BSc. (Life Science) -
Zoology Component (Semester - IV)

DISCIPLINE SPECIFIC CORE COURSE-12 (Zoo-LS-DSC-12):– Fundamentals of Human Physiology

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical		
Fundamentals of Human Physiology Zoo-LS-DSC-12	04	02	Nil	02	Passed Class XII with Chemistry/ Biology/ Biotechnology	NIL

Learning Objectives

The learning objectives of this course are as follows:

- to learn the fundamentals that underpins the health and well-being of living organisms.
- to study the internal working of organs and organ systems.
- to expand their knowledge with respect to functioning of various organ systems such as muscular, nervous, digestive, circulatory, respiratory, excretory, reproductive and endocrine in humans.

Learning Outcomes

By studying this course, students will be able to

- Have an enhanced knowledge and appreciation of human physiology
- Recognize and identify principal tissue structures and functions
- Better understand the functions of important physiological systems including the nervous system, muscular system, endocrine and reproductive system
- Learn an integrative approach to understand how these separate systems interact to yield integrated physiological responses to maintain homeostasis in the body along with feedback mechanism.

SYLLABUS OF DSC- 12

UNIT- 1: Nerve and Muscle **7 hrs**

Structure of a neuron, Resting membrane potential, Graded potential, Origin of action potential and its propagation in myelinated and non-myelinated nerve fibres, Ultrastructure of skeletal muscle, Molecular and chemical basis of muscle contraction.

UNIT- 2: Digestion **4 hrs**

Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids.

UNIT- 3: Respiration **4 hrs**

Pulmonary ventilation, Respiratory volumes and capacities, Transport of Oxygen and carbon dioxide in blood.

UNIT- 4: Excretion **4 hrs**

Structure of nephron, Mechanism of urine formation, Counter-current Mechanism.

UNIT- 5: Cardiovascular system **5 hrs**

Structure of Heart, Origin and conduction of the cardiac impulse, Cardiac cycle.

UNIT- 6: Reproduction and Endocrine Glands **6 hrs**

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 gland.

Practical: **60 hrs**

(Laboratory periods: 15 classes of 4 hours each)

1. Preparation of haemin and haemochromogen crystals.
2. Estimation of WBC and RBC count of blood.
3. Estimation of haemoglobin using Sahli's haemoglobinometer.
4. Determination of Blood Pressure by Auscultatory method.
5. Lung function tests using Spirometry (Determination of Vital Capacity, Peak Expiratory Flow Rate. Lung Volumes and Capacities).
6. Measurement of oxygen saturation by pulse oximetry before and after exercise.
7. Experiments on superficial (plantar) and deep (knee jerk) reflex.
8. Study of permanent histological sections of mammalian pituitary, thyroid, pancreas, adrenal gland, duodenum, liver, lung, kidney, bone, cartilage.
9. Project on Family planning devices.

Essential/recommended readings

1. Tortora, G.J. and Derrickson, B.H. (2009) Principles of Anatomy and Physiology, XIVth Edition, John Wiley & Sons, Inc.
2. Widmaier, E.P., Raff, H. and Strang, K.T. (2008) Vander's Human Physiology, XI Edition., McGraw Hill.
3. Guyton, A.C. and Hall, J.E. (2011) Textbook of Medical Physiology. XII Edition, Harcourt Asia Pvt. Ltd/ W.B. Saunders Company.
4. Victor P. Eroschenko. (2008). Di Fiore's Atlas of Histology with Functional correlations. XII Edition.

Suggestive readings

1. Kesar, S. and Vashisht, N. (2007) Experimental Physiology. Heritage Publishers.
2. Prakash, G. (2012) Lab Manual on Blood Analysis and Medical Diagnostics. S. Chand and Company Ltd.