গড়গাঁও মহাবিদ্যালয়

GARGAON COLLEGE

TEACHING PLAN

DEPARTMENT OF ZOOLOGY

JULY 2020 - JUNE 2021

GARGAON COLLEGE
TEACHING PLAN
Course: B. Sc.
Session: 2020-2021

Subject: ZOOLOGY
Name of the Teacher: Dr. Rina Handique
Methods to be applied: Lecture and presentation method along with interaction and discussion.
Teaching Materials: Green & White Board, Chalk Pencil, Marker, Duster, Books, Laptop, Projector.

Odd semester 2020

1st Semester (CBCS)	
Course Code: ZC101T **CORE COURSE I: NON-CHORDATES I: PROTISTS TO PSEUDOCOELOMATES**	
Allotted Unit No	**1**
Unit Name	**Unit 1: Protista, Parazoa and Metazoa**
No. of Class required	19
Detail of the topics to be taught (Classes required)	General characteristics and Classification up to Classes, Structural organization & nutrition of Euglena, Amoeba and Paramecium, Life cycle and pathogenicity of Plasmodium vivax Locomotion and Reproduction in Animal protista (Protozoa) Evolution of symmetry and segmentation of Metazoa
Allotted Unit No	**2**
No. of Tutorials	**1**
Unit Name	**Unit 5: Platyhelminthes**
No. of Class required	12
Detail of the topics to be taught (Classes required)	General characteristics and Classification up to classes, Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium*
No. of Tutorials	1
Course Code: ZC102T **CORE COURSE II: PRINCIPLES OF ECOLOGY**	
Allotted Unit No	**1**
Unit Name	**Unit 1: Introduction to Ecology**
No. of class required	6
Detail of the topics to be taught (Classes required)	History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of abiotic factors
No. of Tutorials	1
Allotted Unit No	**3**
Unit Name	**Unit 3: Community**
No. of lass required	12
Detail of the topics to be taught (Classes required)	Community characteristics: species richness, dominance, diversity, abundance, vertical stratification, Ecotone and edge effect; Ecological succession with hydrosere Theories pertaining to climax community

No. of Tutorials	1
3rd Semester (CBCS)	
Course Code: ZC305T **CORE COURSE V: DIVERSITY OF CHORDATA**	
Allotted Unit No	**1**
Unit Name	**Unit 1: Introduction to Chordates**
No. of Class required	2
Detail of the topics to be taught (Classes required)	General characteristics and outline classification
No. of Tutorials	Nil
Allotted Unit No.	**2**
Unit Name	**Unit 2: Protochordata**
No. of Class required	8
Detail of the topics to be taught (Classes required)	General characteristics of Hemichordata, Urochordata and Cephalochordata; Study of larval forms in protochordates; Retrogressive metamorphosis in Urochordata
No. of Tutorials	2
Allotted Unit No.	**3**
Unit Name	**Unit 3: Origin of Chordata**
No. of Class required	3
Detail of the topics to be taught (Classes required)	Dipleurula concept and the Echinoderm theory of origin of chordates. Advanced features of vertebrates over Protochordata
No. of Tutorials	2
No. of Tutorials	1
Allotted Unit No.	**5**
Unit Name	**Unit 5: Pisces**
No. of Class required	8
Detail of the topics to be taught (Classes required)	General characteristics of Chondrichthyes and Osteichthyes, classification up to order Migration, Osmoregulation and Parental care in fishes
No. of Tutorials	1
Course Code: ZC306T **CORE COURSE VI:** **ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS**	
Allotted Unit No.	**6**
Unit Name	**Endocrine System**
No. of Class required	6
Detail of the topics to be taught (Classes required)	Histology of endocrine glands - pineal, pituitary, thyroid, parathyroid, pancreas, adrenal;hormones secreted by them and their mechanism of action; Classification of hormones;Regulation of their secretion; Mode of hormone action, Signal transduction pathways for steroidal and non- steroidal hormones; Hypothalamus (neuroendocrine gland) - principa lnuclei involved in neuroendocrine control of anterior pituitary and endocrine system;Placental hormones
No. of Tutorials	1
5th Semester (Non CBCS)	

ZOOMT- 501: GENETICS AND EVOLUTION	
Allotted Unit No.	**4**
Unit Name	**Unit 4.**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Evidences and theories of evolution- palaeo-biological and molecular evidences; Lamarckism, Darwinism, Neo Darwinism, Mutation theory and Modern Synthetic theory; origin of life (chemical and biological origin); variation- types and sources; isolation; speciation (sympatric, allopatric and peripatric); fossil and fossilization.
No. of Tutorials	1
Allotted Unit No.	**5**
Unit Name	**Unit 5:**
No. of Class required	**10**
Detail of the topics to be taught (Classes required)	Concept of population- gene pool and gene frequency (Hardy-Weinberg law); change in gene frequency (genetic drift, gene flow, genetic load); continental drift; parallel, divergent and convergent evolution; endemism and adaptive radiation
No. of Tutorials	1
ZOOMT- 503: ANIMAL PHYSIOLOGY	
Allotted Unit No.	**4**
Unit Name	**Unit 4:**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Circulation- coronary circulation; origin and conduction of cardiac impulse; cardiac cycle; cardiac output and its regulation; disorders of cardio-vascular system; haemostasis; respiration- structure and functions of haemoglobin; O2 and CO2 transport by blood; regulation of respiration; carbon monoxide poisoning; tracheal respiration in insects.
No. of Tutorials	2
ZOOMT- 505: ENVIRONMENTAL BIOLOGY AND WILDLIFE	
Allotted Unit No.	**5**
Unit Name	**Unit 5:**
No. of Class required	10
Detail of the topics to be taught (Classes required)	IUCN status of species category; important endangered species of N.E. India - rhinoceros, tiger, golden langur, dancing deer, river dolphin, pigmy hog, white winged wood duck and golden mahseer (*Tor spp*.); threats to biodiversity; man-wildlife conflict; ex-situ and insitu conservation strategies; major national parks of NE India; concept of biosphere reserve and biodiversity hot spot; Indian Wildlife Protection Act, 1972.
ZOOMT- 507: ENDOCRINOLOGY	
Allotted Unit No.	1
Unit Name	**Unit 1:**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Comparative anatomy of pituitary, thyroid, adrenal and pancreas in fish, amphibia, birds and mammals.
No. of Tutorials	1
Allotted Unit No.	3

Unit Name	**Unit 3:**
No. of Class required	10
Detail of the topics to be taught (Classes required)	General characters of hormones; mechanism of action of hormones; regulation of hormone secretion; hypothalamo-hypophysial system; disorders associated with hypo and hyper secretion of hormones.
No. of Tutorials	1

(Dr. Rina Handique)

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EVEN SEMESTER-2021

	2nd Semester (CBCS)	
	Course Code: ZC203T CORE COURSE III NON-CHORDATES II: COELOMATES	
	Allotted Unit No	**1**
	Unit Name	**Unit 1: Introduction to Coelomates**
	No. of Class required	**2**
	Detail of the topics to be taught (Classes required)	Evolution of coelom and metamerism
	No. of tutorials	**1**
	4th Semester CBCS	
	Course Code: ZC408T CORE COURSE VIII: COMPARATIVE ANATOMY OF VERTEBRATES	
	Allotted Unit No	**1**
	Unit Name	**Unit 1: Integumentary System**
	No. of Class required	**8**
	Detail of the topics to be taught (Classes required)	Structure, functions and derivatives of integument
	No. of tutorials	**1**
6th Semester (Non CBCS)		
ZOOMT- 601: PARASITOLOGY AND ETHOLOGY		
Allotted Unit No		**1**
Unit Name		**Unit 1:**
No. of Class required		**8**
Detail of the topics to be taught (Classes required)		Parasitism; types of parasites, hosts and vectors; pasasitic adaptations and effects on hosts; life history and mode of infection and pathogenicity of *Entamoeba histolytica*, *Trypanosoma spp*., *Leishmania donovanii*, *Giardia intestinalis*, *Trichomonas vaginalis* & *Plasmodium spp.*
ZOOMT- 606: ECONOMIC ZOOLOGY		
Allotted Unit No		**1**
Unit Name		**Unit 1:**
No. of Class required		8
Detail of the topics to be taught (Classes required)		Major insect pests of paddy, tea and stored grains and their biology; Pest management- chemical, cultural and biological; integrated pest management.

Department of Zoology
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(Dr. Rina Handique)

Head
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Gargaon College,

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TEACHING PLAN
Course: B. Sc.
Subject: ZOOLOGY

SESSION: 2020-2021

ODD SEMESTER 2020

Name of the Teacher: Pimily Langthasa
Methods to be applied: Lecture and presentation method along with interaction and discussion.
Teaching Materials: Green & White Board, Chalk Pencil, Marker, Duster, Books, Laptop, and Projector.

1ST SEMESTER (CBCS)	
PAPER TITLE (CODE): NON-CHORDATES I: PROTISTS TO PSEUDOCOELOMATES (CORE COURSE I)	
Allotted Unit No	**2**
Unit Name	**Unit 2:Porifera**
No. of Class required	7
Detail of the topics to be taught (Classes required)	General characteristics (1), Classification up to classes (2) Canal system (2)and spicules in sponges (2)
No. of Tutorials	2
Allotted Unit No	**3**
Unit Name	**Unit 3: Cnideria**
No. of Class required	10
Detail of the topics to be taught (Classes required)	General characteristics (1), Classification up to classes (1), Metagenesis in *Obelia (2)*, Polymorphism in Cnidaria (2) Corals (1) and coral reefs (2)
No. of Tutorials	3
3RD SEMESTER (CBCS)	
PAPER TITLE (CODE): ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEM (CORE COURSE VI)	
Allotted Unit No	**1**
Unit Name	**Unit 1: Tissues**
No. of lass required	6
Detail of the topics to be taught (Classes required)	Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous tissue
No. of Tutorials	2
Allotted Unit No	**2**
Unit Name	**Unit 2: Bone and Cartilage**
No. of lass required	6
Detail of the topics to be taught (Classes required)	Structure and types of bones and cartilages (3) Ossification (2), bone growth and resorption (1)
No. of Tutorials	2
Allotted Unit No	**3**
Unit Name	**Unit 3: Nervous System**
No. of Class required	13

Detail of the topics to be taught (Classes required)	Structure of neuron (1), resting membrane potential, Origin of action potential (1) and its propagation across the myelinated and unmyelinated nerve fibers (2); Types of synapse (1), Synaptic transmission (1) and, Neuromuscular junction (2); Reflex action and its types - reflex arc (1); Physiology of hearing (2) and vision (2).
No. of Tutorials	4
Allotted Unit No.	**4**
Unit Name	**Unit 4: Muscle**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Histology of different types of muscle (2); Ultra structure of skeletal muscle (2); Molecular and chemical basis of muscle contraction (4); Characteristics of muscle twitch (1); Motor unit (1), summation and tetanus (2)
No. of Tutorials	3
Allotted Unit No.	**5**
Unit Name	**Unit 5: Reproductive System**
No. of Class required	11
Detail of the topics to be taught (Classes required)	Histology of testis (1) and ovary (2) ; Physiology of male and female reproduction (3); Puberty (1), Methods of contraception in male (2) and female (2)
No. of Tutorials	5
PAPER TITLE (CODE): FUNDAMENTALS OF BIOCHEMISTRY (CCVII)	
Allotted Unit No.	**3**
Unit Name	**Unit 3: Proteins**
No. of Class required	15
Detail of the topics to be taught (Classes required)	Amino acids: Structure, Classification and General properties of α-amino acids (3); Physiological importance of essential and non-essential α-amino acids (2) Proteins: Bonds stabilizing protein structure (2); Levels of organization in proteins ; Denaturation (3); Introduction to simple and conjugate proteins (2) Immunoglobulins: Basic Structure (1), Classes and Function (1), Antigenic Determinants (1)
No. of tutorials	6
Allotted Unit No.	**4**
Unit Name	**Unit 4: Nucleic Acids**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Structure: Purines and pyrimidines (2), Nucleosides, Nucleotides, Nucleic acids (2) Cot Curves: Base pairing, Denaturation and Renaturation of DNA (3), Types of DNA and RNA (2), Complementarity of DNA (1), Hpyo-Hyperchromaticity of DNA (2)
No. of tutorials	4
5th SEMESTER (NON CBCS)	
PAPER TITLE (CODE): ZOOMT- 501 GENETICS AND EVOLUTION	
Allotted Unit No.	**2**

No. of Class required	4
Detail of the topics to be taught (Classes required)	Linkage and crossing over; basic knowledge of gene mapping; determination of sex, sex-linked inheritance; cytoplasmic inheritance
No. of Tutorials	3
Allotted Unit No.	**3**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Unit-3: Concept of gene and their fine structures; chromosomal (numerical and structural) and gene mutation, types, genetic significance of mutation and practical implications; Human genetics: human as a genetic material, autosome and sex chromosomes, recessive and dominant trades, inborn error in metabolism, human chromosome, human genome project
PAPER TITLE (CODE): ZOOMT- 503: ANIMAL PHYSIOLOGY	
Allotted Unit No.	**Unit: 1**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Muscle and its contraction- molecular composition of myofilaments (3); sarcoplasmic reticulum and T- tubules (2); mechanism of muscle contraction (2); characteristic of muscle twitch- isometric and isotonic contractions (2); summation and tetanus (2).
No. of Tutorials	3
Allotted Unit No.	**Unit: 3**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Excretion- structure and functions of nephron (2); renal blood supply (1); mechanism and regulation of urine formation (4); renal failure and dialysis (1)
No. of Tutorials	2
Allotted Unit No.	**Unit: 5**
No. of Class required	15
Detail of the topics to be taught (Classes required)	Nervous system- neurons, resting membrane potential and its basis (2), action potential and its propagation in myelinated and non-myelinated nerve fibre (3); types of synapses and synaptic transmission (1); neuro-transmitters- their release and action (1); neuro-muscular junction (1); types of reflexes (1); reflex activity (1); reflex arc (1); physiology of vision (2); addictive drugs-types (1); drug addiction- causes, physiological effects; social implications (1)
No. of Tutorials	3
PAPER TITLE (CODE): ZOOMT- 505: ENVIRONMENTAL BIOLOGY AND WILDLIFE	
Allotted Unit No.	**4**
No. of Class required	**8**
Detail of the topics to be taught (Classes required)	Environmental pollution (water, air and soil) (3); bioindicators in pollution studies (1); ecological succession (1); ecological backlash (1); greenhouse effect; ozone layer depletion and its impact (2)

No. of Tutorials	1
PAPER TITLE (CODE): ZOOMT- 507: ENDOCRINOLOGY	
Allotted Unit No.	Unit-4
No. of Class required	6
Detail of the topics to be taught (Classes required)	Roles of hormones in reproductive cycle (1), pregnancy, parturition and lactation (2); methods of contraception (1); amniocentesis and IVF (2).
No. of Tutorials	1
Allotted Unit No.	**5**
No. of Class required	4
Detail of the topics to be taught (Classes required)	Neuroendocrine system in insects (2); role of hormones in growth and development of insects (2)
No. of Tutorials	1

SESSION: EVEN SEMESTER 2021

2nd SEMESTER (CBCS)	
PAPER TITLE (CODE): CELL BIOLOGY (CORE COURSE IV)	
Allotted Unit No	**1**
Unit Name	**Unit 1: Overview of Cells**
No. of lass required	4
Detail of the topics to be taught (Classes required)	Prokaryotic and Eukaryotic cells (3) Virus, Viroids, Mycoplasma, Prions (1)
No. of Tutorials	1
Allotted Unit No	**2**
Unit Name	**Unit 2: Plasma Membrane**
No. of lass required	8
Detail of the topics to be taught (Classes required)	Various models of plasma membrane structure (3) Transport across membranes: Active and Passive transport, Facilitated transport (2), Cell junctions: Tight junctions, Desmosomes, Gap junctions (2)
No. of Tutorials	3
Allotted Unit No	**3**
Unit Name	**Unit 3: Endomembrane System**
No. of Class required	**7**
Detail of the topics to be taught (Classes required)	Structure and Functions: Endoplasmic Reticulum(4), Golgi Apparatus(2), Lysosomes(1)
No. of Tutorials	2
Allotted Unit No.	**4**
Unit Name	**Unit 4: Mitochondria and Peroxisomes**
No. of Class required	9
Detail of the topics to be taught (Classes required)	Mitochondria: Structure (2), Semi-autonomous nature (1), Endosymbiotic hypothesis (2), Mitochondrial Respiratory Chain (2), Chemi-osmotic hypothesis(1), Peroxisomes(1)
No. of Tutorials	Nil

Allotted Unit No.	**5**
Unit Name	**Unit 5: Cytoskeleton**
No. of Class required	4
Detail of the topics to be taught (Classes required)	Structure and Functions: Microtubules, Microfilaments and Intermediate filaments (4)
No. of Tutorials	Nil
Allotted Unit No.	**6**
Unit Name	**Unit 6: Nucleus**
No. of Class required	9
Detail of the topics to be taught (Classes required)	Structure of Nucleus (2) Nuclear envelope, Nuclear pore complex, Nucleolus (2) Chromatin: Euchromatin and Hetrochromatin (2) packaging (nucleosome) (3)
No. of Tutorials	3
4th SEMESTER (CBCS)	
PAPER TITLE (CODE): ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS (CORE COURSE IX)	
Allotted Unit No	**1**
Unit Name	**Unit 1: Physiology of Digestion**
No. of Class required	**14**
Detail of the topics to be taught (Classes required)	Structural organization and functions of gastrointestinal tract and associated glands; Mechanical and chemical digestion of food; Absorptions of carbohydrates, lipids, proteins, water, minerals and vitamins; Hormonal control of secretion of enzymes in Gastrointestinal tract.
No. of tutorials	**3**
Allotted Unit No	**2**
Unit Name	**Unit 2: Physiology of Respiration**
No. of Class required	**15**
Detail of the topics to be taught (Classes required)	Histology of trachea and lung (3); Mechanism of respiration (2), pulmonary ventilation; Respiratory volumes and capacities (2); Respiratory pigments(1), Transport of oxygen and carbon dioxide in blood(3); Dissociation curves and the factors influencing it (2); Carbon monoxide poisoning (1); Control of respiration (1)
No. of tutorials	**5**
Allotted Unit No	**3**
Unit Name	**Unit 3: Renal Physiology**
No. of Class required	**8**
Detail of the topics to be taught (Classes required)	Structure of kidney (1) and its functional unit (2); Mechanism of urine formation (3); Regulation of water balance (1); Regulation of acid-base balance (1)
No. of tutorials	3
PAPER TITLE (CODE): BIOCHEMISTRY OF METABOLIC PROCESSES (CORE COURSE X)	

Allotted Unit No	**4**
Unit Name	**Unit 4: Protein Metabolism**
No. of Class required	10
Detail of the topics to be taught (Classes required)	Catabolism of amino acids (2): Transamination, Deamination, Urea cycle (4); Fate of C-skeleton of Glucogenic and Ketogenic amino acids (4)
No. of tutorials	2
Allotted Unit No	**5**
Unit Name	**Unit 5: Oxidative Phosphorylation**
No. of Class required	10
Detail of the topics to be taught (Classes required)	Redox systems (2); Review of mitochondrial respiratory chain (3), Inhibitors and un-couplers of Electron Transport System (3)
No. of tutorials	**2**
6th SEMESTER (NON-CBCS)	
PAPER TITLE (CODE): ZOOMT- 601: PARASITOLOGY AND ETHOLOGY	
Allotted Unit No	**Unit 4**
No. of Class required	4
Detail of the topics to be taught (Classes required)	Introduction to animal behaviour; brief history of ethology; patterns of behaviour; sense organs and behaviour; genetical and ecological aspects of behaviour. Unit-5:
No. of tutorials	1
Allotted Unit No	**Unit 5**
No. of Class required	28
Detail of the topics to be taught (Classes required)	Different types of orientation and communication in animals; comparative aspects of learning, offensive and defensive behaviour; social behaviour in insects.
No. of tutorials	6
PAPER TITLE (CODE): ZOOMT- 603: MOLECULAR BIOLOGY AND IMMUNOLOGY	
Allotted Unit No	**Unit-1**
No. of Class required	**7**
Detail of the topics to be taught (Classes required)	Genome organization in prokaryotes and eukaryotes (2), DNA as genetic material (1), structure and functions of DNA & RNA (2); Watson & Crick Model of DNA (1); other forms of DNA (A & Z) (1).
No. of tutorials	**2**
Allotted Unit No	**Unit-2**
No. of Class required	**8**
Detail of the topics to be taught (Classes required)	Replication and transcriptions (4); genetic code (1); Wobble hypothesis (1); protein biosynthesis in prokaryotes (2).
No. of tutorials	3
Allotted Unit No	**Unit-3**
No. of Class required	9
Detail of the topics to be taught (Classes required)	Recombination in prokaryotes (2); transformation, conjugation and transduction (2); concept of transposons and plasmids (1); regulation of gene expression in prokaryotes (2), operon concept (Lac operon) (2).

No. of tutorials	1
Allotted Unit No	**Unit-4**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Types of immunity (1); cells and organs involved in immunity (1); lymphoid organs (1); antigens, properties of antigens, adjuvant and haptens (3); antigen-antibody reaction (1); vaccines and vaccinations (1).
No. of tutorials	1
Allotted Unit No	**Unit-5**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Immunoglobulin: basic structure, classes and functions (1); clonal selection theory (1); polyclonal and monoclonal antibodies (2); major histocompatibility complex- structure and functions (3); immune system in health and disease (1); basic concept of immunodiagnostic techniques (immunodiffusion, RIA and ELISA) (3); AIDS (1)
No. of tutorials	3
PAPER TITLE (CODE): ZOOMT- 604: BIOTECHNOLOGY AND BIOINFORMATICS	
Allotted Unit No	**1**
No. of Class required	11
Detail of the topics to be taught (Classes required)	Introduction, history and scope (1), basic knowledge of genetic engineering (1), protoplast fusion and somatic hybridization technique (2); Basic principles of recombinant DNA technology (1), cutting, joining and visualization of DNA fragments, cloning vectors and gene cloning (3); application of DNA technology in agriculture and health (2); industrial biotechnology with special reference to production of alcohol and antibiotics (1).
No. of tutorials	2
PAPER TITLE (CODE): ZOOMT- 606: ECONOMIC ZOOLOGY	
Allotted Unit No	Unit-2
No. of Class required	5
Detail of the topics to be taught (Classes required)	Life histories of silkworm (eri, muga and mulberry) (3); culture technique of silkworms (1); diseases of silkworms and its prevention (1)
No. of tutorials	1

Department of Zoology
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Dr. Rina Handique
HoD
Department of Zoology

GARGAON COLLEGE
TEACHING PLAN
Course: B. Sc.
Session: Even semester 2021

Subject: ZOOLOGY
Name of the Teacher: Dr. Rashmi Dutta
Methods to be applied: Lecture and presentation method along with interaction and discussion.
Teaching Materials: Green & White Board, Chalk Pencil, Marker, Duster, Books, Journal, Newspaper, Magazine, Periodicals, Laptop, Projector.

Paper Title (Code): NON-CHORDATES II: COELOMATES (ZC203T)	
Allotted Unit No	**1**
Unit Name	**Unit 1: Introduction to Coelomates**
No. of Class required	5
Detail of the topics to be taught (Classes required)	Evolution of coelom and metamerism (3); Theory of Metamerism (1); Theory of Coelom (1)
No. of tutorials	2
Allotted Unit No	**2**
Unit Name	**Unit 2: Annelida**
No. of Class required	5
Detail of the topics to be taught (Classes required)	General characteristics and Classification up to classes (3); Excretion in Annelida (2)
No. of tutorials	1
Allotted Unit No	**3**
Unit Name	**Unit 3: Arthropoda**
No. of Class required	10
Detail of the topics to be taught (Classes required)	General characteristics and Classification up to classes (3); Vision and Respiration in Arthropoda (3); Metamorphosis in Insects (1); Social life in bees and termites (3)
No. of tutorials	3
Allotted Unit No	4
Unit Name	**Unit 4: Onychophora**
No. of Class required	3
Detail of the topics to be taught (Classes required)	General characteristics and (1) Evolutionary significance (2)
No. of tutorials	Nil
Allotted Unit No	5
Unit Name	**Unit 5: Mollusca**
No. of Class required	8
Detail of the topics to be taught (Classes required)	General characteristics and (1); Classification up to classes (1); Respiration in Mollusca (1); Torsion and detorsion in Gastropoda (2); Pearl formation in bivalves (1); Evolutionary significance of trochophore larva (2)
No. of tutorials	2
Allotted Unit No	6
Unit Name	**Unit 6: Echinodermata**
No. of Class required	
Detail of the topics to be taught (Classes required)	General characteristics and (1); Classification up to classes (1); Water-vascular system in Asteroidea (1); Larval forms in Echinodermata (2); Affinities with Chordates (1)
No. of tutorials	2
Paper Title (Code): COMPARATIVE ANATOMY OF VERTEBRATES (ZC408T)	
Allotted Unit No	1
Unit Name	**Unit 1: Integumentary System**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Structure of Integument in Vertebrates, (3); functions of Integuments in Vertebrates and (2); Derivatives of integument (2)
No. of tutorials	2
Allotted Unit No	2
Unit Name	**Unit 2: Skeletal System**
No. of Class required	9
Detail of the topics to be taught (Classes required)	Overview of axial and appendicular skeleton of different Vertebrates (4); Jaw suspensorium in Vertebrates, (3); Visceral arches in Different Vertebrates (2)
No. of tutorials	3

Allotted Unit No	3
Unit Name	**Unit 3: Digestive System**
No. of Class required	5
Detail of the topics to be taught (Classes required)	Alimentary canal of Different Vertebrates (1); and associated glands, (2) dentition of Vertebrates (2)
No. of tutorials	2
Allotted Unit No	4
Unit Name	**Unit 4: Respiratory System**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Skin of Vertebrates (2); Gills of Vertebrates (1); Lungs of Vertebrates (1); and air sacs of Vertebrates (1); Accessory respiratory organs of Vertebrates (2)
No. of tutorials	2
Allotted Unit No	5
Unit Name	**Unit 5: Circulatory System**
No. of Class required	5
Detail of the topics to be taught (Classes required)	General plan of circulation of Vertebrates (3); evolution of heart and aortic arches of Vertebrates (2)
No. of tutorials	1
Allotted Unit No	6
Unit Name	**Unit 6: Urinogenital System**
No. of Class required	6
Detail of the topics to be taught (Classes required)	Succession of kidney of Vertebrates (2); Evolution of urinogenital ducts of Vertebrates (3); Types of mammalian uteri (1)
No. of tutorials	2
Allotted Unit No	7
Unit Name	**Unit 7: Nervous System**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Comparative account of brain of Vertebrates (2); Autonomic nervous system of Vertebrates (2); Spinal cord of Vertebrates (2); Cranial nerves in mammals (1)
No. of tutorials	2
Allotted Unit No	8
Unit Name	**Unit 8: Sense Organs**
No. of Class required	4
Detail of the topics to be taught (Classes required)	Classification of receptors (2); Brief account of visual and (1); Auditory receptors in man (1)
No. of tutorials	**1**
Paper Title (Code): ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS (ZC409T)	
Allotted Unit No	1
Unit Name	**Unit 1: Physiology of Digestion**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Structural organization and (1); Functions of gastrointestinal tract and associated glands (2); Mechanical and chemical digestion of food (2); Absorptions of carbohydrates (1); Absorption of lipids, (1); Absorption of proteins, (1); Absorption of water, (1); Absorption of minerals and vitamins (1); Hormonal control of secretion of enzymes in Gastrointestinal tract (2)
No. of tutorials	5
Allotted Unit No	4
Unit Name	**Unit 4: Blood**
No. of Class required	14
Detail of the topics to be taught (Classes required)	Components of blood and their functions (2); Structure and functions of haemoglobin (1); Haemostasis: Blood clotting system, (3); Kallikrein-Kinninogen system, (2); Complement system & Fibrinolytic system, (3); Haemopoiesis (1); Blood groups: Rh factor, (1); ABO and MN blood group (1)
No. of tutorials	3
Allotted Unit No	5
Unit Name	**Unit 5: Physiology of Heart**
No. of Class required	14
Detail of the topics to be taught (Classes required)	Structure of mammalian heart (2); Coronary circulation (2); Structure and working of conducting myocardial fibers (2) Origin and conduction of cardiac impulses (1); Cardiac cycle; (2); Cardiac output and its regulation, (1); Frank-Starling Law of the heart, (1); Nervous and chemical regulation of heart rate (1) Electrocardiogram (1); Blood pressure and its regulation (1)
No. of tutorials	5

Paper Title (Code): BIOCHEMISTRY OF METABOLIC PROCESSES (ZC410T)	
Allotted Unit No	1
Unit Name	**Unit 1: Overview of Metabolism**
No. of Class required	10
Detail of the topics to be taught (Classes required)	Catabolism *vs* Anabolism, (1); Compartmentalization of metabolic pathways, (1) Shuttle systems and membrane transporters; (2); ATP as "Energy Currency of cell" (1); Coupled reactions; (1); Use of reducing equivalents and cofactors;(2) Intermediary metabolism and regulatory mechanisms (2)
No. of tutorials	3
Allotted Unit No	2
Unit Name	**Unit 2: Carbohydrate Metabolism**
No. of Class required	10
Detail of the topics to be taught (Classes required)	Sequence of reactions and regulation of glycolysis, (4); Citric acid cycle, (2) Phosphate pentose pathway (1); Gluconeogenesis (1); Glycogenolysis and (1) Glycogenesis (1)
No. of tutorials	5
Allotted Unit No	3
Unit Name	**Unit 3: Lipid Metabolism**
No. of Class required	10
Detail of the topics to be taught (Classes required)	β-oxidation and (2); omega -oxidation of saturated fatty acids with even and odd number of carbon atoms; (4); Biosynthesis of palmitic acid; (3); Ketogenesis (1)
No. of tutorials	4
Paper Title (Code): Parasitology and Ethology (Zoo MT- 601)	
Allotted Unit No	1
Unit Name	**Unit 1: Introduction**
No. of Class required	10
Detail of the topics to be taught (Classes required)	Parasitism; types of parasites, hosts and vectors; pasasitic adaptations and effects on hosts; life history and mode of infection and pathogenicity of *Entamoeba histolytica*, *Trypanosoma* spp., *Leishmania donovanii*, *Giardia intestinalis*, *Trichomonas vaginalis* & *Plasmodium* spp.
No. of tutorials	4
Allotted Unit No	2
Unit Name	**Unit 2: General organizations and pathogenosity of bacteria & viruses**
No. of Class required	7
Detail of the topics to be taught (Classes required)	General organizations and pathogenosity of bacteria & viruses (*Rickettsia, Borrelia*, *Treponema* & *Leptospira*); life history, parasitic adaptation and pathogenicity of *Taenia solium*, *Fasciola hepatica*, *Ancylostoma duodenale* and *Wuchereria bancrofti*.
No. of tutorials	2
Allotted Unit No	3
Unit Name	**Unit 3: Vectors of human diseases**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Vectors of human diseases- Malaria, Yellow fever, dengue, haemorrhagic fever, filariasis, Japanese B-encephalitis & dengue; measures of control of the vectors.
No. of tutorials	2
Allotted Unit No	4
Unit Name	**Unit 4: Introduction to animal behaviour**
No. of Class required	6
Detail of the topics to be taught (Classes required)	brief history of ethology; patterns of behaviour; sense organs and behaviour; genetical and ecological aspects of behaviour.
No. of tutorials	2
Allotted Unit No	5
Unit Name	**Unit 5: Orientation and communication**
No. of Class required	6
Detail of the topics to be taught (Classes required)	Different types of orientation and communication in animals; comparative aspects of learning, offensive and defensive behaviour; social behaviour in insects.
No. of tutorials	2
Paper Title (Code): Molecular Biology and Immunology (ZooMT- 603)	
Allotted Unit No	**4**
Unit Name	**Unit 4: Immunity and its Types**
No. of Class required	12
Detail of the topics to be taught (Classes required)	Types of immunity; cells and organs involved in immunity; lymphoid organs; antigens, properties of antigens, adjuvant and haptens; antigen-antibody reaction;

	vaccines and vaccinations.
No. of tutorials	5
Allotted Unit No	**5**
Unit Name	**Unit 5: Immuno-System**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Immunoglobulin: basic structure, classes and functions; clonal selection theory; polyclonal and monoclonal antibodies; major histocompatibility complex- structure and functions; immune system in health and disease; basic concept of immunodiagnostic techniques (immunodiffusion, RIA and ELISA); AIDS.
No. of tutorials	3
Paper Title (Code): Biotechnology and Bioinformatics (ZooMT- 604)	
Allotted Unit No	**1**
Unit Name	**Unit 1: Introduction**
No. of Class required	8
Detail of the topics to be taught (Classes required)	History and scope, basic knowledge of genetic engineering, protoplast fusion and somatic hybridization technique; Basic principles of recombinant DNA technology, cutting, joining and visualization of DNA fragments, cloning vectors and gene cloning; application of DNA technology in agriculture and health; industrial biotechnology with special reference to production of alcohol and antibiotics.
No. of tutorials	2
Allotted Unit No	3
Unit Name	**Unit 3: Regulation of biotechnology**
No. of Class required	7
Detail of the topics to be taught (Classes required)	Production and application of transgenic animals and plants, Genetically modified Organism, their benefits and risk assessment; IPR, patents and ethical issues related to biotechnology.
No. of tutorials	3
Allotted Unit No	**4**
Unit Name	**Unit 4: Fundamentals of bioinformatics**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Introduction, history and scope of bioinformatics; Sources of information, internet world wide web and web browsers; Biological database: introduction, basic concepts of primary and secondary databases; Nucleic acid and protein sequence database (NCBI, gene bank and SWISS- PROT); Data mining and data mining tools (ENTREZ).
No. of tutorials	3
Allotted Unit No	**5**
Unit Name	**Unit 5: Database search and sequence alignment**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Database search and sequence alignment, Tools of sequence alignment – FASTA and BLAST; methods of sequence alignment; phylogenetic analysis: basic concept, steps in evaluation of phylogeny and constructing phylogenetic trees.
No. of tutorials	3
Paper Title (Code): Economic Zoology (ZooMT- 606)	
Allotted Unit No	**1**
Unit Name	**UNIT 1: Major Insect Pests**
No. of Class required	9
Detail of the topics to be taught (Classes required)	Major insect pests of paddy, tea and stored grains and their biology; Pest management- chemical, cultural and biological; integrated pest management.
No. of tutorials	3
Allotted Unit No	**2**
Unit Name	**UNIT 2: Silk Worm**
No. of Class required	8
Detail of the topics to be taught (Classes required)	Life histories of silkworm (eri, muga and mulberry); culture technique of silkworms; diseases of silkworms and its prevention
No. of tutorials	**2**
Allotted Unit No	**3**
Unit Name	**UNIT 3: Honey Bee**
No. of Class required	**5**

Detail of the topics to be taught (Classes required)	Life history of honey bee (*Apis india*); rearing techniques of honeybee; Biology and culture of lac insect.
No. of tutorials	**2**
Allotted Unit No	**4**
Unit Name	**UNIT 4: Aquaculture**
No. of Class required	**5**
Detail of the topics to be taught (Classes required)	Principles and practices in aquaculture; fish and prawn culture; preparation and management of different types of ponds for fish culture; induced breeding and hybridization technique in fishes; fish preservation methods; fish by-products.
No. of tutorials	**2**
Allotted Unit No	**5**
Unit Name	**UNIT 5: Piggery:**
No. of Class required	**5**
Detail of the topics to be taught (Classes required)	Piggery: management and practices of pig rearing; poultry: selection of breed (chicken and duck) and their scientific rearing methods; poultry diseases and its prevention/control.
No. of tutorials	**2**

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