Syllabus of physiology

Theoretical :150 hours **5 hours weekly**
Practical :90 hours **3 hours weekly**
Tutorial : 60 hours **2 hours weekly**

TOPIC
1.Introduction to Physiology ☒ General and cellular basis of medical physiology ☒ Organization of the body ☒ Units for measuring concentration of solutes ☒ PH ☒ Buffers ☒ Diffusion ☒ Osmosis, and osmotic pressure
2. Body Fluids ☒ Fluid compartment of the body ☒ Measuring the volumes of the body's compartments ☒ Forces acting upon the ions ☒ Calculating osmolarity in complex solutions ☒ Anion gap ☒ Fluid movement
3. The Cell ☒ Microscopic observation of the cells ☒ Composition of human cell ☒ Basic structures of the cell ☒ Types of protein in the membrane ☒ Transport of molecules across cell membrane ☒ Mediated-Transport systems ☒ Endocytosis and Exocytosis
4. Blood Physiology ☒ Composition and function ☒ The red blood cell (RBC) ☒ Hemoglobin and hemoglobin variants ☒ Iron metabolism, anemia, polycythemia. ☒ Destruction of the red blood cell ☒ The white blood cell (WBC) ☒ Morphology and classification specific function of the different variants

☒ The platelets
☒ Blood group and blood transfusion
☒ Homeostasis and blood coagulation
☒ The plasma composition and function
☒ The fibrinolytic activity of the plasma (Anti-clotting mechanism)
☒ Test of homeostasis
☒ The immune system, Allergy

5. Physiology of Muscle:

☒ Introduction and types of muscles
☒ Skeletal muscles, structure, motor unit.
☒ Excitability
☒ Mechanical response of the muscle
☒ Simple muscle twitch
☒ Types of contraction, muscle fatigue
☒ Summation of muscle contraction
☒ Effects of two muscles contraction
☒ Effects of repeated stimulation
☒ Clonus and tetanus
☒ All or non-law, muscle tone
☒ The sliding filament theory
☒ Thermal and chemical changes during muscle contraction

6. Physiology of the Nerve Cell (Neurophysiology):

☒ Prosperities of nerve fiber
☒ Transmission along nerve fibers
☒ Types of nerve fibers and compound action potential
☒ Ionic theory of the membrane potential
☒ Structure and types of nerve fiber
☒ Effect of cutting a motor nerve

7. Synaptic and Neuromuscular Transmission :

☒ Synaptic transmission
☒ Ionic basis
☒ Convergence and divergence, spatial and temporal
☒ Neuromuscular junction
☒ Neuromuscular transmission and blocking substances

8. Autonomic Nervous System (ANS)

☒ Introduction and definition
☒ Functional anatomy: sympathetic and parasympathetic systems
☒ The concept of membrane receptor
☒ Chemical transmission in the autonomic nervous system

☒ Function of sympathetic and parasympathetic nervous systems

9. Cardio Vascular System (CVS)

☒ The heart
☒ Pulmonary and systemic circulation
☒ Physiology of cardiac muscle
☒ The functions of the heart valves
☒ Heart sounds
☒ Prosperities of cardiac muscle (Autorhythmicity, Excitability, Conductivity)
☒ Cardiac action potentials
☒ Excitation-contraction coupling in the heart muscle
☒ Frank-Starling's law of the heart
☒ Electrical potential of the heart (ECG)
☒ Electrical axis and cardiac vector (right and left axis deviation)

10. Respiratory Physiology

☒ Respiration
☒ Respiratory airway
☒ Respiratory mechanism
☒ Action of respiratory muscles
☒ Air way resistance
☒ Chronic obstructive pulmonary disease (COPD)
☒ Elastic behavior of the lung (compliance)
☒ Pulmonary surfactant
☒ Opposing forces acting on the lung
☒ Work of breathing
☒ Lung volumes and capacities
☒ Gas exchange
☒ Factors influencing rate of gas transport
☒ Transport of O_2 and CO_2 by the blood
☒ O_2 –Hb dissociation curve
☒ Factors affecting the position of the curve
☒ Central regulation of respiratory control
☒ Chemical respiratory control (central chemoreceptors, peripheral chemoreceptors)

11. Gastro Intestinal System

☒ Main function of GIT
☒ Composition of saliva
☒ Functions of saliva

☒ Swallowing (Deglutition)
☒ Lower esophageal sphincter
☒ Motor disorders of the esophagus
☒ Functions of stomach
☒ Mucus secretion by the stomach
☒ Regulation of gastric secretion
☒ Pancreas
☒ Bile salts
☒ Regulation of biliary secretion
☒ Functions of the liver
☒ Bilirubin metabolism and excretion
☒ Jaundice
☒ Small intestine
☒ Large intestine
☒ Absorption
☒ Regulation of GIT functions
☒ Gastrointestinal motility
☒ Emptying of the stomach
☒ Movement in colon
☒ Defaecation

12. Renal Physiology

☒ Functions of kidneys
☒ Functional anatomy of the kidney
☒ The nephron
☒ Macula densa
☒ The processes which are carried by the kidney (filtration, reabsorption, secretion)
☒ GFR
☒ Factors affecting GFR
☒ Factors affecting the rate of reabsorption
☒ Renin-Angio Tensin system
☒ Auto-regulation of GFR and RBF
☒ Renal mechanism for excreting diluted urine
☒ Renal mechanism for excreting concentrated urine
☒ Counter-current system
☒ Na^+ excretion
☒ K^+ excretion
☒ H^+ secretion
☒ The micturition reflex
☒ Diuretics
☒ The acid-base balance

13. Endocrine System

- ☒ Endocrine glands
- ☒ Hormone
- ☒ Feed back mechanism
- ☒ Binding of hormone to the receptor
- ☒ Hypothalamus
- ☒ Pituitary gland
- ☒ Control of ADH secretion
- ☒ Anterior pituitary gland
- ☒ Classification of pituitary hormones
- ☒ Growth hormone
- ☒ Thyroid gland
- ☒ Parathyroid gland
- ☒ Goiter
- ☒ Supra renal gland (Adrenal gland)
- ☒ Cortex (Clucocorticoids, Mineral corticoids)
- ☒ Medulla
- ☒ Cushing syndrome
- ☒ Addisson's disease
- ☒ The pancreas (Glucagon)
- ☒ D.M

14. The Reproductive System

- ☒ Defects in gametogenisis
- ☒ Testis
- ☒ Gonadotrophic hormones
- ☒ Testosterone
- ☒ Spermatogenisis
- ☒ Seminal fluid
- ☒ Ovaries
- ☒ Progesterone
- ☒ Menstrual cycle
- ☒ Ectopic pregnancy

15. Physiology of Nervous System

- ☒ Special Senses
- ☒ Introduction and definition
- ☒ Auditory system (ear)
- ☒ Vestibular system
- ☒ The eye (visual system)
- ☒ The sense of smell
- ☒ Stretch reflex
- ☒ Spinal shock

- ☒ Synapse (excitatory synapse, inhibitory synapse)
- ☒ Supra spinal regulation of stretch reflex
- ☒ Electrical events at synapses
- ☒ Neural control of body temperature
- ☒ Fever
- ☒ Brain stem
- ☒ Central regulation of visceral function
- ☒ Control of feeding and appetite
- ☒ Thirst center
- ☒ Basal ganglia
- ☒ Physiology of the cerebellum and body posture control
- ☒ High functions integrated in human brain
- ☒ EEG
- ☒ Distribution of sleep stage

16. Body Temperature Regulation

- ☒ Normal temperature
- ☒ Shivering and non-shivering thermogenesis
- ☒ Heat loss
- ☒ Hypothalamic regulation of body temperature
- ☒ Fever
- ☒ Hypothermia

17. Sport physiology

- ☒ Types of exercise
- ☒ Aerobic exercise
- ☒ Effect of aerobic exercise on vascular system
- ☒ Anaerobic exercise
- ☒ Effect of anaerobic exercise on vascular system