haematobium and Taenia saginata through	
		permanent slides/micro photographs.	
		3. Study of adult and life stages of Ancylostoma	
		duodenale, Brugia malayi and Trichinella spiralis	
		through permanent slides/micro photographs.	
		4. Study of Pediculus humanus, Xenopsylla	
4		cheopis and Cimex lectularius	
4		D.C.	
4 1100 T CT	and		
April23-June23	2 nd	DC3:	18
April23-June23	SEMESTER	Unit 9: Mammals: (i) General characters and	18
April23-June23	-		18

	,		
		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.	
		Hugivorous), Funamourus.	
	2nd	DC4 18	
	2		
	SEMESTER	Unit 6: Nervous System- Comparative account of brain, cranial nerves in mammals.	
	(Gen)	Unit 7: Skeletal System- Evolution of visceral	
	State State	arches.	
	170 170	DC4P Grp-A	
		iv. Identification of mammalian skulls: Bufo,	
	4 th	Rana, Columba, Cavia and Dog. DC10 Grp-A 45	
	SEMESTER	Unit 1: Definition of taxonomy, micro- and	
		macro taxonomy, systematic, Linnean hierarchy,	
	(HONS.)	cladistics, hierarchy, taxonomic types	
	1.00	Unit 2: Principles of Binomial nomenclature.	
	14.771	Unit 3: Species concept: Types and modes, type	
		concept, primary and secondary types-definition	
	-TU	and application.	
	6 TH	ZOOL DC13: Parasitology and Immunology, 45	
	SEMESTER	Group A: Parasitology (=12.5 marks)	
	(Hons)	Unit 3: Parasitic Platyhelminthes: Study of	
	11000	Morphology, Life Cycle, Prevalence,	
	1. TW 1	Epidemiology, Pathogenicity, Diagnosis,	
		Prophylaxis and Treatment of Schistosoma	
	and the second second second	haematobium, Taenia saginata.	
	and the same of th	Unit 4: Parasitic Nematodes: Study of	
	140400000000000000000000000000000000000	Morphology, Life Cycle, Prevalence,	
	17.10	Epidemiology, Pathogenicity, Diagnosis,	
		Prophylaxis and Treatment of Ancylostoma	
		duodenale, and Trichinella spiralis, Brugia	
		malayi, Meloidogyne incognita, Heterodera	
		rostochiensis-Life-Cycle, symptoms and control.	
11.5		Practical (=15 marks)	
		Unit 5: Parasitic Arthropods: Biology,	
		importance and control of Ticks, Mites, Lice,	
		Flea and Bug	
		Practical (=15 marks)	
		5. Study of nematode/cestode parasites from the	
		intestines of Poultry bird (Intestine can be	
		procured from poultry/market as a by-product).	
		6. Submission of a brief report on parasitic	
		vertebrates.	
		7. Study of rectal parasites of Periplaneta sp. /	
		Bufo sp. 8. Demonstration of lymphoid organs.	
		9. Histological study of spleen, thymus and	
		lymph nodes through slides/ photographs	

10. Preparation of stained blood film to study various types of blood cells. 11. Antigen antibody reaction by immunediffusion.	
12. Demonstration of ELISA.13. Determination of human blood group	



ACADEMIC QUARTER	CLASS	NAME OF THE TEACHER	TOPIC TO BE COVERED	NO OF LECTURES
JULY 22 TO SEPTEMBER 22	1 ST SEMESTER (HONS.)	ATINDRIYA SEN HONS. (THEORY+ PRACTICAL) GENERAL (THEORY+ PRACTICAL) SYLLABUS TOPICS ARE TO BE ALLOTED	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.	18
1	(%)		Unit 6: Echinodermata: General characteristics and classification up to classes; Watervascular 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	
1.0			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.	

1 ST SEMESTER	Discipline Core Courses (DC): Zoology for 18	
(Gen)	General Studies	
	(A1)DC 1: Animal Diversity and Ecology Theory[(A1)-ZOOL-G-DC 1-T]:	
	Group A: Biology of Non-Chordates(=10 marks)	
	Group in Biology error energants (To mane)	
	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;	
100	Discipline Core Courses (DC): Zoology for General	
100 - 100 - 100	Studies (A1) DC 1. Asimal Dispositor and Feel and	
10000	(A1)DC 1: Animal Diversity and Ecology Theory[(A1)-ZOOL-G-DC 1-T]:	
170.485	Group A: Biology of Non-Chordates(=10 marks)	
5.145		
	Unit 11: Mollusca: General characteristics and	
	classification up to classes, Nervous	
	system and torsion in gastropod; feeding and respiration in Pila.	
754	respiration in rina.	
54731 07	Unit 12: Echinodermata: General characteristics and	
	classification up to classes;	
	water-vascular system in Asteroidea.	
	Unit 13: Hemichordata: General characteristics of	
7,00,1	phylum Hemichordata;	
0.1574	relationship with non-chordates and chordates.	
	Practical (=15 marks) [(A1)-ZOOL-G-DC 1-P]:	
The second second	•Identification:	
	f. Molluscs: Chiton, Doris, Unio, Sepia, Octopus,	
11.71.734.795	Nautilus, Loligo. Mytilus.	
1/3 - APP - 1 - 3	g. Echinodermate: Pentaceros/Asterias, Ophiura, Echinus, Cucumaria and	
17.7.1	Antedon.	
1 444		
Total Control	• Ecology:	
	i Study of an aquatic accountant determination of	
	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.	
	station/point coosystem/agito-ecosystem.	

3 RD		ZOOL DC6: Ecology and Conservation Biology	45
SEMESTER (HONS.)		[Allotted Marks- 50 (Theory 25+ Practical 15+ Internal Assessment 10)]	
		Theory (Full marks = 25) [ZOOL-H-DC6-T]	
		Group A: Perspective of Ecology (= 12.5 marks)	
		Unit 1: Introduction to Ecology- History of ecology, autecology and synecology,	
	1	levels of organization, laws of limiting factors, limiting factors: temperature and light.	
1	70	Unit 2: Population-(i) Population density, natality, birth rate and mortality,(ii)	
	80	Unique and group attributes of population: demographic factors, life tables,	
100		fecundity tables, survivorship curves, dispersal and dispersion,(iii) Geometric, exponential and logistic growth, equation and	
339	- 4	patterns, r and k strategies, population regulation - density-dependent and	
		independent factors, (iv) Population interactions, Gause's principle with	
		laboratory and field examples, Lotka-Volterra equation for competition, intra- and inter-specific interaction.	
7,76		Unit 3: Community- (i) Community characteristics: Species diversity,	
		abundance, dominance, richness, diversity indices, (ii) Vertical stratification,	
100	15 H	ecotone and edge effect, ecological succession with example.	177
1		Unit 4: Structure of Ecosystem -(i) Types of ecosystem with examples in details,	K.
1657	- 70	food chain: detritus and grazing food chains, linear and Y-shaped food chains,	3.1
Livery 1		food web, energy flow through the ecosystem, ecological pyramids and	J.
		ecological efficiencies. (ii) Nutrient and biogeochemical cycles with an example of nitrogen cycle.	
		Group B: Conservation Biology Unit 1: Introduction to Biodiversity & Conservation-	
		Types and level of biodiversity, Mega-biodiversity countries, Biodiversity Hotspots,	
		Flagship species, Keystone species,	

Wild life conservation (In-situ and ex-situ conservation), Concept of protected areas, Red data book, IUCN categories, Indian Wildlife act-1972 and schedule. Importance and values of wild life causes of depletion of wild life and related conservation strategies of Tiger, Gibbon, Lion and Rhino. Unit 2: Man and Wildlife- Causes and consequences of human-wildlife conflicts; mitigation of conflict an overview; management of excess population. Practical (Full Marks = 15) [ZOOL-H-DC6-P] Group A: Laboratory experimentation (= 10 marks) 1. Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided. 2. Determination of population density in a natural/hypothetical community by quadrate method and calculation of Shannon-Weiner diversity index for the same community. 3. Study of an aquatic ecosystem: Estimation of population density of phytoplankton and zooplankton, measurement of area, temperature, turbidity/penetration of light, determination of pH, and dissolved oxygen content (Winkler's method), chemical oxygen demand, CO2 and alkalinity. 4. Report on a visit to National park/Biodiversity park/Wild life sanctuary/ Biodiversity study of any place of ecological interest.

SEMESTER (Gen) Witt 4- Nucleic Acids - DNA is the genetic material, Structure of purines and pyrimidines, nucleosides, nucleosides, nucleosides, types of DNA and RNA. Unit 5: Enzymes - Nomenclature and classification; Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 125 marks) 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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatiac, Sympatro) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in mechanisms, of stribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse accestors, (ii) Darwin's Finches with		3 RD	(A2)DC7 Dhysiology and Dischamistry	18
Structure of purines and pyrimidines, nucleoides, nucleic acids; types of DNA and RNA. Unit 5: Enzymes - Nomenclature and classification; Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 125 marks) 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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution — Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of birts and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse with diagrams/ cut outs of limbs and teeth of horse methods of horse mith diagrams cut outs of limbs and teeth of horse mith diagrams cut outs of limbs and teeth of horse mith diagrams.			(A3)DC7 Physiology and Biochemistry Unit 4: Nucleic Acids - DNA is the genetic material.	18
pyrimidines, nucleosides, nucleotides, nucleic acids: types of DNA and RNA. Unit 5: Enzymes - Nomenclature and classification; Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (+50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 125 marks) 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. Unit 3: Sources of variations - Types of variations and their ole in evolution Unit 4: Population genetics - Hardy-Weinberg law, Natural selection; Genetic drift mechanism (Founder's effect, Bottleneck phenomenon); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study fo homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse accestors, (iii) Darwin's Finches with				
Unit 5: Enzymes - Nomenclature and classification; Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 125 marks) Unit 1: Life's Beginnings- Origin of life, Chemogeny Unit 2: Theory and concept of evolution - Historical review of evolutionary concepts, Lumarkism, Darwinism and Neo-Darwinism, Geological time scale, evolution of Horse. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatrie) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution of birds and marmals in different realms. Practical (=15 marks) [(A4)-ZOOI-G-DC 10-P]: Evolutionary Biology i. Study of homology and analogy from suitable specimens/ pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with			pyrimidines, nucleosides, nucleotides, nucleic acids;	
Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 12.5 marks) 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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of brids and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fosmology and analogy from suitable specimens/ pictures iii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with			types of DNA and RNA.	
Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 12.5 marks) 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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of brids and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fosmology and analogy from suitable specimens/ pictures iii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with			Unit 5: Enzymes - Nomenclature and classification;	
(## (## (## ## ## ## ## ## ## ## ## ## #				
Assessment: 10 marks) Group B: Evolutionary Biology (= 125 marks) 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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with				
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. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes of speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with				
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(Allopatric, Sympatric) Unit 6: Macro-evolution – Idea about Macro-evolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography – Zoogeographical realms, distribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with		1,797	(advantages and limitations),	
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Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: Evolutionary Biology i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with		100	distribution of birds and	300
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specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with				
diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with				
			diagrams/ cut outs of limbs and teeth	
diagrams/ cut outs of beaks of different			diagrams/ cut outs of beaks of different	

	species.	
	iv. Identification of Zoogeographical fauna.	
5 th SEMESTER (Hons)	Paper ZOOL DC12: Economic Zoology and Industrial Zoology	45
	[Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)]	
	Theory (Full marks = 25) [ZOOL-H-DC12-T]	
3	Unit 1: Aquaculture: Composite fish culture, Induced breeding of fish, types of hatcheries, Prawn culture (Fresh Water), Pearl culture, Fish diseases	
	Unit 2: Elementary idea on Agricultural insect pests : Categorization of insect pests; basic idea on economic threshold level (ETL) and economic injury level (EIL).	
39	Unit 3: Major insect pests: Life history, damage and control measures of the following pests a) Leptocorisa sp.,b) Scirpophaga sp c) Anomis sp. d) Autocharis sp. e) Sitophilus oryzae	
.76	Unit 4: IPM and Insect Pest Management- Elementary idea about IPM, components, strategy and approaches, pest surveillance, sampling methods and forecasting. Elementary idea about GMO and its application on pest management.	
100	Unit 5: Insecticides: Types of insecticides, insecticide residues in food stuff, phytotoxicity due to insecticide application, first aid antidotes. Evaluation of insecticide toxicity, insecticide synergism, potentiation and antagonism, insect pest resurgence, biorational insecticides.	6
Sales S	Unit 6: Animal Husbandry: Types of Cattle breeds, Artificial insemination.	J.
	Unit 7: Poultry Farming: Types of poultry breeds, management of breeding stocks and broiler, poultry diseases and control.	
	Unit 8: Preservation of fish: Causes of fish spoilage and prevention (Drying. Salting pickling and smoking, freezing) use of ice in storage,	

			Harvest limit for sustainable	
			fishery.	
			Practical (Full marks = 15) [ZOOL-H-DC12-P]	
			Group A : Laboratory Experimentation (= 10 marks)	
			I. Identification of different types of bees (Queens, Drones and Worker bees) with	
			characters.	
		- M	2. Identification of different types of silk moths with characters.	
	- 3	nd"	3. Identification of different types of pearls with characters.	
		1	4. Identification of different types of fish diseases with characters.	
	30		5. Identification of different types of scales in fishes with characters.	
	:431		6. Identification of different types of fins with characters.	
	7.7		7. Study of different modified structures of fishes (Saw of sawfish, Hammer of hammer	
	(951		head fish, tail of sharks etc.).	
-	-0.75		8. Identification of various types of natural silks.	
2		get 1	9. Visit to a sericulture farm/ poultry farm/ apiary.	
Oct22-Dec22	1 ST SEMESTER (HONS.)		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.	18
-			Unit 4: Onychophora: General characteristics and evolutionary significance.	10.0
			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,	
		- 100	Bombyx, Periplaneta, termites and	
			honey bees,,Peripatus.	
			noney bees,,i empatus.	
			b. Onychophora	
			о. Опуспорнога	
			a Mallysas Chitan Dant-liver Dila Davis II I'	
			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.	
	1 ST SEMESTER		Discipline Core Courses (DC): Zoology for	18
	(Gen)		General Studies	
			(A1)DC 1: Animal Diversity and Ecology	
			Theory[(A1)-ZOOL-G-DC 1-T]:	
	1.7900-1		Group A: Biology of Non-Chordates(=10 marks)	
			Group in Brotogy of the Character to markets,	
			Group in Bloogy of the Gustantos (10 minus)	
	0.75			
	0.354		Unit 11: Mollusca: General characteristics and	
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10	+0	10	Unit 11: Mollusca: General characteristics and	
1	TO	Ø.	Unit 11: Mollusca: General characteristics and classification up to classes, Nervous	
	Trill	Ŕ.	Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and	16
	Tri	Ř.	Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and	g.
A	til	A.	Unit 11: Mollusca: General characteristics and classification up to classes, Nervous system and torsion in gastropod; feeding and respiration in Pila.	
1	Tri)	100	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	
1			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;	ĥ
1			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; Discipline Core Courses (DC): Zoology for General	h
			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; Discipline Core Courses (DC): Zoology for General	j
			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; Discipline Core Courses (DC): Zoology for General Studies	9
		7	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; Discipline Core Courses (DC): Zoology for General Studies (A1)DC 1: Animal Diversity and Ecology	
	11		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; Discipline Core Courses (DC): Zoology for General Studies (A1)DC 1: Animal Diversity and Ecology Theory[(A1)-ZOOL-G-DC 1-T]:	
	til		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; Discipline Core Courses (DC): Zoology for General Studies (A1)DC 1: Animal Diversity and Ecology Theory[(A1)-ZOOL-G-DC 1-T]:	
			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; 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)	9
			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; 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 11: Mollusca: General characteristics and classification up to classes, Nervous	
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	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	
100	Antedon.	
- 10	• Ecology:	
	i. Study of an aquatic ecosystem: determination of pH, and Dissolved Oxygen content	
3_10	(Winkler's method) and CO2 in water.	
	ii. Report on a one-day visit to	
3.00	Sanctuary/Zoo/Sericulture	
	station/Fishery/apiculture station/pond ecosystem/agro-ecosystem	
3 RD	ZOOL DC6: Ecology and Conservation Biology	45
SEMESTER (HONS.)	[Allotted Marks- 50 (Theory 25+ Practical 15+ Internal Assessment 10)]	
(764	Theory (Full marks = 25) [ZOOL-H-DC6-T]	
	Group A: Perspective of Ecology (= 12.5 marks) Unit 1: Introduction to Ecology- History of ecology,	
110000000000000000000000000000000000000	autecology and synecology,	
-0.0	levels of organization, laws of limiting factors, limiting factors: temperature and light.	18
13-73	Unit 2: Population-(i) Population density, natality,	75
1 444	birth rate and mortality,(ii) Unique and group attributes of population:	3-1
1400	demographic factors, life tables, fecundity tables, survivorship curves, dispersal and	
	dispersion,(iii) Geometric, exponential and logistic growth, equation and	
	patterns, r and k strategies, population regulation - density-dependent and	
	independent factors, (iv) Population interactions, Gause's principle with	
	laboratory and field examples, Lotka-Volterra equation for competition, intra- and inter-specific interaction.	
	Unit 3: Community- (i) Community characteristics: Species diversity,	

abundance, dominance, richness, diversity indices, (ii) Vertical stratification, ecotone and edge effect, ecological succession with example. Unit 4: Structure of Ecosystem -(i) Types of ecosystem with examples in details, food chain: detritus and grazing food chains, linear and Y-shaped food chains, food web, energy flow through the ecosystem, ecological pyramids and ecological efficiencies. (ii) Nutrient and biogeochemical cycles with an example of nitrogen Group B: Conservation Biology Unit 1: Introduction to Biodiversity & Conservation-Types and level of biodiversity, Mega-biodiversity countries, Biodiversity Hotspots, Flagship species, Keystone species, Wild life conservation (In-situ and ex-situ conservation), Concept of protected areas, Red data book, IUCN categories, Indian Wildlife act-1972 and schedule. Importance and values of wild life causes of depletion of wild life and related conservation strategies of Tiger, Gibbon, Lion and Rhino. Unit 2: Man and Wildlife- Causes and ZOOL DC6: Ecology and Conservation Biology [Allotted Marks- 50 (Theory 25+ Practical 15+ Internal Assessment 10)] Theory (Full marks = 25) [ZOOL-H-DC6-T] Group A: Perspective of Ecology (= 12.5 marks) Unit 1: Introduction to Ecology-History of ecology, autecology and synecology, levels of organization, laws of limiting factors, limiting factors: temperature and light. Unit 2: Population-(i) Population density, natality, birth rate and mortality,(ii) Unique and group attributes of population: demographic factors, life tables, fecundity tables, survivorship curves, dispersal and dispersion,(iii) Geometric, exponential and logistic growth, equation and patterns, r and k strategies, population regulation - density-dependent and independent factors, (iv) Population interactions, Gause's principle with laboratory and field examples, Lotka-Volterra equation for competition, intra- and inter-specific interaction.

3 RD SEMESTER	ccosystem with examples in details, food chains, detritus and grazing food chains, linear and Y-shaped food chains, food web, energy flow through the ecosystem, ecological pyramids and example of nitrogen cycle. Group B: Conservation Biology Unit 1: Introduction to Biodiversity & Conservation-Types and level of biodiversity, Mega-biodiversity countries, Biodiversity Hotspots, Flagship species, Keystone species, Wild life conservation (In-situ and ex-situ conservation), Concept of protected areas, Red data book, IUCN categories, Indian Wildlife act-1972 and schedule. Importance and values of wild life causes of depletion of wild life and related conservation strategies of Tiger, Gibbon, Lion and Rhino. Unit 2: Man and Wildlife- Causes and consequences of human-wildlife conflicts; mitigation of conflict—an overview; management of excess population. Practical (Full Marks = 15) [ZOOL-H-DC6-P] Group A: Laboratory experimentation (= 10 marks) 1. Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided. 2. Determination of population density in a natural/hypothetical community by quadrate method and calculation of Shannon-Weiner diversity index for the same community. 3. Study of an aquatic ecosystem: Estimation of population density of phytoplankton and zooplankton, measurement of area, temperature, turbidity/penetration of light, determination of pH, and dissolved oxygen content (Winkler's method), chemical oxygen demand, CO2 and alkalinity. 4. Report on a visit to National park/Biodiversity park/Wild life sanctuary/ Biodiversity study of any place of ecological interest. (A3)DC7 Physiology and Biochemistry Unit 4: Nucleic Acids - DNA is the genetic material,
(Gen)	Structure of purines and

pyrimidines, nucleosides, nucleotides, nucleic acids; types of DNA and RNA. Unit 5: Enzymes - Nomenclature and classification; Mechanism of enzyme action. (A4) DC 10 Genetics and Evolutionary Biology (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks) Group B: Evolutionary Biology (= 12..5 marks) Unit 1: Life's Beginnings- Origin of life, Chemogeny Unit 2: Theory and concept of evolution - Historical review of evolutionary concepts, Lamarkism, Darwinism and Darwinism, Geological time scale, evolution of Horse. 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); Unit 5: Species concept - Biological species concept (advantages and limitations), isolating mechanisms, modes speciation (Allopatric, Sympatric) Unit 6: Macro-evolution - Idea about Macroevolutionary Principles and stages in macro-evolution (example: Darwin's Finches) Unit 7: Zoogeography - Zoogeographical realms, distribution of birds and mammals in different realms. Practical (=15 marks) [(A4)-ZOOL-G-DC 10-P]: **Evolutionary Biology** i. Study of fossil evidences from plaster cast models and pictures ii. Study of homology and analogy from suitable specimens/ pictures iii. Study from charts: (i) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors, (ii) Darwin's Finches with diagrams/ cut outs of beaks of different species.

5 TH	Paper ZOOL DC12: Economic Zoology and	45
SEMESTER	Industrial Zoology	
(Hons)		
	[Allotted Marks- 50 (Theory: 25+ Practical: 15+	
	Internal Assessment: 10)]	
	mema Assessment. 10)]	
	The same (Full assertion = 25) [700]. II DC12 T]	
	Theory (Full marks = 25) [ZOOL-H-DC12-T]	
	Unit 1: Aquaculture: Composite fish culture,	
	Induced breeding of fish, types of	
	hatcheries, Prawn culture (Fresh Water), Pearl	
	culture, Fish diseases	
	 Unit 2: Elementary idea on Agricultural insect pests	
	 : Categorization of insect pests;	
1.00	basic idea on economic threshold level (ETL) and	
	economic injury level (EIL).	
1 1	commonity to or (ELE).	
	 Unit 3: Major insect pests: Life history, damage and	
	control measures of the following	
	 _	
	pests a) Leptocorisa sp.,b) Scirpophaga sp c) Anomis	
	sp. d) Autocharis sp. e) Sitophilus oryzae	
- CT 66-41		
1,700	Unit 4: IPM and Insect Pest Management-	
179.14	Elementary idea about IPM, components,	
	strategy and approaches, pest surveillance, sampling	
	methods and forecasting.	
	Elementary idea about GMO and its application on	
	pest management.	
17455.3	Unit 5: Insecticides: Types of insecticides,	
7,7000	insecticide residues in food stuff, phyto-	
	toxicity due to insecticide application, first aid	
	antidotes. Evaluation of insecticide	
The second secon	toxicity, insecticide synergism, potentiation and	
100	antagonism, insect pest resurgence, bio-	
4 7 7 7 1		
1.0	rational insecticides.	
	Huit 6. Animal Hughander True 1	
177	Unit 6: Animal Husbandry: Types of Cattle breeds,	100
1 1/4	Artificial insemination.	
	HAZ D I D I D	
	Unit 7: Poultry Farming: Types of poultry breeds,	
	management of breeding stocks and	
	broiler, poultry diseases and control.	
	Unit 8: Preservation of fish: Causes of fish spoilage	
	and prevention (Drying. Salting	
	pickling and smoking, freezing) use of ice in storage,	
	Harvest limit for sustainable	
	fishery.	
	Paper ZOOL DC12: Economic Zoology and	
	Industrial Zoology	
	GV	
		L

[Allotted Marks- 50 (Theory: 25+ Practical: 15+ **Internal Assessment: 10)**] Theory (Full marks = 25) [ZOOL-H-DC12-T] Unit 1: Aquaculture: Composite fish culture, Induced breeding of fish, types of hatcheries, Prawn culture (Fresh Water), Pearl culture. Fish diseases Unit 2: Elementary idea on Agricultural insect pests : Categorization of insect pests; basic idea on economic threshold level (ETL) and economic injury level (EIL). Unit 3: Major insect pests: Life history, damage and control measures of the following pests a) Leptocorisa sp.,b) Scirpophaga sp c) Anomis sp. d) Autocharis sp. e) Sitophilus oryzae Unit 4: IPM and Insect Pest Management-Elementary idea about IPM, components, strategy and approaches, pest surveillance, sampling methods and forecasting. Elementary idea about GMO and its application on pest management. Unit 5: Insecticides: Types of insecticides, insecticide residues in food stuff, phytotoxicity due to insecticide application, first aid antidotes. Evaluation of insecticide toxicity, insecticide synergism, potentiation and antagonism, insect pest resurgence, biorational insecticides. Unit 6: Animal Husbandry: Types of Cattle breeds, Artificial insemination. Unit 7: Poultry Farming: Types of poultry breeds, management of breeding stocks and broiler, poultry diseases and control. Unit 8: Preservation of fish: Causes of fish spoilage and prevention (Drying. Salting pickling and smoking, freezing) use of ice in storage, Harvest limit for sustainable fishery. Practical (Full marks = 15) [ZOOL-H-DC12-P] Group A: Laboratory Experimentation (= 10 marks)

characters. 2. Identification of different types of silk moths with characters. 3. Identification of different types of pearls with characters. 4. Identification of different types of fish diseases with characters. 5. Identification of different types of scales in fishes with characters. 6. Identification of different types of fins with characters. 7. Study of different modified structures of fishes (Saw of sawfish, Hammer of hammer head fish, tail of sharks etc.). 8. Identification of various types of natural silks. 9. Visit to a sericulture farm/ poultry farm/ apiary. 2md SEMESTER (HONS.) 2nd ZOOL DC4: Comparative Anatomy of Vertebrates [Allotted Marks-50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of		Identification of different types of bees (Queens, Drones and Worker bees) with		
characters. 3. Identification of different types of pearls with characters. 4. Identification of different types of fish diseases with characters. 5. Identification of different types of scales in fishes with characters. 6. Identification of different types of fins with characters. 7. Study of different modified structures of fishes (Saw of sawfish, Hammer of hammer head fish, tail of sharks etc.). 8. Identification of various types of natural silks. 9. Visit to a sericulture farm/ poultry farm/ apiary. 3 Jan23-March23 ZOOL DC4: Comparative Anatomy of 18 Vertebrates [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri.		characters.		
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(Saw of sawfish, Hammer of hammer head fish, tail of sharks etc.). 8. Identification of various types of natural silks. 9. Visit to a sericulture farm/ poultry farm/ apiary. ZOOL DC4: Comparative Anatomy of SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri.			39	
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Jan23-March23 ZOOL DC4: Comparative Anatomy of 18 SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri.		8. Identification of various types of natural silks.		
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and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri.		Unit 5: Circulatory System: General plan of	1000	10.00
of kidney; Evolution of urinogenital ducts; Types of mammalian uteri.	В	THE PROPERTY OF THE PROPERTY OF	Date	- 4
the second of th	n			172
Unit 7: Nervous System: Comparative account of		urinogenital ducts; Types of mammalian uteri.		1.2
brain; Cranial nerves in mammals	10.00			
(Origin distribution and nature)		(Origin distribution and nature)		
2 nd (A2)-DC 4 Comparative Anatomy and 18 SEMESTER Developmental Biology of	18	(A2)-DC 4 Comparative Anatomy and	SEMESTER	
(Gen) Vertebrates (=50 marks)		Vertebrates (=50 marks)	(Gen)	

	(Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)	
	Theory (=25 marks) [(A2)-ZOOL-G-DC 4-T]:	
	Group A: Comparative Anatomy (= 12.5 marks) 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.	
- 3	Unit 6: Nervous System- Comparative account of brain, cranial nerves in mammals.	
	Unit 7: Skeletal System- Evolution of visceral arches.	
4 th SEMESTER (HONS.)	ZOOL DC10: Systematics and Evolution (Full marks = 50)	45
199	[Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Group B: Evolution (=12.5marks)	
	Unit 1: Evidences of organic evolution- Study of comparative anatomy, embryology,	
5.63	paleontology, biochemistry, physiology and molecular biology.	
7,767	Unit 2 : Origin of life, chemogeny, RNA world	
	Unit 3: Historical review of evolutionary concepts, Lamarkism, Darwinism and natural	
100	selection and Neo-Darwinism	V /
1 200	Unit 4: Geological time scale, Evolution of horse.	100
19-75	Unit 5: Sources of variations and their role in evolution.	15
100	Unit 6 : Population genetics- Hardy-Weinberg law (statement and derivation of	2.5
	equation, application of law to human population); genetic drift mechanism (founder's	100
	effect, bottleneck phenomenon).	
	Unit 7: Species- Species concept, isolating mechanisms, modes of speciation; adaptive	
	radiation/macroevolution (exemplified by mammals and Galapagos finches).	

	Theory (Full marks = 25) [ZOOL-H-D	C14-T]
SEMESTER (Hons)	[Allotted Marks- 50 (Theory: 25+ Prac Internal Assessment: 10)]	etical: 15+
6 TH	ZOOL DC14: Molecular Biology	45
1000	12. Pedigree analysis of some human inh traits.	erited
100	11. Distribution of animals in Zoogeogra realm by map pointing method.	phical
13-77	humans in relation to their age and sex.	1
1 500	10. Graphical representation and interpre data of height/ weight of a sample of 100	
100	9. Study and verification of Hardy-Weinl by chi-square analysis.	perg Law
A.15	7. Study of homology and analogy from specimens 8. Study of fossils from models / pictures	
100	species on supplied data.	V-10-1
	identification at genus level 6. Mapping of the distribution of endanger	531
1,431	taxonomy 5. Dichotomous key preparation for insections of the control of the con	ot
760	4. Allozyme analysis in relation to morph	nology and
7-17	with molecular taxonomy on supplied data.	a.
	of insect for taxonomic categorization. 3. Analysis of RFLP and RAPD data in c	onnection
8	2. Morphometric analysis of the wing, an	
	Group A: Laboratory experimentation (= 1. Cladistic analysis on the supplied data.	
	Practical (Full marks = 15) [ZOOL-H-DO	C10-P]
	distribution, zoogeographical realms and faunal peculiarities; Plate tectonic and continental drift theory.	their
	Unit 9: Animal distribution- Pattern of ar distribution, factors affecting animal	
	effects), detailed example of K-T extincti	ion.
	Unit 8: Abolition of species- Extinctions, ground and mass extinctions (causes and	

Unit 6: Gene Mutation-Molecular basis of gene mutation in relation to spontaneous mutation and physical and chemical mutagens. Unit 7: DNA Repair Mechanisms-Photo-reactivation antelotide and base excision repair, SOS response. Unit 8: Cancer Biology- Concepts of proto oncogenes and oncogenes, Activation of proto oncogenes and oncogenes, Activation of proto oncogenes and oncogenes, Properties of cancer cells, Study of Retrovirus and oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53 and retinoblastoma. Apoptosis and necrosis. Unit 9: Molecular Techniques-PCR, Western and Southern blot, Northern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 ZOOI. DC4: Comparative Anatomy of Vertebrates [Allotted Marks-50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 3: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 7: Nervous System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 18 2ed SEMESTER (Gen) DC4 SEMESTER (I		
mutation and physical and chemical mutagens. Unit 7: DNA Repair Mechanisms-Photo-reactivation nucleotide and base excision repair, SOS response. Unit 8: Cancer Biology- Concepts of proto oncogenes and oncogenes and oncogenes. Activation of proto oncogenes to oncogenes. Properties of cancer cells, Study of Retrovirus and oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53 and retinoblastoma. Apoptosis and necrosis. Unit 9: Molecular Techniques-PCR, Western and Southern blot, Dorthern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10]) Unit 5: Circulatory System: General plan of circulation; Computative account of heart. and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital duets; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 2nd SEMESTER (Gen) DC4 (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)				Unit 6: Gene Mutation-Molecular basis of gene mutation in relation to spontaneous	
reactivation nucleotide and base excision repair, SOS response. Unit 8: Cancer Biology- Concepts of proto oncogenes and oncogenes, Activation of proto oncogenes to oncogenes, Properties of cancer cells, Study of Retrovirus and oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53 and retinoblastoma. Apoptosis and necrosis. Unit 9: Molecular Techniques-PCR, Western and Southern Blot, Northern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 ZOOL DC4: Comparative Anatomy of 18 Vertebrates [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aurtic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney: Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals DC4 SEMESTER (Gen) DC4 (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)					
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Unit 8: Cancer Biology-Concepts of proto oncogenes and oncogenes, Activation of proto oncogenes and oncogenes, Activation of proto oncogenes to oncogenes, Properties of cancer cells, Study of Retrovirus and oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53 and retinoblastoma. Apoptosis and necrosis. Unit 9: Molecular Techniques-PCR, Western and Southern blot, Northern Blot, DNA sequencing, DNA finger printing. 2 nd April23-June23 2 nd ZOOI. DC4: Comparative Anatomy of Vertebrates [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 2 nd SEMESTER (Gen) DC4 SEMESTER (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)					
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cells, Study of Retrovirus and oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53 and retinoblastoma. Apoptosis and necrosis. Unit 9: Molecular Techniques-PCR, Western and Southern blot, Northern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 2nd SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 2nd SEMESTER (Gen) DC4 (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)					
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Unit 9: Molecular Techniques-PCR, Western and Southern blot, Northern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 2nd SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 2nd SEMESTER (Gen) DC4 (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)		1	Ŋ		
Southern Blot, Northern Blot, DNA sequencing, DNA finger printing. 4 April23-June23 2nd SEMESTER (HONS.) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Unit 5: Circulatory System: General plan of circulation; Comparative account of heart and aortic arches. Unit 6: Urinogenital System: Comparative anatomy of kidney; Evolution of urinogenital ducts; Types of mammalian uteri. Unit 7: Nervous System: Comparative account of brain; Cranial nerves in mammals 2nd SEMESTER (Gen) DC4 (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)			17	and retinoblastoma. Apoptosis and necrosis.	
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SEMESTER (Gen) (A2)-DC 4 Comparative Anatomy and Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)	1.2	-			
(Gen) Developmental Biology of Vertebrates (=50 marks) (Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)		2 nd		DC4	18
(Theory: 25 marks, Practical: 15 marks, Internal Assessment: 10 marks)					
Assessment: 10 marks)				Vertebrates (=50 marks)	
Theory (=25 marks) [(A2)-ZOOL-G-DC 4-T]:				I ' -	
				Theory (=25 marks) [(A2)-ZOOL-G-DC 4-T]:	

	Group A: Comparative Anatomy (= 12.5 marks) 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. Unit 6: Nervous System- Comparative account of brain, cranial nerves in mammals. Unit 7: Skeletal System- Evolution of visceral arches.
4 th SEMESTER (HONS.)	ZOOL DC10: Systematics and Evolution (Full marks = 50) [Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)] Group B: Evolution (=12.5marks) Unit 1: Evidences of organic evolution- Study of comparative anatomy, embryology, paleontology, biochemistry, physiology and molecular biology. Unit 2: Origin of life, chemogeny, RNA world Unit 3: Historical review of evolutionary concepts, Lamarkism, Darwinism and natural selection and Neo-Darwinism Unit 4: Geological time scale, Evolution of horse. Unit 5: Sources of variations and their role in evolution. Unit 6: Population genetics- Hardy-Weinberg law (statement and derivation of equation, application of law to human population); genetic drift mechanism (founder's effect, bottleneck phenomenon). Unit 7: Species- Species concept, isolating mechanisms, modes of speciation; adaptive radiation/macroevolution (exemplified by mammals and Galapagos finches). Unit 8: Abolition of species- Extinctions, Back ground and mass extinctions (causes and effects), detailed example of K-T extinction.

	Unit 9: Animal distribution- Pattern of animal distribution, factors affecting animal
	distribution, zoogeographical realms and their faunal peculiarities; Plate tectonic and continental drift theory.
	Practical (Full marks = 15) [ZOOL-H-DC10-P]
	Group A: Laboratory experimentation (=10 marks)
	1. Cladistic analysis on the supplied data.
	2. Morphometric analysis of the wing, antenna, leg of insect for taxonomic categorization.
Seriel .	3. Analysis of RFLP and RAPD data in connection with molecular taxonomy on supplied
7046	data.
- 340	4. Allozyme analysis in relation to morphology and taxonomy
4534	5. Dichotomous key preparation for insect identification at genus level
.437	6. Mapping of the distribution of endangered species on supplied data.
	7. Study of homology and analogy from suitable specimens8. Study of fossils from models / pictures.
(76)	9. Study and verification of Hardy-Weinberg Law by chi-square analysis.
	10. Graphical representation and interpretation of data of height/ weight of a sample of 100
+41 TG	humans in relation to their age and sex.
10.00	11. Distribution of animals in Zoogeographical realm by map pointing method.
	12. Pedigree analysis of some human inherited traits.
6 TH SEMESTER	ZOOL DC14: Molecular Biology 45
(Hons)	[Allotted Marks- 50 (Theory: 25+ Practical: 15+ Internal Assessment: 10)]
	Theory (Full marks = 25) [ZOOL-H-DC14-T]
	Unit 6: Gene Mutation-Molecular basis of gene mutation in relation to spontaneous
	mutation and physical and chemical mutagens.
	Unit 7: DNA Repair Mechanisms-Photo-reactivation nucleotide and base excision
	nacional and case excision

		repair, SOS response.	
		Unit 8: Cancer Biology- Concepts of proto oncogenes and oncogenes, Activation of	
		proto oncogenes to oncogenes , Properties of cancer cells, Study of Retrovirus and	
		oncogene (Ras) mediated cancer. Tumor suppressor genes with special reference to p53	
	- B	and retinoblastoma. Apoptosis and necrosis.	
3	A.	Unit 9: Molecular Techniques-PCR, Western and Southern blot, Northern Blot, DNA	
	18	sequencing, DNA finger printing.	

