

TEACHING PLAN (Year 2020-21)
Department of Zoology
SBMS COLLEGE, SUALKUCHI

Teaching technique:

- The classroom transaction of all the papers will be done through lectures, assignments, group discussion, practical demonstration, projects, etc.
- To make the teaching learning process more interactive and interesting ICT enabled classes will also be taken.
- In view of the pandemic situation, few classes will be arranged through online mode also.
- Practical experiments will be done in departmental laboratories under guidance of respective teacher. Necessary instruction will be followed. To develop an understanding quality few experiments will be incorporated outside the laboratory (within college campus)
- To gain practical knowledge, field study, educational excursion, institutional visit etc. will also be planned according to demand of course content.
- At least two class tests will be conducted per semester among the major students.
- For knowledge upliftment, observation of Days of importance, poster presentation competition, photography (Zoology related) competition will also be organized time to time.
- Invited lecture/ popular talk/ workshop/ departmental seminars etc. will also be arranged for boosting the knowledge/ ideas among the students.

NB:

- Sessional Examinations are conducted by the College Examination Cell in the middle part of each semester.
- End Semester Examinations are generally held in Oct- Dec and May- Jun.
- Summer Vacation (generally starts from 1st Jul to 31st Jul)
- Winter Break (generally starts 1st Jan to 19th Jan)

Odd Semester

CBCS Course Content

Semester	TDC I Semester	Course	Major
Credit	04	Marks:	60
Paper Name	NON-CHORDATES I: PROTISTS TO PSEUDOCOELOMATES	Paper Code:	ZOO-HC-1016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	<ul style="list-style-type: none"> • Protista, Parazoa and Metazoa 19 General characteristics and Classification upto classes Study of Euglena, Amoeba and Paramecium Life cycle and pathogenicity of Plasmodium vivax and Entamoeba histolytica Locomotion and Reproduction in Protista Evolution of symmetry and segmentation of Metazoa 	Dr Sikha Rani Kalita	13	Oct	
2	<ul style="list-style-type: none"> • Porifera 7 General characteristics and Classification upto classes Canal system and spicules in sponges 		04	Nov	
3	<ul style="list-style-type: none"> • Cnidaria: General characteristics and Classification upto classes Metagenesis in Obelia Polymorphism in Cnidaria Corals and coral reefs 		09	Dec	
4	<ul style="list-style-type: none"> • Ctenophora: General characteristics and Evolutionary significance 		02	Jan	
5	<ul style="list-style-type: none"> • Platyhelminthes: General characteristics and Classification up to classes Life cycle and pathogenicity of Fasciola hepatica and Taeniasolium 	Dr Kakali Talukdar	06	Oct	
6	<ul style="list-style-type: none"> • Nematelminthes: General characteristics and Classification up to classes Lifecycle, and pathogenicity of Ascaris lumbricoides and Wuchereria bancrofti Parasitic adaptations in helminthe 		06	Oct	

Semester	TDC I Semester	Course	Major
Credit	04	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-1016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Study of whole mount of Euglena, Amoeba and Paramecium, Binary fission and Conjugation in Paramecium	Dr Sikha Rani Kalita	02	Dec	
2	• Examination of pond water collected from different places for diversity in protista		07	Nov	
3	• Study of Sycon (T.S. and L.S.), Hyalonema, Euplectella, Spongilla		04	Dec	
4	• Study of Obelia, Physalia, Millepora, Aurelia, Tubipora, Corallium, Alcyonium, Gorgonia, Metridium, Pennatula, Fungia, Meandrina, Madrepora		07	Dec	
5	• One specimen/slide of any ctenophore	Dr Kakali Talukdar	02	Nov	
6	Study of adult Fasciola hepatica, Taenia solium and their life cycles (Slides/micro- photographs)		04	Dec	
7	• Study of adult Ascaris lumbricoides and its life stages (Slides/micro-photographs)		04	Dec	
8	• To submit a Project Report on any related topic on life cycles.	Bandana Deka	Each student will be given to prepare a project report individually on a topic given in the syllabus (within Jan)		

Semester	TDC I Semester	Course	Major
Credit	04	Marks:	60
Paper Name	PRINCIPLES OF ECOLOGY	Paper No:	ZOO-HC-1026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction to Ecology: History of ecology, Autecology and synecology, Levels of organization, Laws of limiting factors, Study of physical factors	Bandana Deka	05	Oct	
2	• Population: Unitary and Modular populations Unique and group attributes of population: Density, natality, mortality, life tables, fecundity tables, survivorship curves, age ratio, sex ratio, dispersal and dispersion Exponential and logistic growth, equation and patterns, r and K strategies Population regulation - density-dependent and independent factors Population interactions, Gause's Principle with laboratory and field examples, Lotka-Volterra equation for competition and Predation, functional and numerical responses		12	Oct	
3	• Community: Community characteristics: species richness, dominance, diversity, abundance, vertical stratification, Ecotone and edge effect; Ecological succession with one example Theories pertaining to climax community		08	Nov, Dec	
4	• Ecosystem: Types of ecosystems with one example in detail, 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 Nutrient and biogeochemical cycle with one example of Nitrogen cycle Human modified ecosystem	Dr Kakali Talukdar	10	Nov, Dec	
5	• Applied Ecology: Ecology in Wildlife Conservation and Management		04	Jan	

Semester	TDC I Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-1026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Study of life tables and plotting of survivorship curves of different types from the hypothetical/real data provided	Bandana Deka	02	Dec	
2	• Determination of population density in a natural/hypothetical community by quadrat method and calculation of Shannon Weiner diversity index for the same community		04	Dec	
3	• Study of an aquatic ecosystem: Phytoplankton and zooplankton, determination of pH	Dr Sikha Rani Kalita	04	Dec	
	• Measurement of area, temperature, turbidity/penetration of light,	Bandana Deka	04	Dec	
	• Dissolved Oxygen content (Winkler's method).	Dr Kakali Talukdar	04	Dec	
4	• Report on a visit to National Park/Biodiversity Park/Wild life sanctuary	Due to pandemic situation this time it will not be conducted			

Semester	TDC I Semester	Course	Major
Credit	04	Marks:	60
Paper Name	ANIMAL DIVERSITY	Paper No:	ZOO-HG/RC-1016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Kingdom Protista: General characters and classification up to classes; Locomotory Organelles and locomotion in Protozoa	Dr Sikha Rani Kalita	03	Oct	

2	• Porifera: General characters and classification up to classes; Canal System in Sycon		03	Nov	
3	• Cnidaria: General characters and classification up to classes; Polymorphism in Hydrozoa		02	Nov	
4	• Platyhelminthes: General characters and classification up to classes; Life history of Taenia solium	Dr Kakali Talukdar	03	Oct	
5	• Nematelminthes: General characters and classification up to classes; Life history of Ascaris lumbricoides and its parasitic adaptations		04	Nov	
6	• Annelida: General characters and classification up to classes; Metamerism in Annelida		03	Dec	
7	• Arthropoda: General characters and classification up to classes; Vision in Arthropoda, Metamorphosis in Insects	Bandana Deka	04	Oct	
8	• Mollusca: General characters and classification up to classes; Torsion in gastropods		03	Oct	
9	• Echinodermata: General characters and classification up to classes; Water-vascular system in Asteroidea		03	Nov	
10	• Protochordates: General features and Phylogeny of Protochordata	Dr Kakali Talukdar	03	Dec	
11	• Agnatha: General features of Agnatha and classification of cyclostomes up to classes		03	Jan	
12	• Pisces: General features and Classification up to orders; Osmoregulation in Fishes	Dr Sikha Rani Kalita	02	Nov	
13	• Amphibia: General features and Classification up to orders; Parental care		02	Dec	
14	• Reptiles: General features and Classification up to orders; Poisonous and non-poisonous snakes, Biting mechanism in snakes		03	Jan	
15	• Aves: General features and Classification up to orders; Flight adaptations in birds	Bandana Deka	03	Dec	
16	• Mammals: Classification up to orders; Origin of mammals		03	Jan	

Semester	TDC I Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HG/RC-1016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	<ul style="list-style-type: none"> Study of the following specimens: Amoeba, Euglena, Plasmodium, Paramecium, Sycon, Hyalonema, and Euplectella, Obelia, Physalia, Aurelia, Tubipora, Metridium, Taeniasolium, Male and female Ascaris lumbricoides, Aphrodite, Nereis, Pheretima, Hirudinaria, Palaemon, Cancer, Limulus, Palamnaeus, Scolopendra, Julus, Periplaneta, Apis, Chiton, Dentalium, Pila, Unio, Loligo, Sepia, Octopus, Pentaceros, Ophiura, Echinus, Cucumaria and Antedon, Balanoglossus, Herdmania, Branchiostoma, Petromyzon, Sphyrna, Pristis, Torpedo, Labeo, Exocoetus, Anguilla, Ichthyophis/Ureotyphlus, Salamandra, Bufo, Hyla, Chelone, Hemidactylus, Chamaeleon, Draco, Vipera, Naja, Crocodylus, Gavialis, Any six common birds from different orders, Sorex, Bat, Funambulus, Loris 	Bandana Deka Dr Sikha Rani Kalita Dr Kakali Talukdar	06 06 04	Dec Oct Dec Oct	
2	<ul style="list-style-type: none"> Study of the following permanent slides: T.S. and L.S. of Sycon, Study of life history stages of Taenia, T.S. of Male and female Ascaris 	Dr Kakali Talukdar	06	Dec Oct	
3	<ul style="list-style-type: none"> Key for Identification of poisonous and non-poisonous snakes 	Dr Sikha Rani Kalita	02	Oct	

Semester	TDC III Semester	Course	Major
Credit	04	Marks:	60
Paper Name	PHYSIOLOGY AND BIOCHEMISTRY	Paper No:	ZOO-HC-3016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction to Chordates General characteristics and outline classification	Dr Sikha Rani Kalita	01	Oct	
2	• Protochordata General characteristics of Hemichordata, Urochordata and Cephalochordata; Study of larval forms in protochordates; Retrogressive metamorphosis in Urochordata		04	Oct	
3	• Origin of Chordata Dipleurula concept and the Echinoderm theory of origin of chordates Advanced features of vertebrates over Protochordata		02	Nov	
4	• Agnatha General characteristics and classification of cyclostomes up to class		01	Nov	
5	• Pisces General characteristics of Chondrichthyes and Osteichthyes, classification upto order Migration, Osmoregulation and Parental care in fishes		02	Nov	
6	• Amphibia Origin of Tetrapoda (Evolution of terrestrial ectotherms); General characteristics and classification upto order; Parental care in Amphibians	Bandana Deka	05	Oct	
7	• Reptilia General characteristics and classification up to order; Affinities of Sphenodon; Poison apparatus and Biting mechanism in snakes	Dr Sikha Rani Kalita	02	Dec	
8	• Aves General characteristics and classification up to order Archaeopteryx-- a connecting link; Principles and aerodynamics of flight, Flight adaptations and Migration in	Bandana Deka	05	Nov	

	birds				
9	• Mammals General characters and classification up to order; Affinities of Prototheria; Adaptive radiation with reference to locomotory appendages	Bandana Deka	04	Dec	
10	• Zoogeography Zoo geographical realms, Theories pertaining to distribution of animals, Plate tectonic and Continental drift theory, distribution of vertebrates in different realms	Dr Kakali Talukdar	04	Dec	

Semester	TDC III Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-3016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Protochordata Balanoglossus, Herdmania, Branchiostoma, Colonial Urochordata Sections of Balanoglossus through proboscis and branchio genital regions, Sections of Amphioxus through pharyngeal, intestinal and caudal regions. Permanent slide of Herdmania spicules	Dr Sikha Rani Kalita	04	Nov	
2	• Agnatha Petromyzon, Myxine		02	Nov	
3	• Fishes Scoliodon, Sphyrna, Pristis, Torpedo, Chimaera, Mystus, Heteropneustes, Labeo, Exocoetus, Echeneis, Anguilla, Hippocampus, Tetradon/ Diodon, Anabas, Flat fish		02	Nov	
4	• Amphibia Ichthyophis/Ureotyphlus, Necturus, Bufo, Hyla, Alytes, Salamandra		02	Dec	
5	• Reptilia Chelone, Trionyx, Hemidactylus, Varanus, Uromastix, Chamaeleon, Ophiosaurus, Draco, Bungarus, Vipera, Naja, Hydrophis, Zamenis, Crocodylus Key for		04	Dec	

	Identification of poisonous and non-poisonous snakes				
6	• Aves Study of six common birds from different orders. Types of beaks and claws	Bandana Deka	04	Dec	
7	• Mammalia Sorex, Bat (Insectivorous and Frugivorous), Funambulus, Loris, Herpestes, Erinaceus.		02	Jan	
8	• Mount of weberian ossicles of fish	Dr Sikha Rani Kalita	02	Dec	
9	• Power point presentation on study of any two animals from two different classes by students (may be included if dissections not given permission)	Bandana Deka	Each student will be given to prepare a power point presentation individually on a topic given in the syllabus (within Jan)		

Semester	TDC III Semester	Course	Major
Credit	04	Marks:	60
Paper Name	ANIMAL PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS	Paper No:	ZOO-HC-3026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Tissues: Structure, location, classification and functions of epithelial tissue, connective tissue, muscular tissue and nervous	Dr Sikha Rani Kalita	05	Dec	
2	• Bone and Cartilage: Structure and types of bones and cartilages, Ossification, bone growth and resorption	Bandana Deka	04	Oct	
3	• Nervous System: Structure of neuron, resting membrane potential, Origin of action potential and its propagation across the myelinated and unmyelinated nerve fibers; Types of synapse, Synaptic transmission and, Neuromuscular junction; Reflex action and its types - reflex arc; Physiology of hearing and vision.		08	Oct	
4	• Muscle: Histology of different types of muscle; Ultra		04	Nov	

	structure of skeletal muscle; Molecular and chemical basis of muscle contraction; Characteristics of muscle twitch; Motor unit, summation and tetanus				
5	• Reproductive System: Histology of testis and ovary; Physiology of male and female reproduction; Puberty, Methods of contraception in male and female	Dr Sikha Rani Kalita	04	Dec	
6	• Endocrine System: 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)- principal nuclei involved in neuro endocrine control of anterior pituitary and endocrines system; Placental hormones	Bandana Deka	10	Dec, Jan	

Semester	TDC III Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-3026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Demonstration of the unconditioned reflex action (Deep tendon reflex such as knee jerk reflex)	Bandana Deka	02	Jan	
2	• Preparation of temporary mounts: Squamous epithelium, Striated muscle fibres and nerve cells	Dr Kakali Talukdar	02	Dec	
3	• Study of permanent slides of Mammalian skin, Cartilage, Bone, Spinal cord, Nerve cell, Pituitary, Pancreas, Testis, Ovary, Adrenal, Thyroid and Parathyroid	Bandana Deka	04	Dec	
4	• Microtomy: Preparation of permanent slide of any five mammalian (Goat/ rat/mice) tissue	Dr Kakali Talukdar	08	Dec, Jan	

Semester	TDC III Semester	Course	Major
Credit	04	Marks:	60
Paper Name	FUNDAMENTALS OF BIOCHEMISTRY	Paper No:	ZOO-HC-3036

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Carbohydrates Structure and Biological importance: Monosaccharides, Disaccharides, Polysaccharides and Glycoconjugates	Dr Kakali Talukdar	02	Oct	
2	• Lipids Structure and Significance: Physiologically important saturated and unsaturated fatty acids, Tri-acylglycerols, Phospholipids, Glycolipids, Steroids		03	Oct	
3	• Proteins Amino acids: Structure, Classification and General properties of α _amino acids; Physiological importance of essential and non-essential α _amino acids Proteins: Bonds stabilizing protein structure; Levels of organization in proteins; Denaturation; Introduction to simple and conjugate proteins Immunoglobulins: Basic Structure, Classes and Function, Antigenic Determinants		04	Nov	
4	• Nucleic Acids Structure: Purines and pyrimidines, Nucleosides, Nucleotides, Nucleicacids Cot Curves: Base pairing, Denaturation and Renaturation of DNA Types of DNA and RNA, Complementarity of DNA, Hpyo-Hyperchromaticity of DNA		04	Nov	
5	• Enzymes Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes; Mechanism of enzyme action; Enzyme kinetics; Factors affecting rate of enzyme-catalyzed reactions; Derivation of Michaelis-Menten equation, Concept of Km and Vmax, Lineweaver_Burk plot; Multi-substrate reactions; Enzyme inhibition; Allosteric enzymes and their kinetics; Regulation of enzyme action		04	Dec	

Semester	TDC III Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-3036

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Qualitative tests of functional groups in carbohydrates, proteins and lipids.	Dr Kakali Talukdar	04	Dec	
2	• Paper chromatography of amino acids.	Bandana Deka	04	Dec	
3	• Action of salivary amylase under optimum conditions.	Dr Kakali Talukdar	02	Dec	
4	• Effect of pH, temperature on the action of salivary amylase.		02	Jan	
5	• Demonstration of proteins separation by SDS-PAGE.		02	Jan	

Semester	TDC III Semester	Course	Major
Credit	04	Marks:	60
Paper Name	PHYSIOLOGY AND BIOCHEMISTRY	Paper No:	ZOO-HG/RC-3016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Nerve and muscle Structure of a neuron, Resting membrane potential, Graded potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres, Ultra-structure of skeletal muscle, Molecular and chemical basis of muscle contraction	Bandana Deka	05	Oct	
2	• Digestion Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids	Dr Sikha Rani Kalita	04	Oct	
3	• Respiration Pulmonary ventilation, Respiratory volumes	Bandana Deka	03	Nov	

	and capacities, Transport of Oxygen and carbon dioxide in blood				
4	• Excretion Structure of nephron, Mechanism of Urine formation, Counter-current Mechanism	Dr Sikha Rani Kalita	04	Nov	
5	• Cardiovascular system Composition of blood, Haemostasis, Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle	Bandana Deka	04	Dec	
6	• Reproduction and Endocrine Glands Physiology of male reproduction: hormonal control of spermatogenesis; Physiology of female reproduction: hormonal control of menstrual cycle Structure and function of pituitary, thyroid, Parathyroid, pancreas and adrenal	Dr Sikha Rani Kalita	08	Nov, Dec	
7	• Carbohydrate Metabolism Glycolysis, Krebs Cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogen metabolism, Review of electron transport chain	Dr Kakali Talukdar	06	Oct	
8	• Lipid Metabolism Biosynthesis and β oxidation of palmitic acid		02	Oct	
9	• Protein metabolism Transamination, Deamination and Urea Cycle		03	Nov	
10	• Enzymes Introduction, Mechanism of action, Enzyme Kinetics, Inhibition and Regulation		04	Dec	

Semester	TDC III Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HG/RC-3016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Preparation of hemin crystals	Bandana Deka	02	Dec	
2	• Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland	Dr Sikha Rani Kalita	04	Nov	
3	• Study of permanent slides of spinal cord, duodenum, liver, lung, kidney, bone, cartilage		02	Dec	
4	• Qualitative tests to identify functional groups of carbohydrates in given solutions (Glucose, Fructose, Sucrose, Lactose)	Dr Kakali Talukdar	04	Oct	
5	• Estimation of total protein in given solutions by Lowry's method.		02	Nov	
6	• Study of activity of salivary amylase under optimum conditions		02	Dec	

Semester	TDC III Semester	Course	Major
Credit	04	Marks:	50+50
Paper Name	Ornamental Fish & Fisheries	Paper No:	ZOO-SE-3016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Ornamental Fish Diversity of North East India.	Bandana Deka	02	Nov	
2	• Aquarium plant diversity in the wetland of Assam.	Dr Sikha Rani Kalita	02	Nov	
3	• Construction and management of Home Aquarium.	Bandana Deka	02	Nov	
4	• Natural feed of Ornamental Fish		02	Dec	

5	• Strategies for maintenance of natural colour of Ornamental Fish		04	Dec	
6	• Natural Breeding of Tricogaster species	Dr Sikha Rani Kalita	02	Nov	
7	• Health management of Ornamental Fish	Dr Kakali Talukdar	02	Nov	
8	• Feed formulation of Ornamental Fish		02	Nov	
9	• Development of Biological filtration in Aquarium		02	Dec	
10	• Pure culture of planktons	Dr Sikha Rani Kalita	01	Jan	
Practical					

1	• Identification of Ornamental Fish	Bandana Deka	02	Nov	
2	• Culture of Indigenous ornamental fish in Aquarium	Dr Sikha Rani Kalita	04	Nov	
3	• Estimation of Physico-chemical characteristics of Aquarium water	Dr Kakali Talukdar	02	Dec	
4	• Biological filter for removal of Ammonia from Aquarium		04	Nov	
5	• Culture of Planktons	Dr Sikha Rani Kalita	02	Dec	

Non CBCS Course Content

Semester	TDC V Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Animal Physiology	Paper No:	M-501

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Nutrition: Nutritional requirements, Digestion and absorption of dietary components (Carbohydrates, fats, proteins, vitamins, and minerals), Co-ordination and control of digestive activity (nervous and hormonal regulation)	Dr Kakali Talukdar	03	Dec	
2	• Respiration: Types of respiration-anaerobic and aerobic, Properties and function of respiratory pigments, Exchange of gases, Breathing, O ₂ dissociation curve, control of breathing	Bandana Deka	08	Oct	
3	• Body fluids: Type of body fluids, composition and function of different body fluids, haemopoiesis, Buffer system in blood, chloride shift, blood group and transfusion, Blood clotting mechanism		09	Oct	
4	• Heart and circulation: Types of heart-myogenic and neurogenic, origin, conduction and regulation of heart beat, cardiac cycle, blood pressure		07	Dec	
5	• Excretion: Types of nitrogenous wastes- ammonotelic, ureotelic and uricotelic. Physiology of urine formation. Regulation of urine formation	Dr Sikha Rani Kalita	05	Oct	
6	• Nerve physiology: Initiation and conduction of nerve impulse, Synapse and synaptic transmission through myelinated and non- myelinated nerve fibre, Neuromuscular co-ordination		05	Oct	

7	• Muscle protein, chemistry of muscle contraction		02	Oct	
8	• Osmoregulation in vertebrates		02	Dec	

Semester	TDC V Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Biochemistry and bioenergetics	Paper No:	M-502

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Chemical foundation of biology- pH, pK, acids, bases, buffers free energy, isomerisation	Dr Kakali Talukdar	03	Oct	
1.2	• Classification and biological significance of carbohydrate, protein and lipid		03	Oct	
1.3	• Assembly of macromolecular complexes, ribosome chromatin and plasma membrane		03	Oct	
1.4	• Enzymes nature and classification- Mechanism of enzyme action • Enzyme kinetics	Dr Sikha Rani Kalita	02	Dec	
1.5	• Ornithine cycle		01	Dec	
1.6	• Oxidation and biosynthesis of fatty acids	Bandana Deka	04	Nov	
2.1	• First and second laws of thermodynamics	Dr Kakali Talukdar	02	Oct	
2.2	• Oxidation- reduction potential with special reference to mitochondrial electron transport system. • ATP in metabolism and in free energy production		03	Oct	
2.3	• Theories of oxidative phosphorylation		03	Oct	

Semester	TDC V Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Endocrinology and Immunology	Paper No:	M-503

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Brief account of structural features, historical structure and function of endocrine glands-Pituitary, Thyroid, Pancreas, Adrenal and Gonads	Bandana Deka	06	Oct, Nov	
1.2	• Hypothalamo-hypophysial axis		02	Nov	
1.3	• Classification of hormone		03	Nov	
1.4	• Mechanism of hormone action		03	Dec	
1.5	• Synthesis of thyroxin		02	Dec	
1.6	• Pancreatic hormones and metabolic regulation, physiological action of insulin and glucagon		03	Dec	
1.7	• Hormonal control of calcium homeostasis, chemistry and control of secretion of parathormone	Dr Sikha Rani Kalita	02	Oct	
2.1	• Basic immunological concept		01	Oct	
2.2	• Innate and acquired immunity		02	Nov	
2.3	• Components of immune system		01	Nov	
2.4	• Cell mediated and humoral immune system	Dr Kakali Talukdar	01	Dec	
2.5	• Structure and function of antibodies		03	Oct	
2.6	• Antigen antibody interaction		02	Nov	
2.7	• Immunization		02	Nov	
2.8	• Hyper immunity (allergy, immune deficiency, autoimmunity, Basic concept)		02	Nov	

Semester	TDC V Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Biological techniques and Biostatistics	Paper No:	M-504

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Principle and uses of analytical instruments: pH meter, colorimeter, spectrophotometer, ultra centrifuge	Dr Kakali Talukdar	03	Oct	
1.2	• Microscopy- Working principle of light, electron phase contrast and fluorescence microscopy		03	Oct	
1.3	• Separation techniques in biology- elementary knowledge of chromatography and electrophoresis		02	Dec	
1.4	• Microtomy		02	Dec	
1.5	• Cryopreservation of eggs and sperms		01	Oct	
1.6	• Use of radioisotope in biology, Autoradiography		01	Oct	
2.1	• Statistics in Biology	Dr Sikha Rani Kalita	02	Oct	
2.2	• Sampling techniques-sample units and their selection		01	Oct	
2.3	• Correlation and regression analysis- linear		01	Nov	
2.4	• Analysis of variance, t-test		03	Nov	
2.5	• Chi Square test (XY)		02	Nov	
2.6	• Use of computers in biology, computer application- data processing, language		05	Dec	
2.7	• Utility of biostatistics	Bandana Deka	01	Oct	
2.8	• Mean-Arithmetic, Geometric and Harmonic mean. Median and Mode		03	Oct	
2.9	• Standard deviation, standard error of mean		02	Dec	
2.10	• Graphic representation of data- histogram, bar diagram, Pie diagram and O-give		01	Dec	

Semester	TDC V Semester	Course	Major
Credit	04	Marks:	40+10=50
Paper Name	Physiology (Practical)	Paper No:	M-505

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Demonstration of Osmosis	Dr Sikha Rani Kalita	02	Oct	
2	• Effect of isotonic, hypertonic and hypotonic solution, acid and alkali on RBC		02	Oct	
3	• Haemoglobin estimation	Bandana Deka	02	Dec	
4	• Human blood grouping, ABO and Rh factor		02	Dec	
5	• Total count of RBC and WBC		06	Oct	
6	• Differential count of WBC		02	Oct	
7	• Preparation of haemin crystal from blood		02	Dec	
8	• Study of cardiac cycle in frog/rat using Kymograph	Dr Sikha Rani Kalita	02	Dec	
9	• Normal and abnormal constituents of urine (glucose and albumin)	Dr Kakali Talukdar	02	Jan	

Semester	TDC V Semester	Course	Major
Credit	04	Marks:	40+10=50
Paper Name	Biochemistry and Endocrinology (Practical)	Paper No:	M-506

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Biochemical estimation of glucose, total soluble proteins and total lipids.	Dr Kakali Talukdar	02	Nov	
1.2.	• Detection of enzyme activity-salivary amylase, pepsin		02	Dec	
1.3	• Separation of amino acids by paper/thin layer	Bandana Deka	06	Nov	

	chromatography				
1.4	• Estimation of ascorbic acid in lemon	Dr Kakali Talukdar	02	Nov	
1.5	• Detection of presence of vitamin A		02	Nov	
1.6	• Detection of mono, di, and polysaccharides		02	Nov	
2.1	• Dissection and localisation of selected endocrine glands: thyroid, pituitary, pancreas, adrenal, testis, ovary in frog/rat/rabbit	Dr Sikha Rani Kalita	10	Nov, Dec	
2.2	• Histological study of endocrine glands: thyroid, pancreas, adrenal, testis, ovary (through prepared slides)		04	Dec	

Semester	TDC V Semester	Course	General
Credit	08	Marks:	80+20=100
Paper Name	Cell biology, Genetics and Developmental Biology	Paper No:	E-501

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Structure of prokaryotic and eukaryotic cell	Dr Kakali Talukdar	01	Oct	
1.2	• Virus- structure and assembly		01	Oct	
1.3	• Cell Theory		01	Oct	
1.4	• Structure and function of plasma membrane, Membrane transport		03	Nov	
1.5	• Cell reproduction and mitosis		03	Nov	
1.6	• Ultra structure and function of mitochondria, Golgi bodies, Endoplasmic reticulum, and ribosome,		03	Dec	
1.7	• Chromosome -Ultrastructure and organization, Giant Chromosomes- Types and significance		02	Dec	
2.1	• Linkage- its mechanism and significance	Dr Sikha Rani Kalita	01	Oct	
2.2	• Crossing over- its types, mechanism, and significance		02	Oct	
2.3	• Sex linkage, Sex linked inheritance		02	Nov	
2.4	• Chromosomal sex determination		01	Nov	
2.5	• Varieties of gene expression-multiple alleles, lethal genes,		03	Dec	

	pleotropic genes, epistasis				
2.6	• Mutation- a) Chromosomal aberration b) Gene mutation, c) Harmful and beneficial effects of mutation		04	Oct	
3.1	• Gametogenesis: Spermatogenesis, Oogenesis,	Bandana Deka	02	Oct	
3.2	• Fertilization: Sperm-egg interaction, activation of egg, Gaete fusion in Sea urchin		03	Oct	
3.3	• Types of animal eggs.		01	Nov	
3.4	• Concept of Organizer and Induction		02	Nov	
3.5	• Extra embryonic membranes in bird and mammal.		02	Nov	
3.6	• Reproductive cycles in vertebrates		01	Dec	
3.7	• Regeneration in vertebrates and invertebrates		02	Dec	
3.8	• Parthenogenesis.		01	Dec	

Semester	TDC V Semester	Course	General
Credit	08	Marks:	80+20=100
Paper Name	Cell biology, Genetics and Developmental Biology (Practical)	Paper No:	E-502

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Study of different types of cells (prokaryotic and eukaryotic)	Bandana Deka	04	Nov	
2	• Staining techniques of nucleus and neucleolus	Dr Kakali Talukdar	02	Nov	
3	• Study of mitosis in onion root tip/tadpole larve		02	Dec	
4	• Study of meosis in Grasshopper/ <i>Grylotalpa</i>		02	Dec	
5	• Study of different tissue through Permanent slides	Dr Sikha Rani Kalita	04	Nov	
6	• Staining of Barr body from buccal epithelium		02	Dec	
7	• Study of slides of blastula, gastrula, and morula of Amphioxus and Frog/Toad	Bandana Deka	02	Nov	
8	• Study of specific stages of development of chick embryo through prepared slides		02	Dec	

Even Semester

CBCS Course Content

Semester	TDC II Semester	Course	Major
Credit	04	Marks:	60
Paper Name	NON-CHORDATES II: COELOMATES	Paper Code:	ZOO-HC-2016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction to Coelomates Evolution of coelom and metamerism	Dr Sikha Rani Kalita	02	Feb	
2	• General characteristics and Classification upto classes Excretion in Annelida		03	Feb	
3	• Arthropoda General characteristics and Classification upto classes Vision and Respiration in Arthropoda Metamorphosis in Insects Social life in bees and termites	Bandana Deka	07	Feb, Mar	
4	• Onychophora General characteristics and Evolutionary significance	Dr Sikha Rani Kalita	03	Mar, Apr	
5	• Mollusca General characteristics and Classification upto classes Respiration in Mollusca Torsion and detorsion in Gastropoda Pearl formation in bivalves Evolutionary significance of trochophore larva	Bandana Deka	06	Mar, Apr	
6	• Echinodermata General characteristics and Classification upto classes Water-vascular system in Asteroidea Larval forms in Echinodermata Affinities with Chordates	Dr Sikha Rani Kalita	10	Feb, Mar, Apr	

Semester	TDC II Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-2016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	<ul style="list-style-type: none"> • Study of followingspecimens: Annelids-Aphrodite, Nereis, Heteronereis , Sabella, Serpula, Chaetopterus, Pheretima, Hirudinaria 2 	Dr Sikha Rani Kalita	02	Apr	
	<ul style="list-style-type: none"> • Arthropods - Limulus, Palamnaeus, Palaemon, Daphnia, Balanus, Sacculina, Cancer, Eupagurus, Scolopendra, Julus, Bombyx, Periplaneta, termites and honey bees Onychophora - Peripatus 	Bandana Deka	04	Mar	
	<ul style="list-style-type: none"> • Molluscs - Chiton, Dentalium, Pila, Doris, Helix, Unio, Ostrea, Pinctada, Sepia, Octopus, Nautilus 		02	Apr	
	<ul style="list-style-type: none"> • Echinodermates - Pentaceros/Asterias, Ophiura, Clypeaster, Echinus, Cucumariaand Antedon 		02	Mar	
2	<ul style="list-style-type: none"> • Study of digestive system septal nephridia and pharyngeal nephridia of earthworm 	Dr Sikha Rani Kalita	02	Mar	
3	<ul style="list-style-type: none"> • T.S. through pharynx, gizzard, and typhlosolar intestine ofearthworm 		02	Mar	
4	<ul style="list-style-type: none"> • Mount of mouth parts and dissection of digestive system and nervous systemof Periplaneta 		04		
5	<ul style="list-style-type: none"> • To submit a Project Report on any related topic to larval forms (crustacean, mollusc and echinoderm) 	Bandana Deka	Each student will be given to prepare a project report individually on a topic given in the syllabus (within Apr)		

Semester	TDC II Semester	Course	Major
Credit	04	Marks:	60
Paper Name	CELL BIOLOGY	Paper Code:	ZOO-HC-2026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Over view of Cells 3 Prokaryotic and Eukaryotic cells, Virus, Viroids, Mycoplasma, Prions	Dr Kakali Talukdar	03	Feb	
2	• Plasma Membrane 7 Various models of plasma membrane structure Transport across membranes: Active and Passive transport, Facilitated transport Cell junctions: Tight junctions, Desmosomes, Gap junctions		04	Feb	
3	• Endomembrane System 10 Structure and Functions: Endoplasmic Reticulum, Golgi Apparatus, Lysosomes		04	Feb	
4	• Mitochondria and Peroxisomes 8 Mitochondria: Structure, Semi-autonomous nature, Endosymbiotic hypothesis Mitochondrial Respiratory Chain, Chemi-osmotic hypothesis Peroxisomes		04	Mar	
5	• Cytoskeleton 8 Structure and Functions: Microtubules, Microfilaments and Intermediate filaments		02	Mar	
6	• Nucleus 12 Structure of Nucleus: Nuclear envelope, Nuclear pore complex, Nucleolus Chromatin: Euchromatin and Heterochromatin and packaging (nucleosome)		04	Apr	
7	• Cell Division Mitosis, Meiosis, Cell cycle and its regulation 8		03	Apr	
8	• Cell Signaling GPCR and Role of second messenger (cAMP)		02	Apr	

Semester	TDC II Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-2026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Preparation of temporary stained squash of onion root tip to study various stages of mitosis	Dr Kakali Talukdar	02	Feb	
2	• Study of various stages of meiosis.		02	Mar	
3	• Preparation of permanent slide to show the presence of Barrbody in human female blood cells/cheek cells.	Dr Sikha Rani Kalita	04	Mar	
4	• Preparation of permanent slide to demonstrate: i) DNA by Feulgen reaction ii) Mucopolysaccharides by PAS reaction iii) Proteins by Mercurio bromophenol blue/FastGreen	Dr Kakali Talukdar	06	Mar, Apr	

Semester	TDC II Semester	Course	Major
Credit	04	Marks:	60
Paper Name	COMPARATIVE ANATOMY AND DEVELOPMENTAL BIOLOGY OF VERTEBRATES	Paper Code:	ZOO-HG/RC-2016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Integumentary System 4 Derivatives of integument w.r.t. glands and digital tips	Dr Sikha Rani Kalita	02	Feb	
2	• Skeletal System Evolution of visceral arches		02	Feb, Mar	

3	•Digestive System Brief account of alimentary canal and digestive glands		03	Mar	
4	•Respiratory System Brief account of Gills, lungs, air sacs and swim bladder	Bandana Deka	04	Feb,	
5	•Circulatory System Evolution of heart and aortic arches		04	Mar,	
6	•Urinogenital System Succession of kidney, Evolution of urinogenital ducts	Dr Sikha Rani Kalita	03	Apr	
7	•Nervous System Comparative account of brain	Bandana Deka	02	Mar,	
8	•Sense Organs Types of receptors		02	Mar,	
9	•Early Embryonic Development Gametogenesis: Spermatogenesis and oogenesis w.r.t. mammals, vitellogenesis in birds; Fertilization: external (amphibians), internal (mammals), blocks to polyspermy; Early development of frog and humans (structure of mature egg and its membranes, patterns of cleavage, fate map, up to formation of gastrula); types of morphogenetic movements; Fate of germ layers; Neurulation in frog embryo.	Dr Kakali Talukdar	12	Feb, Mar, Apr	
10	•Late Embryonic Development Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology; Metamorphic events in frog life cycle and its hormonal regulation.	Bandana Deka Dr Sikha Rani Kalita	06 02	Apr Apr	
11	•Control of Development Fundamental processes in development (brief idea) – Gene activation, determination, induction, Differentiation, morphogenesis, intercellular communication, cell movements and cell death	Dr Kakali Talukdar	08	Apr	

Semester	TDC II Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HG/RC-2016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	<ul style="list-style-type: none"> • Osteology: <ol style="list-style-type: none"> a) Disarticulated skeleton of fowl and rabbit b) Carapace and plastron of turtle/tortoise c) Mammalian skulls: One herbivorous and one carnivorous animal. 	Dr Sikha Rani Kalita	06	Feb, Mar	
2	<ul style="list-style-type: none"> • Frog - Study of developmental stages - whole mounts and sections through permanent slides – cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages. 	Dr Kakali Talukdar	08	Mar	
3	<ul style="list-style-type: none"> • Study of the different types of placenta histological sections through permanent slides or photomicrographs. 	Bandana Deka	02	Mar	
4	<ul style="list-style-type: none"> • Examination of gametes - frog/rat - sperm and ova through permanent slides or photomicrographs. 		02	Apr	

Semester	TDC IV Semester	Course	Major
Credit	04	Marks:	60
Paper Name	COMPARATIVE ANATOMY OF VERTEBRATES	Paper Code:	ZOO-HC-4016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	<ul style="list-style-type: none"> • Integumentary System Structure, functions and derivatives of integument 	Dr Sikha Rani Kalita	02	Feb	
2	<ul style="list-style-type: none"> • Skeletal System Overview of axial and appendicular skeleton, Jaw suspensorium, Visceral arches 		03	Feb	

3	•Digestive System Alimentary canal and associated glands, dentition		02	Mar	
4	•Respiratory System Skin, gills, lungs and air sacs; Accessory respiratory organs		03	Mar,	
5	•Circulatory System General plan of circulation, evolution of heart and aortic archs	Bandana Deka	03	Feb	
6	•Urinogenital System Succession of kidney, Evolution of urinogenital ducts, Types of mammalian uteri	Dr Sikha Rani Kalita	03	Mar	
7	•Nervous System Comparative account of brain Autonomic nervous system, Spinal cord, Cranial nerves in mammals	Bandana Deka	03	Feb	
8	•Sense Organs Classification of receptors Brief account of visual and auditory receptors in man		04	Mar	

Semester	TDC IV Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-4016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	•Study of placoid, cycloid and ctenoid scales through permanent slides/photographs	Bandana Deka	02	Apr	
2	• Disarticulated skeleton of Frog, Fowl, Rabbit	Dr Sikha Rani Kalita	02	Mar	
3	•Carapace and plastron of turtle/tortoise		02		
4	•Mammalian skulls: One herbivorous and one carnivorous animal		02	Mar	
5	•Study of structure of any two organs (heart, lung, kidney, eye and ear) from video recording (may be included if dissection not permitted)	Bandana Deka	04	May	
6	•Project on skeletal modifications in vertebrates (may be included if dissection not permitted)	Dr Sikha Rani Kalita	Each student will be given to prepare a project report individually on a topic given in the syllabus (within Apr)		

Semester	TDC IV Semester	Course	Major
Credit	04	Marks:	60
Paper Name	ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS	Paper Code:	ZOO-HC-4026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	•Physiology of Digestion 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.	Dr Sikha Rani Kalita	04	Mar, Apr	
2	•Physiology of Respiration Histology of trachea and lung; Mechanism of respiration, Pulmonary ventilation; Respiratory volumes and capacities; Transport of oxygen and carbon dioxide in blood; Respiratory pigments, Dissociation curves and the factors influencing it; Carbon monoxide poisoning; Control of respiration	Bandana Deka	07	Feb, Mar,	
3	•Renal Physiology Structure of kidney and its functional unit; Mechanism of urine formation; Regulation of water balance; Regulation of acid-base balance	Dr Sikha Rani Kalita	04	Apr	
4	•Blood Components of blood and their functions; Structure and functions of haemoglobin Haemostasis: Blood clotting system, Kallikrein-Kininogen system, Complement system& Fibrinolytic system, Haemopoiesis Blood groups: Rh factor, ABO and MN	Bandana Deka	05	Mar,	
5	•Physiology of Heart Structure of mammalian heart; Coronary circulation; Structure and working of conducting myocardial fibers.Origin and conduction of cardiac impulses Cardiac cycle; Cardiac output and its regulation, Frank-Starling Law of the heart, nervous and chemical regulation of heart rate. Electrocardiogram, Blood pressure and its regulation		06	Apr	

Semester	TDC IV Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-4026

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Determination of ABO Blood group	Bandana Deka	02	Mar	
2	• Enumeration of red blood cells and white blood cells using haemocytometer		04	Mar	
3	• Estimation of haemoglobin using Sahli's haemoglobinometer		02	Apr	
4	• Preparation of haemin crystals		02	Mar	
5	• Recording of blood pressure using a sphygmomanometer		04	May	
6	• Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum liver, trachea, lung, kidney	Dr Sikha Rani Kalita			

Semester	TDC IV Semester	Course	Major
Credit	04	Marks:	60
Paper Name	BIOCHEMISTRY OF METABOLIC PROCESSES	Paper Code:	ZOO-HC-4036

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Overview of Metabolism 10 Catabolism vs Anabolism, Stages of catabolism, Compartmentalization of metabolic pathways, Shuttle systems and membrane transporters; ATP as "Energy Currency of cell"; coupled reactions; Use of reducing equivalents and cofactors; Intermediary metabolism and regulatory mechanisms	Dr Kakali Talukdar	07	Feb	
2	• Carbohydrate Metabolism Sequence of reactions and regulation of glycolysis, Citric acid cycle, Phosphate pentose pathway,		06	Mar	

	Gluconeogenesis, Glycogenolysis and Glycogenesis			
3	•Lipid Metabolism β -oxidation and omega-oxidation of saturated fatty acids with even and odd number of carbon atoms; Biosynthesis of palmitic acid; Ketogenesis		04	Mar
4	•Protein Metabolism Catabolism of amino acids: Transamination, Deamination, Urea cycle; Fate of C-skeleton of Glucogenic and Ketogenic amino acids		05	Mar, Apr
5	•Oxidative Phosphorylation Redox systems; Review of mitochondrial respiratory chain, Inhibitors and un-couplers of Electron Transport System		05	Apr

Semester	TDC IV Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HC-4036

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Estimation of total protein in given solutions by Lowry's method.	Dr Kakali Talukdar	02	Mar	
2	• Detection of SGOT and SGPT in serum/tissue		04	Mar	
3	• To study the enzymatic activity of Trypsin and Lipase		02	Apr	
4	• Study of biological oxidation (SDH) [goat liver]		02	Mar	
5	• To perform the Acid and Alkaline phosphatase assay from serum/tissue		04	May	

Semester	TDC IV Semester	Course	Major
Credit	04	Marks:	60
Paper Name	GENETICS AND EVOLUTIONARY BIOLOGY	Paper Code:	ZOO-HG/RC-4016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction to Genetics 3 Mendel's work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information	Bandana Deka	07	Mar	
2	• Mendelian Genetics and its Extension Principles of Inheritance, Chromosome theory of inheritance, Incomplete dominance and co_dominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, sex linked inheritance, extra-chromosomal inheritance		06	Mar	
3	• Linkage, Crossing Over and Chromosomal Mapping Linkage and crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, Somatic cell genetics - an alternative approach to gene mapping,		04	Apr	
4	• Mutations Chromosomal Mutations: Deletion, Duplication, Inversion, Translocation, Aneuploidy and Polyploidy; Gene mutations: Induced versus Spontaneous mutations, Back versus Suppressor mutations	Dr Sikha Rani Kalita	06	Mar,	
5	• Sex Determination Chromosomal mechanisms, dosage compensation		03	Mar	
6	• History of Life Major Events in History of Life		02	Apr	
7	• Introduction to Evolutionary Theories Lamarckism, Darwinism, Neo-Darwinism		02	Apr	
8	• Direct Evidences of Evolution Types of fossils, Incompleteness of fossil record, Dating of fossils, Phylogeny of horse		02	May	
9	• Processes of Evolutionary Change Organic variations; Isolating Mechanisms; Natural selection (Example: Industrial melanism);		05	Feb, Mar	

	Types of natural selection (Directional, Stabilizing, Disruptive), Artificial selection	Dr Kakali Talukdar			
10	• Species Concept Biological species concept (Advantages and Limitations); Modes of speciation (Allopatric, Sympatric)		04	Mar	
11	• Unit 11: Macro-evolution 5 Macro-evolutionary Principles (example: Darwin's Finches)		01	Apr	
12	• Unit 12: Extinction 6 Mass extinction (Causes, Names of five major extinctions, K-T extinction in detail), Role of extinction in evolution		02	Apr	

Semester	TDC IV Semester	Course	Major
Credit	02	Marks:	20
Paper Name	Practical	Paper No:	ZOO-HG/RC-4016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Study of Mendelian Inheritance and gene interactions (Non-Mendelian Inheritance) using suitable examples. Verify the results using Chi-square test.	Bandana Deka	04	Mar	
2	• Study of Linkage, recombination, gene mapping using the data.		01		
			02	Mar	
3	• Study of Human Karyotypes (normal and abnormal).	Dr Sikha Rani Kalita	02	Apr	
4	• Study of fossil evidences from plaster cast models and pictures	Dr Kakali Talukdar	02	Mar	
5	• Study of homology and analogy from suitable specimens/pictures	Dr Sikha Rani Kalita	02	May	
6	• Charts: a) Phylogeny of horse with diagrams/ cut outs of limbs and teeth of horse ancestors b) Darwin's Finches with diagrams/ cut outs of beaks of different species	Dr Kakali Talukdar	04	Apr	
7	• Visit to Natural History Museum and submission of report	Dr Sikha Rani Kalita Dr Kakali Talukdar	Teacher will guide and accompany the tour in the month of Mar		

Semester	TDC IV Semester	Course	Major
Credit	04	Marks:	50+50
Paper Name	NON-MULBERRY SERICULTURE	Paper No:	ZOO-SE-4016

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction Sericulture: Definition, history and present status of Mulberry and Non-Mulberry Sericulture; Silk route Varieties of Silk; Types and distribution of non-mulberry or wild or vanyasericigenous insects in N-E India	Dr Kakali Talukdar	03	Sep	
2	• Unit 2: Biology of Non-mulberry Silkworm: Life cycle of silkworm- Eri and Muga Structure of silk gland and Nature of Silk	Bandana Deka	03	Sep	
3	• Unit 3: Rearing of Silkworms (Eri and Muga Silkworm): Food plants of Eri and Muga Silkworm Rearing Operation: Rearing house/Site and rearing appliances Disinfectants: Formalin, bleaching powder Rearing technology: Early age and Late age rearing Environmental conditions in rearing-Temperature, Humidity, Light and Air Types of mountages Harvesting and storage of cocoons Spinning and Reeling of silk	Dr Sikha Rani Kalita	07	Sep	
4	• Unit 4: Pests and Diseases: Pests of eri and muga silkworm Pathogenesis of eri and muga silkworm diseases: Protozoan, viral, fungal and bacterial Prevention and control measures of pests and diseases	Bandana Deka	04	Sep	
5	• Unit 5: Entrepreneurship in Non-Mulberry Sericulture: Varieties of Non-Mulberry Silk products and economics in India Prospectus of Non-Mulberry Sericulture in India: Non-Mulberry Sericulture industry in different states, employment generation and potential	Dr Kakali Talukdar	04	Oct	
6	• Visit to various sericulture Govt. /Private Farm/ Centers	Teacher will guide and accompany the tour in the month of Mar/Apr			

Non CBCS Course Content

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Animal Behaviour	Paper No:	M-601

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Introduction to Ethology	Bandana Deka	01	Feb, Mar	
2	• Scope and methods of ethology		02	Mar	
3	• Behaviour and equipment- Sign, stimuli, stimulus filtering		02	Mar	
4	• Patterns of Behaviour		02	Apr	
5	• Individual behavioural pattern		01	Mar	
6	• Homeing behaviour		01	Mar	
7	• Genetic basis of behaviour		02	Mar	
8	• Neural and hormonal control of behaviour		02	Mar	
9	• Circadian rhythm		02	Mar	
10	• Motivation: Models of motivation of motivation, feeding and drinking		02	Apr	
11	• Learning behaviour: Types of learning, Reasoning and Imprinting		02	Apr	
12	• Socio Biology: Social organization, Individual Social interactions, Animal communications, Dance language of honey bees, Aggregation, Social behaviour of bee, ant and monkey, Role of pheromones.		08	Apr	
13	• Communication; Chemical, Visual, Audio, Language of behaviour, Habitat Selection, Aggression, Territoriality, Dispersal.		05	Apr	

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Evolution and Adaptation	Paper No:	M-602

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Evolution – Origin of life	Dr Kakali Talukdar	02	Feb	
1.2	• Spontaneous generation, formation of organic compound.		02	Mar	
1.3	• Evidences of organic evolution: Embryological and biochemical		02	Mar	
1.4	• Theories of organic evolution		01		
1.5	• Darwinism and Neo-Darwinism		01	Mar	
1.6	• Lamarckism and Neo Lamarckism		01	Mar	
1.7	• Germplasm theory, Mutation theory		02	Mar	
1.8	• Modern synthetic theory		01	Mar	
1.9	• Concept of micro, macro and mega evolution		02	Mar	
1.10	• Phylogeny of Horse		01	Apr	
1.11	• Evolution of Man		01	Mar	
1.12	• Origin of Bird		01	Mar	
1.13	• Speciation- Genetic and Geographical		01	Mar	
1.14	• Zoo-geography		01	Apr	
1.15	• Factor influencing animal distribution		01	Apr	
1.16	• Geological time scale		01	Apr	
1.17	• Fossils-Definition, fossilization and significance, dating of fossils.		02	Apr	
2.1	• Principles of adaptation	Dr Sikha Rani Kalita	01	Mar	
2.2	• Types of adaptation- Aquatic, terrestrial and Volant adaptation		02	Mar	
2.3	• Adaptive Radiation in mammal		01	Mar	
2.4	• Cryptic and warning coloration, Mimicry.		01	Apr	

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Economic Zoology	Paper No:	M-603

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	Sericulture • Nature of silk	Dr Sikha Rani Kalita	01	Feb	
1.2	• Concise account of four varieties of silk products and economics in India (Eri, Muga, Pat, Tasar), Life cycle of silk worm- Muga and Eri		07	Mar	
1.3	• Diseases, prevention, and control measures of silkworm pest		02	Mar	
1.4	• Rearing of silkworm- Muga and Eri		02	Mar	
1.5	• Environmental conditions for silkworm rearing temperature, humidity, light and air		02	Mar	
1.6	• Storage, spinning and reeling of silkworm		01	Mar	
2.1	Apiculture • External Morphology of honey bee		01	Mar	
2.2	• Bee colony-cast/members-the queen, worker and drone, life history of honey bee, colony nest		03	Apr	
2.3	• Cast distinction during development of honey bee		02	Apr	
2.4	• Economics of bee keeping		01	Apr	
3.1	Aquaculture • Aquaculture-Definition, Important groups of aquacultures		02	Apr	
3.2	• Fresh water fish groups of India		02	Apr	
3.3	• Captive and culture fisheries		02	Apr	
3.4	• Fresh water prawn culture		02	Apr	
3.5	• Pond fisheries- Construction and layout of ponds of a		03		

	fish farm				
3.6	•Composite fish culture		02	May	
3.7	•Induced breeding		02	May	
3.8	•Integrated fish farming		03	May	
4	•Lac culture and enemies of lac, uses of lac		03	May	
5.1	Pest and pest Management •Definition of term pest, Types of pests	Bandana Deka	02	Mar	
5.2	•Importance of pest control		02	Mar	
5.3	•Principles of pest control- Cultural, Physical, Mechanical and Biological control of Pest		05	Mar	
5.4	•Pesticides and their hazards		02	Mar	
5.5	•Role of natural products and in pest control		02	Apr	
5.6	•Integrated pest management		03	Apr	

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Biotechnology, Bioinformatics and Computer Application	Paper No:	M-604

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Basic concepts in genetic engineering	Dr Kakali Talukdar	01	Mar	
1.2	• Enzymology in genetic engineering- Restriction enzyme, DNA ligases		02	Mar	
1.3	• Tissue culture		02	Apr	
1.4	• Media preparation and sterilisation		01	Apr	
1.5	• Cell culture media preparation and cell harvesting methods		02	Apr	
1.6	• Cloning		01	Apr	

1.7	• Gene libraries- Construction of CDNA, mRNA, isolation		02	Apr	
1.8	• Transferring genes into animal oocytes, eggs, embryos and specific animal tissues		02	Apr	
2.1	• Operating system DOS, WINDOWS, UNIX	Guest lecture	03	Apr	
2.2	• Programming using C++		02	Apr	
2.3	• Computer aided techniques for data presentation, data analysis, statistical techniques		04	Apr	

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	Economic Zoology (Practical)	Paper No:	M-605

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	• Identification of different varieties of silkworm (Eri, Muga, Mulberry) larval and adult stages	Dr Sikha Rani Kalita	2	Mar	
2	• Study of life history of honey bee	Bandana Deka	02	Mar	
3	• Study of important pest of paddy, jute, tea, stored grain, cane sugar and vegetables		06	Apr	
4	• Identification of commercially important fishes		02	Apr	
5	• Slide preparation: pollen basket of honeybee, different types of antennae, mouth parts, legs of insects	Dr Sikha Rani Kalita	2	Apr	
6	• Dissection of pituitary from any locally available fish		2	Apr	

Semester	TDC VI Semester	Course	Major
Credit	06	Marks:	60+15=75
Paper Name	(Practical)	Paper No:	M-606

Unit	Course Content	Allotted to	Hours	Remarks
	Submission	Bandana Deka	About 3-4 class	In the month of Mar Teachers will demonstrate the methods
1.1	• Submission of slides			
1.2.	• Submission of body parts of insects			
1.3	• Insect pest, fishes and other insects (10 in each category)			
1.4	• Project: Each student should allot a field-based study and presents the result in the form of a report	Bandana Deka Dr Sikha Rani Kalita Dr Kakali Talukdar	In-Charge teacher will guide the field- based study per student on a given topic	
1.5	• Visit to advanced laboratories/National Park/Wildlife Sanctuary and prepare a note	Bandana Deka Dr Sikha Rani Kalita Dr Kakali Talukdar	Teacher will guide and accompany the tour in the month of Feb/ Mar	

Semester	TDC V Semester	Course	General
Credit	08	Marks:	80+20=100
Paper Name	Physiology, Biochemistry and Endocrinology	Paper No:	E-601

Unit	Course Content	Allotted to	Hours	Month	Remarks
1.1	• Chemical foundation of physiology- solution, osmotic pressure, diffusion, PK and Ph, buffer	Dr Kakali Talukdar	02	Feb	
1.2	• Physiology of digestion- Digestion of carbohydrates, fats and protein. Function of liver and pancrease, Absorption of dietary components	Dr Sikha Rani Kalita	03	Feb	

.1.3	•Respiration: Exchange of gases, O ₂ transport, respiratory pigments, O ₂ association and dissociation curve, transport and removal of CO ₂	Bandana Deka	04	Mar	
.1.4	•Excretion: Nitrogenous wastes- ammonotelic, ureotelic and uricotelic modes of excretion.	Dr Sikha Rani Kalita	02	Mar	
1.5	•Blood- Composition and function of blood and lymph, Blood group and Blood coagulation	Dr Kakali Talukdar	04	Mar	
1.6	•Initiation and conduction of nerve impulse, Neurotransmitters	Bandana Deka	03	Mar	
2.1	•Biomolecules- Structure, classification and biological significance of carbohydrate, protein and lipid	Dr Kakali Talukdar	04	Mar	
2.2	•Enzymes nature and classification- Mechanism of enzyme action		02	Mar	
2.3	•Cellular respiration		01	Apr	
3.1	•Brief outline of organisation of endocrine system in mammals with special reference to Pituitary, and Gonads	Bandana Deka	04	Apr	
3.2	•Regulation of hormone secretion		02	Apr	
4.1	• Utility of biostatistics	Dr Sikha Rani Kalita	01	Mar	
4.2	• Mean-Arithmetic, Geometric and Harmonic mean. Median and Mode		03	Mar	
4.3	• Standard deviation, standard error of mean		03	Apr	
4.4	• Graphic representation of data- histogram, bar diagram, Pie diagram		02	Apr	

Semester	TDC V Semester	Course	General
Credit	08	Marks:	80+20=100
Paper Name	Practical	Paper No:	E-601

Unit	Course Content	Allotted to	Hours	Month	Remarks
1	•Determination of blood group in man	Bandana Deka	01	Apr	
2	•RBC, WBC- total count		02	Apr	
3	•Preparation of haemin crystal		01	Apr	
4	•Biochemical detection of carbohydrate (mono, di, and polysaccharides/ glucose, fructose, sucrose,) protein and lipid	Dr Kakali Talukdar	02	Mar	
5	•Qualitative detection of salivary amylase		02	Apr	
6	•Dissection of pituitary, thyroid, pancreas in Rat/rabbit	Dr Sikha Rani Kalita	3	Apr	
7	•Dissection of Weberian ossicle in fish		1	Apr	
8	•Dissection of pituitary gland in fish		1	Apr	



**Signature of HoD
(Bandana Deka)**