INTRODUCTORY HUMAN PHYSIOLOGY

Programme	B.Sc. Zoology				
Type of Course	Minor				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total hours
	4	3		2	75
Pre-requisites	+2 /VHSC Biology or the following online courses 7. https://www.coursera.org/learn/physiology 8. https://learn.utoronto.ca/programs-courses/courses/2159-basic-human-physiology 9. https://www.classcentral.com/classroom/youtube-anatomy-physiology-45834 10. https://www.ivyroses.com/Revise/AnatomyPhysiology/index.php 11. https://www.medicalnewstoday.com/articles/organs-in-the-body#organ-systems 12. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/health_science_students/physiologypti.pdf				
Course objectives	The student develops understanding in the organization and functioning of human physiological systems and will be able to perform simple experiments related to it.				

Course outcomes (CO)

CO	CO statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Describe the structural and functional organization of human body[PSO2]	U	F&C	
CO2	Explain the mechanism of transport and exchange of respiratory gases and its control[PSO2]	U	F&C	
CO3	Identify different components of blood and various blood groups; cardio-vascular problems[PSO1]	R	F	
CO4	Compare the different types of neurons; Explain mechanism of nerve impulse transmission; the ultrastructure of skeletal muscles and biochemical events and energetics involved in muscle contraction, the need of physical exercise in good physical and physiological condition[PSO3]	U	F&C	
CO5	Acquire skill in estimating and enumerating blood parameters; calculating BMI, measuring the respiratory volumes, etc. [PSO4]	Ap	C&P	
CO6	Explain the mechanism of excretion and its hormonal control; enumerate common renal disorders in man.[PSO2]	U	F&C	

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Question paper pattern for external examination: Module 1 : short answer 1 x 3 = 3marks, paragraph 1 x 6 = 6 marks; Module 2 : short answer 3 x 3= 9 marks, paragraph 2 x 6 = 12 marks, Essay 1 x10 = 10 marks; Module 3 : short answer 3 x 3= 9marks, paragraph 2 x 6 = 12 marks Essay 1 x10 = 10 marks ; Module 4 : short answer 3 x 3= 9 marks, paragraph 3 x 6 = 18 marks.

Module 1: Unit 1: Introduction to human physiology :(3 hrs)
Branches of human physiology, Components of body system, Human body systems and functions, vital and non vital organs, Levels of physiological regulation: Intracelluar, local and extrinsic regulation. Homeostasis, Anthropometry, BMI and its significance.

Module 2: Physiology of Respiration & Circulation (18 hrs)

Unit 1: Respiration (8 hrs) : Measures of lung volume : Vital capacity, tidal volume, residual volume etc., Structure, types and functions of hemoglobin, Transport of oxygen and carbon dioxide in blood, factors influencing transport of gases, Oxygen dissociation curves and the factors influencing it; Carbon monoxide poisoning; Nervous and chemical control of respiration, Respiratory problems in new born babies and old age, COVID associated problems, COPD, Problems and adaptations at high altitude.

Unit 2: Circulation (10 hrs)
Pace maker and conducting system, Components of blood and their functions; Haemostasis, Biochemical pathway of Blood coagulation: Clotting factors, Disorders of blood clotting,

Haemopoiesis; ESR, Haemoglobinopathies, Blood groups: Rh factor, ABO and MN; Blood transfusion and agglutination, Apherisis, ECG, Cardiovascular problems: Hyper and hypotension, Artheriosclerosis, Bradycardia and tachycardia, Myocardial infarction, Angina pectoris, Cardiac arrest.

Module 3: Physiology of Excitation (12 hrs)

Unit 1: Nervous system (5 hrs): Structure and types of neurons, Propagation of nerve impulse, myelinated and non-myelinated nerve fibers, Types of synapse and synaptic transmissions; Saltatory conduction, Neurotransmitters, synaptic delay, synaptic fatigue, numbness, tingling, tickling .

Unit 2: Muscular system (7 hrs) : Types of muscles; Ultra structure of skeletal muscle; Physiology and biochemistry of muscle contraction:- Sliding filament theory, physiological changes, Muscular relaxation, Energy for muscular contraction, Neuromuscular junction; muscle twitch; summation, tetanus and Rigor mortis. Sports Physiology - Aims and its benifits, Effect of sports on physical health, Benefits of exercise, Physical ergonomics.

Module:4 -Physiology of Digestion and Excretion (12 hrs):

C) **Digestion (6 hrs):** Structural organization and functions of gastrointestinal tract and associated glands; Hormonal control of digestion. Nutrition in pregnancy. Nutritional disorders: Cachexia, Bulmia Nervosa, Anorexia nervosa, obesity, flatulence, Peptic ulcer; physiological causes of vomiting and hiccups

D) **Excretion (6 hrs):** Ornithine cycle, Juxta glomerulus apparatus, Urine formation and Counter current mechanism, Hormonal and enzymatic control of urine formation. Role of kidney in osmoregulation, Abnormal constituents of human urine and its significane: Glycosuria, Albuminuria, Heamaturia, Ketonuria, Haemoglobinuria, Uraemia, Pyuria. Dialysis.

Module 5: PRACTICALS (1 CREDIT, 30 Hrs)

MANDATORY EXPERIMENTS

1. Determination of ABO Blood group
2. Detection of Abnormal constituents of urine (Glucose, Protein, Ketone bodies)
3. Determination of Lung volume, tidal volume etc. by using Spirometer
4. Examination of sections of mammalian oesophagus, stomach, duodenum, ileum, rectum, liver, trachea, lung, kidney, Types of Muscles, (Virtual Model/Slide)

Of the remaining experiments any 4 can be selected by the Institution from the following list. Two experiments other than the listed should be selected by the Supervising teacher and introduced to the students.

5. Estimation of haemoglobin using Sahli's haemoglobinometer
6. Preparation of haemin crystals
7. Calculation of BMI
8. Recording of blood pressure using a sphygmomanometer
9. Demonstration of Blood clotting time
10. Demonstration enzymatic activity of Amylase, Protease and lipase
11. Recording of simple muscle twitch

Field study: A) Visit to Anatomy Museum B) Visit to Diagonestic centres, and submission of detailed field study report at the time of semester end practical examination.

Virtual Labs (Suggestive sites)

https://www.vlab.co.in
https://zoologysan.blogspot.com
www.vlab.iitb.ac.in/vlab
www.onlinelabs.in