SYLLABUS & PROGRAMME STRUCTURE

Zoology

(Honours)

(Choice Based Credit System)

(Effective from the Academic Session 2017-2018)

Fourth Semester

MAHARAJA BIR BIKRAM UNIVERSITY
AGARTALA, TRIPURA: 799004

PROGRAMME STRUCTURE

Structure of Proposed CBCS Syllabus B.A/B.Sc/B.Com Honours.

Semester	Core Course (14) Honours	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (2)	Discipline Specific Elective (DSE) (4)	Generic Elective (GE) (4)
1	**C1** **C2**	**AECC1: Environmental Science**			**GE1** (Paper-I of selected subject other than Hons subject)
2	**C3** **C4**	**AECC2 : (English/MIL (Communication)**			**GE2** (Paper-II of selected subject other than Hons subject)
3	**C5** **C6** **C7**		**SEC1**		**GE3** (Paper-III of selected subject other than Hons subject)
4	**C8** **C9** **C10**		**SEC2**		**GE4** (Paper-IV of selected subject other than Hons subject)
5	**C11** **C12**			**DSE1** **DSE2**	
6	**C13** **C14**			**DSE3** **DSE4**	

Semester-IV
Core Course - Paper –VIII
COMPARATIVE ANATOMY OF VERTEBRATES

TOTAL MARKS – 100

[Theory – (60+10), Practical – (20+10)]

THEORY

Credits: 04

Unit-I

Integumentary & Skeletal Systems:

a) Structure, functions and derivatives of integument.
b) Axial and appendicular skeletons of Birds (Pigeon) & Mammals (Guinea Pig).
c) Definition types and function with reference to mammalian teeth.

Unit-II

Digestive & Repository Systems:

a) Structural organization of Alimentary canal and associated glands with reference to one Ruminant & one Non-ruminant mammals
b) General organization of gills, lungs and air sacs,
c) Accessory respiratory organs of Geol fishes (*Monopterus or Amhipnous, Anabas, Clarias, Heteropneustes, Ophiocephalus*).

Unit-III

Circulatory & Urinogenital Systems:

a) General plan of circulation with reference to Single-circuit (Lates sp.) and Double-circuit (Guineapig) hearts.
b) Evolution of heart and aortic arches.
c) Evolution of urinogenital system in mammals.

Unit-IV

Nervous System & Sense Organs:

a) Comparative account of brain.
b) Autonomic nervous system, Spinal cord and Cranial nerves in mammals.
c) Classification of receptors, Function of Visual & Auditory receptors in man.

PRACTICAL

Credits: 02

1. Study of Placoid, Cycloid and Ctenoid scales through permanent slides/ photographs.
2. Disarticulated skeleton of Frog, Fowl/Pigeon and Rabbit/ Guinea pig.
3. Carapace and plastron of turtle/ tortoise.
4. Mammalian skulls: One herbivorous and one carnivorous animal.

NOTE: ***Assignment / Project preparation on any one of the followings (Internal Assessment only for evaluation of 10 marks including Interaction):***

1. Details on structure of any one organ (heart, lung, kidney, eye and ear) with Models, Drawings or Photographs.
2. Details on Skeletal modifications in Vertebrates with Drawings or Photographs.
3. Details on Accessory respiratory structures and functions of our known Geol fishes.

Suggested Readings:

1. ***Kardong, K.V. (2005)*** *Vertebrates' Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education.*
2. ***Kent, G.C. and Carr R.K. (2000).*** *Comparative Anatomy of the Vertebrates. IX Edition, Tata McGraw – Hill Education.*
3. ***Weichert C.K and William Presch (1970).*** *Elements of Chordate Anatomy, Tata McGraw Hills.*
4. ***Hilderbrand, M and Gaslow G.E. (1998).*** *Analysis of Vertabrate Structure, 5th Edn. John Wiley and Sons.*
5. ***Walter, H.E. and Sayles, L.P (1949);*** *Biology of Vertebrates, McMillan, 6th Printing 1959.*

Semester-IV
Core Course - Paper –IX
ANIMAL PHYSIOLOGY: LIFE SUSTAINING SYSTEMS

TOTAL MARKS – 100

[Theory – (60+10), Practical – (20+10)]

THEORY

Credits: 04

Unit-I

Digestive Systems:

a) Histology and functions of gastrointestinal tract and its associated glands.
b) Mechanism of digestion of foodstuff and absorptions of carbohydrates, lipids and proteins.
c) Role of gastrointestinal hormones on secretion of enzymes in GIT.

Unit – II

Respiratory Systems:

a) Histology of lung; Mechanism of respiration, Pulmonary ventilation; Respiratory volumes and capacities.
b) Transport of oxygen and carbon dioxide in blood.
c) Respiratory pigments, Structure and functions of haemoglobin, Dissociation curves and the factors influencing it.

Unit – III

Excretory Systems:

a) Structure of kidney and its functional unit.
b) Mechanism of urine formation and its regulation.
c) Regulation of water balance & Regulation of acid-base balance.

Unit - IV

Physiology of Circulation:

a) Components of blood; Haemostasis and Haemopoiesis.
b) Structure of mammalian heart; Coronary circulation and structure of myocardial fibers.
c) Origin and conduction of cardiac impulses; Cardiac cycle; Cardiac output; Blood pressure and its regulation.

PRACTICAL

Credits - 02

1. Enumeration of red blood cells using Haemocytometer*
2. Estimation of Haemoglobin using Sahli's Haemoglobinometer*
3. Preparation of Haemin crystals.
4. Preparation of blood-film and identification of White blood cells.
5. Recording of blood pressure using a Sphygmomanometer*
6. Microscopic studies of Tissue sections (mammalian): Esophagus, Stomach, Duodenum, Ileum, Rectum, Liver, Lung and Kidney (any five available slides).

NOTE: ***Assignment/ Project preparation by every candidate on any one* of the followings (Internal Assessment only for evaluation of 10 Marks including Interaction):***

1. Enumeration of red blood cells using haemocytometer.
2. Estimation of haemoglobin using Sahli's haemoglobinometer.
3. Recording of blood pressure using a sphygmomanometer.

*** As decided by the Department/ concerned Teacher.**

Suggested Readings:

1. ***Guyton, A.C. & Hall, J.E. (2006).*** *Textbook of Medical Physiology. XI Edition. Hercourt Asia PTE Ltd./ W.B. Saunders Company.*
2. ***Tortora, G.J. & Grabowski, S. (2006).*** *Principles of Anatomy & Physiology. Xi Edition John Wiley & sons.*
3. ***Victor P. Eroschenko. (2008).*** *diFiore's Atlas of Histology with Functional correlations. XII Edition. Lippincott W. & Wilkins.*
4. ***Arey, L.B. (1974).*** *Human Histology. IV Edition. W.B. Saunders.*
5. ***Mariano S.H. (1981).*** *di Fiore's Atlas of Human Histology, Lea & Febiger; 5th ed.*
6. ***Widmaier Eric P (2015).*** *Vander's Human Physiology: The Mechanisms of Body Function, 14th Edition, McGraw – Hill Education.*

Semester-IV
Core Course - Paper –X
BIOCHEMISTRY OF METABOLIC PROCESSES

TOTAL MARKS – 100

[Theory – (60+10), Practical – (20+10)]

THEORY

Credits: 04

Unit – I

Carbohydrate Metabolism:

a) Glycolysis, Glycogenolysis, Glycogenesis, Gluconeogenesis.
b) Citric acid cycle, Pentose phosphate pathway.
c) Shuttle systems (Malate-aspartate shuttle, Glycerol 3-phosphate shuttle).

Unit – II

Lipid Metabolism:

a) Triglycerides and steroids.
b) β-oxidation of saturated fatty acids with even and odd number of carbon atoms.
c) Biosynthesis of palmitic acid; Ketogenesis and its regulation.

Unit – III

Protein Metabolism:

a) Catabolism of amino acids: Transamination & Deamination.
b) Urea-Ornithine cycle and its significance.
c) Fate of C-skeleton of Glucogenic and Ketogenic amino acids.

Unit – IV

Intermediary metabolism & Oxidative Phosphorylation:

a) Inter-relationship of carbohydrates, lipid and protein metabolism.
b) Oxidative phosphorylation and ETS.
c) Role of ATP synthase, Inhibitors and Uncouplers.

PRACTICAL

Credits – 02

1. Identification of unknown carbohydrates in given solutions (Starch, Sucrose, Lactose, Galactose, Glucose, Fructose) or Qualitative tests of functional groups in carbohydrates.
2. Quantitative Estimation of Glucose.
3. Colour tests of functional groups in protein solutions.
4. Study of enzyme activity (Pepsin, Trypsin).
5. Estimation of total protein in given solutions by Lowry's method. *

NOTE-1: ***Any three of the above mentioned Items (except No. 6) are to be practiced in Practical Classes.***

NOTE-2: ***Assignment/ Project preparation on Item-5 (Internal Assessment only for evaluation of 10 Marks including Interaction):*** *Estimation of total protein in given solutions by Lowry's method. **

Suggested Readings:

1. ***Cox, M.M and Nelson D.L. (2008).*** *Lehninger Principles of Biochemistry, V Edition, W.H. Freeman and Co., New York. 21.*
2. ***Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007).*** *Biochemistry, VI Edition, W.H. Freeman and Co., New York.*
3. ***Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009).*** *Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw – Hill Companies Inc.*
4. ***Hames, B.D. and Hooper, N.M. (2000).*** *Instant Notes in Biochemistry, II Edition, BIOS Scientific Publishers Ltd., U.K.*