

Subject Code: 1PT1010102	Subject Title: HUMAN PHYSIOLOGY & BIOCHEMISTRY
Pre-requisite Subject	- NONE -

HUMAN PHYSIOLOGY

Objectives of course:

1. Acquire the knowledge of functions of various systems of human body.
2. Understand the role of hormones, enzymes and other different types of cells of human body.

Learning outcomes:

At the end of the year the candidate will be able to:

1. Draw and label the internal structures of the cell, different tissues and systems of the human body.
2. Explain the functions of important systems.
3. Explain basic knowledge of some common disease.
4. Define common terminologies used in health.

Teaching Scheme (Hours)				Evaluation Scheme (Marks)					
Lecture	Tutorial	Practical	Total Hours	Theory(T)		Practical(P)		Total Marks	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Theory	Practical
170	-	50	220	55	14	80	20	69	100

Subject Contents			
Sr. No.	Topic	Total Hours	Weight (%)
1	General Physiology: 1. Cell Structure and organelle. 2. General Principles of Biophysics 3. Body Fluid compartments.	10	
2	Blood: 1. Composition of blood, Plasma, protein formation and their function. 2. Structure, formation and functions of R.B.C. 3. Structure, formation and functions W.B.Cs. and Platelets. 4. Coagulation and its effects on bleeding, clotting time. 5. Blood groups and their significance, Rh. factor. 6. Reticulo-Endothelial system, jaundice, structure and functions of spleen. 7. Haemoglobin and E.S.R.	15	
3	Cardiovascular System: 1. Structure, properties of heart muscle and nerve supply of heart, Structure and function of arteries, arterioles, capillaries and veins. 2. Cardiac cycle and heart sounds.	20	

	3. Cardiac output measurement & affecting factors 4. Heart rate and its regulation, cardio vascular reflexes. 5. Blood pressure, its regulations and physiological variations. 6. Peripheral resistance, Factors controlling, Role in B.P. 7. Haemorrhage. 8. Changes in muscular exercise.		
4	Respiratory System: 1. Mechanism of respiration, Intra-pleural and intra pulmonary pressure. 2. Lung volumes and capacities. 3. O ₂ and CO ₂ carriage and their exchange in tissues and lungs. 4. Nervous chemical regulation of respiration - Respiratory Centres. Respiratory states - anoxia, asphyxia, Cyanosis, Acclimatization.	15	
5	Digestive System: 1. General outline and salivary digestion 2. Gastric secretion and its mechanism of secretion and functions. 3. Digestion, absorption and metabolism of proteins. 4. Structure, Secretions and Functions of Livers.	10	
6	Nutrition: 1. Digestion, absorption and metabolism of carbohydrates. 2. Digestion, absorption and metabolism of fats. 3. Digestion, absorption and metabolism of proteins. 4. Vitamins, sources, functions and resources. 5. Balanced diet in different age groups and occupation.	5	
7	Endocrines: 1. Anterior Pituitary. 2. Posterior Pituitary and parathyroid. 3. Thyroid. 4. Adrenal Cortex. 5. Adrenal Medulla, thymus. 6. Pancreas and Blood sugar regulation.	20	
8	Reproductive System: 1. Sex determination and development, puberty, 2. Male sex hormones and their functions, spermatogenesis. 3. Female sex hormones and formation of urine, G.F.R. and Tubular functions. 4. Pregnancy, functions of placenta and lactation.	10	
9	Excretory System: 1. Gross and minute structure of kidney and features of renal	5	

	circulation. 2. Mechanism of formation of urine, G.F.R. and Tubular function. 3. Renal function tests. 4. Physiology of micturition		
	Neuro Muscular Physiology:		
10	Muscle And Nerve : 1. Structure of neurones, membrane potential and generation of action potential. 2. Nerve impulse conduction, saltatory conduction. 3. Nerve muscular junction and drugs acting on it - Myasthenia. 4. Degeneration and regeneration in peripheral nerves including Wallerian degeneration	10	
11	Muscle: 1. Type of muscles and their gross structure, stimulus, chronaxie, strength duration curve. 2. Structure of Sarcomere - basis of muscle contraction, Starlings law, changes during muscle contraction. 3. Electrical - Biphasic and monophasic action potentials. 4. Chemical, Thermal and Physical changes, isometric and isotonic contraction. 5. Motor units and its properties, clonus, tetanus, all or none law, beneficial effect. 6. Nature of voluntary contraction, fatigue.	10	
12	Nervous System: 1. Types and properties of receptors, types of sensations 2. Structure of synapse, reflex arc and its properties, occlusion, summation, subminimal fringe etc. 3. Tracts of spinal cord. 4. Descending tracts, Pyramidal and Extraparapidal. 5. Hemisection and complete section of spinal cord. Upper and lower motor neuron paralysis. 6. Cerebral cortex, areas and functions - E.E.G. 7. Structure - connections and function of cerebellum. 8. Basal ganglia and thalamus, connections and functions. 9. Reticular formation, tone, posture and equilibrium. 10. Autonomic Nervous system.	30	
13	Special Senses: 1. Broad features of eye, errors of refraction, lesions of visual pathways. 2. Speech and its disorders. 3. Ear and vestibular apparatus.	10	

TOTAL	170	
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Practical & Demonstrations: (50 Hours)

Sr. No.	Title
	Nerve Muscle physiology 1. Gastrocnemius Muscle-Sciatic Nerve Prep. 2. Action Potential etc. 3. Effect of Temperature on S.M.C 4. Effect of Load on Skeletal Muscle Contraction
	Cardio-Vascular System 5. Graph 6. BP 7. Radial Pulse 8. Spirometry/Respiratory Efficiency Test
	Instruments
	Recording Body Temperature
	Haematology 9. Total red Cell Count 10. Total White Blood Count 11. Cells in Peripheral blood film 12. Differential WBC count 13. Absolute count, Arneth count 14. Blood grouping Bleeding time/Clotting Time, Blood ,PCV, ESR
	Central Nervous System 15. Examination of sensory function 16. Examination of motor functions 17. Examination of reflexes 18. Cranial nerves I, III, IV, V, VI 19. Cranial nerve II 20. Cranial nerves VII, VIII, IX, X, XII

BIOCHEMISTRY

Objectives of course: Structure, functions of cell in brief.

1. Normal functions of different components of food
2. Basal metabolic rate and factors affecting BMR, with special reference to obesity.
3. Nutritional aspects of carbohydrates, lipids, proteins and vitamins.
4. The basic and clinical aspects of enzyme and regulation of enzymatic activity.
5. Biochemical aspects of muscle contraction.

Learning outcomes:

At the end of the course, the Candidate should be able to describe;

1. Describe the structure and function of the cell in brief.
2. Describe the normal functions of different components of food.
3. Describe basal metabolic rate and the factors affecting the same (in brief) with special reference to obesity.
4. Discuss nutritional aspects of carbohydrates, lipids, proteins, vitamins and minerals and their metabolism with special reference to obesity.
5. Define enzymes and discuss in brief the factors affecting enzyme activity and diagnostic use of enzymes.
6. Describe in detail the biochemical aspects of muscle contraction.
7. Acquire knowledge in brief about the clinical biochemistry, with special reference to liver and renal function tests, blood study for lipid profile, metabolism of fat, carbohydrates, proteins, bone minerals, electrolyte balance, water balance and acid – base balance.

Teaching Scheme (Hours)			Evaluation Scheme (Marks)					
Lecture	Practical	Total	Theory(T)		Practical(P)		Total Marks	
			University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	Theory	Practical
50	-	50	25	6	-	-	31	-

Subject Contents			
Sr. No.	Topic	Total Hours	Weight (%)
1	Biochemical characteristics of living mater.		
2	Biochemistry, morphology of cell		
3	Nucleic acids		
4	Proteins		
5	The enzymes		
6	Metabolism		
7	Hormones		

8	Nutrition		
9	Biochemistry of connective tissues, nerve tissue and muscle		
10	Water, electrolyte and acid base balance		
11	Chemistry of biology materials		
12	Physicochemical Phenomenon		
13	Common procedures used in biochemistry		
Total Hours		50	