AP STATE COUNCIL OF HIGHER EDUCATION

w.e.f. 2020-21 (Revised in April, 2020) **ZOOLOGY –**

SEMESTER IV

PAPER – IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

HOURS : 60 (5X12) **Max. Marks: 100**

Learning Objectives

- To achieve a thorough understanding of various aspects of physiological systems and their functioning in animals.
- To instil the concept of hormonal regulation of physiology, metabolism and reproduction in animals.
- To understand the disorders associated with the deficiency of hormones
- To demonstrate a thorough knowledge of the intersection between the disciplines of Biology and Chemistry.
- To provide insightful knowledge on the structure and classification of carbohydrates, proteins, lipids and enzymes
- To demonstrate an understanding of fundamental biochemical principles such as the function of biomolecules, metabolic pathways and the regulation of biochemical processes
- To make students gain proficiency in laboratory techniques in biochemistry and orient them to apply the scientific method to the processes of experimentation and hypothesis testing.

ZOOLOGY SYLLABUS FOR IV SEMESTER

PAPER – IV: ANIMAL PHYSIOLOGY, CELLULAR METABOLISM AND EMBRYOLOGY

HOURS: 60 (5X12) **Max. Marks: 100**

UNIT I Animal Physiology - I

Process of digestion and assimilation

Respiration - Pulmonary ventilation, transport of oxygen and CO_2

(Note: Need not study cellular respiration here)

Circulation - Structure and functioning of heart, Cardiac cycle

Excretion - Structure and functions of kidney urine formation, counter current Mechanism

UN IT II Animal Physiology - II

Nerve impulse transmission - Resting membrane potential, origin and propagation of action potentials along myelinated and non-myelinated nerve fibers

Muscle contraction - Ultra structure of muscle, molecular and chemical basis of muscle contraction

Endocrine glands - Structure, functions of hormones of pituitary, thyroid, parathyroid, adrenal glands and pancreas

Hormonal control of reproduction in a mammal

UNIT III Cellular Metabolism – I (Biomolecules)

Carbohydrates - Classification of carbohydrates. Structure of glucose

Proteins - Classification of proteins. General properties of amino acids

Lipids - Classification of lipids

Enzymes: Classification and Mechanism of Action

UNITIV Cellular Metabolism – II

Carbohydrate Metabolism - Glycolysis, Krebs cycle, Electron Transport Chain, Glycogen metabolism, Gluconeogenesis

Lipid Metabolism – β-oxidation of palmitic acid

Protein metabolism - Transamination, Deamination and Urea Cycle

Unit – V Embryology

Gametogenesis

Fertilization

Types of eggs

Types of cleavages

5. 5 Development of Frog upto formation of primary germ layers

Co-curricular activities (Suggested)

- Chart on cardiac cycle, human lung, kidney/nephron structure etc.
- Working model of human / any mammalian heart.
- Chart of sarcomere/location of endocrine glands in human body
- Chart affixing of photos of people suffering from hormonal disorders
- Student study projects such as identification of incidence of hormonal disorders in the local primary health centre, studying the reasons thereof and measures to curb or any other as the lecturer feels good in nurturing health awareness among students
- Chart on structures of biomolecules/types of amino acids (essential and non-essential)Chart preparation by students on Glycolysis / kreb's cycle/urea cycle etc.
- Model of electron transport chain
- Preparation of models of different types of eggs in animals
- Chart on frog embryonic development, fate map of frog blastula, cleavage etc.

REFERENCE BOOKS

1. Eckert H. *Animal Physiology: Mechanisms and Adaptation.* W.H. Freeman & Company.
2. Floray E. *An Introduction to General and Comparative Animal Physiology*. W.B. Saunders
   Co., Philadelphia.
3. Goel KA and Satish KV. 1989. *A Text Book of Animal Physiology*, Rastogi Publications, Meerut, U.P.
4. Hoar WS. *General and Comparative Physiology.* Prentice Hall of India, New Delhi.
5. Lehninger AL. Nelson and Cox. *Principles of Biochemistry.* Lange Medical Publications, New Delhi.
6. Prosser CL and Brown FA. *Comparative Animal Physiology*. W.B. Saunders Company, Philadelphia.
7. Developmental Biology by Balinksy
8. Developmental Biology by Gerard Karp
9. Chordate embryology by Varma and Agarwal
10. Embryology by V.B. Rastogi
11. Austen CR and Short RV. 1980. *Reproduction in Mammals*. Cambridge University Press.
12. Gilbert SF. 2006. *Developmental Biology,* 8th Edition. Sinauer Associates Inc., Publishers,Sunderland, USA.
13. Longo FJ. 1987. *Fertilization.* Chapman & Hall, London.
14. Rastogi VB and Jayaraj MS. 1989. *Developmental Biology*.KedaraNath Ram Nath Publishers, Meerut, Uttar Pradesh.
15. Schatten H and Schatten G. 1989. *Molecular Biology of Fertilization.* Academic Press, New York.