THREE YEAR DEGREE COURSE IN ZOOLOGY (GENERAL)

I SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-101	Biosystematics, Taxonomy, Wildlife Conservation & Management	60+15=75	06
E-102		60+15=75	06
E-103		60+15=75	06
English-I		40+10=50	04
		275	**22**

II SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-201	Ecology, Evolution and Adaptation	60+15=75	06
E-202		60+15=75	06
E-203		60+15=75	06
English-II		40+10=50	04
		275	**22**

III SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-301	Animal Diversity-I (Non Chordates)	40+10=50	04
E-302(Practical)	Animal Diversity-I (Non Chordates)	40+10=50	04
E-303		40+10=50	04
E-304(Practical)		40+10=50	04
E-306		40+10=50	04
E-307(Practical)		40+10=50	04
Env.Studies-I		40+10=50	04
		350	**28**

IV SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-401	Animal Diversity-II (Chordates)	40+10=50	04
E-402(Practical)	Animal Diversity-II (Chordates)	40+10=50	04
E-403		40+10=50	04
E-404(Practical)		40+10=50	04
E-406		40+10=50	04
E-407(Practical)		40+10=50	04
Env.Studies-II		40+10=50	04
		350	**28**

V SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-501	Cell Biology, Genetics & Developmental Biology	80+20=100	08
E-502(Practical)	Cell Biology, Genetics & Developmental Biology	80+20=100	08
E-505		80+20=100	08
E-506(Practical)		80+20=100	08
		400	**32**

VI SEMESTER

Paper No.	Name of the paper	Total Marks	Credits
E-601	Physiology, Biochemistry and Endocrinology	80+20=100	08
E-602(Practical)	Physiology, Biochemistry and Endocrinology	80+20=100	08
E-605		80+20=100	08
E-606(Practical)		80+20=100	08
		400	**32**

TOTAL MARKS FOR TDC (GENERAL) ZOOLOGY : 2050
TOTAL CREDITS FOR TDC (GENERAL) ZOOLOGY : 164

TDC I SEMESTER (GENERAL)

PAPER : E-101 **Total Marks:75(60+15)**
Total Credits : 6

BIOSYSTEMATICS , TAXONNOMY, WILDLIFE CONSERVATION AND MANAGEMENT

BIOSYSTEMATICS AND TAXONNOMY **45**

1. Definition and basic concepts of Biosystematics and Taxonomy.
2. History of Systematics
3. Importance and applications of biosystematics in biology.
4. Trends in biosystematics –concepts of different conventional and newer aspects : Chemotaxonomy, Cytotaxonomy, Molecular taxonomy
5. Taxonomic procedures-taxonomic collections, preservations, process of identification.
6. Taxonomic keys-different types of taxonomic keys.
7. Concepts of taxonomic terms.
8. Systems of classification.
9. International Code of Zoological Nomenclature.
10. Binominal Nomenclature, Trinominal nomenclature.

WILDLIFE CONSERVATION AND MANAGEMENT **15**

1. Definition of wildlife, Wildlife protection act, 1972
2. Principles of wildlife protection and management.
3. Wildlife in N E region with special reference to Kaziranga and Manas National Park.
4. Conservation of Wildlife and importance of biodiversity

TDC II SEMESTER (GENERAL)

PAPER : E-201 **Total Marks:75(60+15)**
Total Credits : 6

ECOLOGY, EVOLUTION AND ADAPTATION

ECOLOGY 20

1. Ecology- definition, aim and scope of ecology.
2. Subdivisions of ecology- a) Autecology b) Synecology.
3. Ecosystems-concept, Ecosystem energetics.
4. Ecological succession.
5. Pollution-Air, water, soil and Noise

EVOLUTION 20

1. Concept of Evolution, Macro and Micro Evolution.
2. Origin of life-Spontaneous generation, formation of organic compounds, sources of Energy and food.
3. Evidences of organic evolution, Embryological Paleontological and Biochemical Evidences.
4. Darwinism and Neo Darwinism.
5. Lamarckism and Neo Lamarckism.
6. Evolution of Man.

ADAPTATION 20

1. Principles of adaptation.
2. Types of adaptations.
3. Volant and aquatic adaptation.
4. Cryptic and warning coloration, Mimicry

TDC III SEMESTER (GENERAL)

PAPER : E-301 **Total Marks:50(40+10)**
Total Credits : 4

ANIMAL DIVERSITY-I (NON-CHORDATES)

1. Introduction to Animal Kingdom.
2. PROTOZOA :General characters and outline classification of the Phylum up to order with examples. Structure, nutrition, locomotion and reproduction of *Paramecium*.
3. PORIFERA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and functions with special reference to canal system of *Sycon*.
4. COELENTERATA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and functions of *Obelia*.
5. PLATYHELMINTHES : General characters and outline classification of the Phylum up to order with examples. Structure and life history *of Fasciola*.
6. ASCHELMINTHES : General characters and outline classification of the Phylum up to order with examples. Anatomical structure and life history of *Ascaris*.
7. ANNELIDA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and functions of Leech.
8. ARTHROPODA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and appendages of Prawn. Mouthparts, life history of Mosquito and Housefly and their roles as vector
9. MOLLUSCA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and functions of *Pila.*
10. ECHINODERMATA : General characters and outline classification of the Phylum up to order with examples. Anatomical structures and functions of starfish with special reference to water-vascular system.

TDC III SEMESTER (GENERAL)

PAPER : E-302 (PRACTICAL) **Marks 50 (40 + 10)**
Total Credits : 4
Time : 4 Hrs

(ANIMAL DIVERSITY: NON CHORDATES)

A. **Dissection** of the following systems of Invertebrate animal (any one) **10**

1. Leech i) Urinogenital system.

2. Cockroach i) Digestive system
ii) Nervous system

4. *Pila* i) Digestive system

B. Mounting

Temporary- Setae of Earthworm, Salivary gland of Cockroach, , Radula of *Pila* 4

Permanent- Crustacean lavae, *Obelia* colony, *Euglena*. 2
(The preparations have to be incorporated in the Practical Note Book. Submission is not required at the Examination).

C. Identification of prepared slides **4**

Polystomella, Sponge spicules, T.S of *Ascaris, Miracidium, Cercaria* larvae of Liver fluke, T.S. of Leech (Through crop region). T.S. of Earth worm (through pharynx, gizzard and intestine). Mouth parts of mosquitoes, Larvae of *Glochidium* and Echinodermata (Bipennaria)

D. Study of Museum Specimens **10**
(Identification and classification upto order. Generic name must be known)

Spongilla, Physalia, Metridium (Seaanemone). Pennatula, (Sea-pen) *Gorgonia, Fasciola. Taenia, Echiurus, Limulus ,Scolopendra* (Centipede) *Julus* (Millipede), *Carausius* (stick insect), *Lepisma, Mantis, Termite queen, Belostoma* (Giant water bug*), Peripatus, Chiton, Achatina, Pinctada* (Pearl oyster), *Loligo, Mytilus, Limax, Cucumaria* (Sea Cucumber), *Echinus* (Seaurchin).

E. Practical Note Book **4**

F. Viva-Voce **6**

TDC IV SEMESTER (GENERAL)

PAPER : E-401 **Total Marks 50 (40 + 10)**
Total Credits : 4

ANIMAL DIVERSITY-II (CHORDATES)

1. General characters outline classification and plan of body organization in chordates.
2. PROTOCHORDATES : General characters and classification. Structural organization of Hemichordata (*Balanoglossus*), Urochordate (*Herdmania*) and Cephalochordate (*Amphioxious*); Affinities of Hemichordates
3. AGNATHOSTOMATA : Classification, Ammocoete larva.
4. PISCES : General characters, classification up to order with characters and examples. Anatomical structures of *Scoliodon*. Digestive, Circulatory and Nervous system of *Scoliodon*, Distinction between cartilaginous and bony fishes.
5. AMPHIBIA : Distinctive characters and classification up to order with characters and examples. Anatomical structures of *Bufo* with special reference to respiration. Metamorphosis in Amphibia.
6. REPTILIA : Distinctive characters and classification up to order with characters and examples. Characteristics of poisonous snakes. Poison apparatus and biting mechanism.
7. AVES : Distinctive characters and classification up to order with characters and examples. Differences between Paleognathae and Neognathae. Flight muscles and flight mechanism in Bird , Migration of Birds.
8. MAMMALIA : Distinctive characters and classification up to order with characters and examples. Affinities of Prototheria.
9. General organization of exoskeleton in vertebrates.
10. Comparative anatomy of heart and aortic arch in Vertebrates.

TDC IV SEMESTER (GENERAL)

PAPER : E-402 (PRACTICAL) **Marks 50 (40 + 10)**
Total Credits : 4
Time : 4 Hrs

(ANIMAL DIVERSITY: CHORDATES)

1. Dissection of the following systems of vertebrate animals **10**

a. *Scoliodon*: Internal ear, IXth and Xth cranial nerves, afferent and efferent nerves
b. Pigeon - Flight muscles, arterial system

2. Mounting **4**

a. Temporary – Blood film of amphibian and mammal, Placoid scale, filoplume.
b. Different types of scales of bony fishes, striated and unstriated muscles, ciliated and squamous epithelium of vertebrates

3. Identification of Prepared Slides **3**

W.M. of *Salpa*, *Doliolum*, different types of scales of fishes, T.S of *Amphioxus* through pharynx. T.S of intestine, liver, Kidney, testis and ovary of Mammals.

4. Study of Bones **3**

Axial and appendicular skeleton of Fowl/ Pigeon.

5. Identification and classification (up to order, Generic name must be mentioned) **10**

Pyrosoma, Balanoglossus, Herdmania, Amphioxus Petromyzon, Myxine. Torpedo (Electric Ray) *Pristis, Hippocampus* (Sea horse), *Monopterus, Cyprinus, Heteropeneustes* (Singhi), *Clarias* (Magur), *Anabus, Labeo* (Rohu). *Catla, Mystus. Icthyophis. Chameleon, Varanus , Zenochrophis* (Dhora), *Alcedo* (King fisher), *Hystrix* (Porcupine), *Funambulus* (Squirrel), *Pteropus or Sctotophilus* (Bat), *Echidna, Manis*

6. PRACTICAL NOTE BOOK **4**

7. VIVA –VOCE **6**

TDC V SEMESTER (GENERAL)

PAPER : E-501 **Total Marks 100 (80 + 20)**
Total Credits : 8

CELL BIOLOGY, GENETICS AND DEVELOPMENTAL BIOLOGY

CELL BIOLOGY 30

1. Structure of Prokaryotic and Eukaryotic cells.
2. Virus-Structure and assembly.
3. Cell theory.
4. Structure and function of plasma membrane, membrane transport.
5. Cell reproduction- Mitosis and Meiosis.
6. Ultra structure and function of Mitochondria. Golgi bodies, Endoplasmic Reticulum and Ribosome.
7. Chromosome- Ultrastructure and organization, Giant chromosomes-Types and Significance.

GENETICS 25

1. Linkage-its mechanism and significance.
2. Crossing over-its mechanism types and significance.
3. Sex linkage, Sex linked inheritance.
4. Chromosomal sex determination.
5. Varieties of gene expressions- multiple alleles, lethal genes, pleiotropic genes, epistasis
6. Mutation- a) Chromosomal aberration b) Gene mutation c) Harmful and beneficial effects of mutation.

.

DEVELOPMENTAL BIOLOGY 25

1. Gametogenesis –Spermatogenesis and Oogenesis.
2. Fertilization- Sperm egg interactions, Activation of egg, Gamete fusion in Sea urchin.
3. Types of egg and cleavage pattern.
4. Concept of organizer and induction
5. Extra embryonic membranes in Birds and Mammal.
6. Reproductive cycles in vertebrates.
7. Regeneration in Vertebrates and invertebrates.
8. Parthenogenesis

TDC V SEMESTER (GENERAL)

PAPER : E-502 (PRACTICAL) **Total Marks 100 (80+ 20)**
Total Credits : 8
Time : 6 Hrs

(CELL BIOLOGY, GENETICS AND DEVELOPMENTAL BIOLOGY)

1. Study of different type of cells (Representatives of prokaryotic and eukaryotic cell)
3. Staining techniques of nucleus and nucleolus
4. Study of mitosis in onion root tip/tadpole tail.
5. Study of meiosis in Grasshopper/ *Grylotalpa*.
6. Study of different tissue through permenent slides : Epithelial (Simple, squamous, cuboidal, columnar, Compound, stratified, transitional, muscular, bon, cartilage, areolar, tandon, adipose, reticular and nervous)
8. Staining of Barr body from buccal epithelium.
9. Study of slides of blastula, gastrula, and nurula of *Amphioxus* and Frog \Toad.
10. Study of specific stages of development of chick embryo through prepared slides

PRACTICAL NOTEBOOK **5**
VIVA VOCE **10**

TDC VI SEMESTER (GENERAL)

PAPER : E-601 **Total Marks : 100 (80 + 20)**
Total Credits : 8

PHYSIOLOGY, BIOCHEMISTRY AND ENDOCRINOLOGY

PHYSIOLOGY 35

1. Chemical foundation of Physiology- solutions, osmotic pressure, diffusion, PK and PH, buffer.
2. Physiology of digestion- Digestion of carbohydrates, fats and protein. Function of liver and pancreas. Absorption of dietary components.
3. Respiration- Exchange of gases, oxygen transport, respiratory pigments. Oxygen association and dissociation Transport and removal of CO2
4. Excretion- Nitrogenous wastes, ammonotelic, uriotelic and uricotelic modes of excretion. Physiology
5. Blood-Composition and functions of blood and lymph, Blood group, Blood coagulation
6. Initiation and conduction of nerve impulse. Neurotransmitters.

BIOCHEMISTRY 15

1. Biomolecules- Structure, classification and biological significance of Carbohydrate, protein and Lipid.
2. Enzyme- classification and mechanism of enzymatic action
3. Cellular respiration

ENDOCRINOLOGY 15

1. Brief outline of the organization of endocrine system in mammals with special reference to pituitary gland and gonads.
2. Regulation of hormone secretion.

BIOSTATISTICS 15

1. Utility of biostatistics.
2. Mean-Arithmetic,Geometric and Harmonic mean; Median and Mode.
3. Standard deviation and standard error of mean.
4. Graphic presentation of data-Histogram, Bar diagram, Pie diagram

TDC VI SEMESTER (GENERAL)

PAPER : E-602 (PRACTICAL) **Total Marks : 100 (80+20)**
Total Credits : 8
Time : 6 Hrs

(PHYSIOLOGY, BIOCHEMISTRY AND ENDOCRINOLOGY)

1. Determination of Blood groups in man
2. R.B.C, W.B.C –Total counts.
3. Preparation of Haemin crystal
4. Biochemical detection of carbohydrate (Mono, di and polysaccharides/ glucose, fructose sucrose, polysaccharide) Protein and lipid
5. Enzyme- qualitative detection of salivary amylase.
6. Dissection of Pituitary, Thyroid, Pancreas in Rat/Rabbit
7. Dissection of Weberian ossicle in fish.
8. Dissection of Pituitary gland of fish
9. **Practical Record** **5**
10. **Viva voce** **10**