Learning objectives of Physiology for MBBS Teaching

Theory:

1. Basic concept and knowledge of structure and functioning of different systems in body.
2. To understand integrated aspect of functioning of the individual and all the systems in totality in body.
3. To understand the integration of the combined knowledge of Physiology, Anatomy and Biochemistry.
4. To know all the common clinical conditions of deranged normal physiology in body - clinical usefulness for knowing Physiology.
5. To be able to solve simple clinical problems with the help of their knowledge in Physiology.
6. To promote and inculcate curiosity and skill for elective learning in the field of research.
7. Basic exposure to some necessary clinical departments and Clinical tests laboratories for horizontal and vertical integration for early clinical exposure and to witness theoretical knowledge.

Practical:

1. Knowledge of all the practicals of hematology and clinical laboratories.
2. To be able to skillfully perform all the experiments.
3. To understand their implication to clinical conditions.

Distribution of syllabus based on utility and applicability as a basic doctor

General Physiology

1) Must Know:

General introduction to Physiology
Functional Organization of human body
Control of internal environment-homeostasis
Physicochemical properties of cell membrane
Transport of substances through the cell membranes
The body fluid compartment
Characteristics of control systems

2) Should Know:

Genetic control of protein synthesis in cell
Control of cell growth and cell reproduction
Apoptosis
Edema

3) May know:

Basis of tests that are used to evaluate genetic functions
Clinical conditions causing irregularities of fluid volume regulation
Patch clamp

Nerve–Muscle

1) Must Know:

Principles of bioelectricity
Genesis of resting membrane potential
Excitability and Action potential
Properties and classification of nerve-fibres
Functional anatomy of neuromuscular junction
Neuromuscular transmission
Muscle proteins – (Biochemistry)
Excitation – contraction coupling
Contraction kinetics of skeletal muscles
Smooth muscle
Injury & repair of nerves and muscles

2) Should Know:
Energetics of nerve & muscle
Exercise physiology
Clinical and applied aspect of nerve and muscles
3) May know:
Work Physiology

Blood

1. Must Know
Introduction to blood
Plasma proteins and functions
Principles of hemopoiesis
Red Blood cells and erythropoiesis
Destruction of red cells
Jaundice
Anemia and polycythemia
WBCs production and regulation
WBCs and functions
Immunity and allergy
Platelets and functions
Hemostasis and anti clotting
Blood groups
Physiological basis of transfusion medicine

2. Should know:
Plasmapheresis
Causes of abnormal blood cells count
Biosynthesis of hemoglobin
Physiological variations of hemoglobin
Cytokines
Iron metabolism
Biochemical tests used for jaundice
Anticoagulants

3. May Know:
Leukemias
Organ transplant and its rejection
Bleeding disorders and thromboembolic conditions in human being
Blood coagulation tests

Respiratory System and Environmental Physiology

1. Must Know:
Introduction to respiratory system
Lung volumes and capacities
Mechanics of respiration – I
Mechanics of respiration – II
Composition of respired air: pulmonary ventilation
Exchange of gases in the lungs
Ventilation – perfusion ratio
O_2 carriage, O_2-dissociation curve
C O_2 carriage, C O_2–dissociation curve
Neural regulation of respiration
Chemical regulation of respiration
Physiological responses to high attitude
Physiological responses to high atmospheric pressure
Introduction to environmental physiology
Body temperature regulation
Man in cold environment
Man in hot environment

2. Should Know:
Respiratory diseases and pathophysiology
Special features of pulmonary circulation
Artificial respiration
Pulmonary function tests

3. May Know:
Hypothermia and its clinical applications
Therapeutic use of oxygen
Study of blood gases and blood pH

Cardiovascular System

1. Must Know:

Introduction to CVS
Properties of cardiac muscle
Action potential and spread of impulse in the heart
ECG
Pressure changes in the heart
Cardiac cycle
General principles of hemodynamics
Neural regulation of cardiac activity
Regulation of heart rate
Intrinsic regulation of heart's action
Cardiac output
Cardiac output: measurement and regulation
Blood pressure and its regulation
Cardiovascular reflexes
Neural control of circulation
Coronary Circulation

2. Should Know

E-C coupling in the myocardium
Functional basis of heart sounds and murmurs
Cardiovascular aspect of Exercise physiology
Cerebral and Splanchnic circulation
Special features of circulation in skeletal muscles and skin
Circulatory shock
Cardiac failure

3. May Know:

Valvular heart disease
Foetal and neonatal circulation

Gastrointestinal System

1. Must Know:

General organization of G.I. tract
Mastication and deglutition
Salivary glands and secretion
Gastric secretion and regulation
Biliary and pancreatic secretions
Liver and functions
Gastrointestinal motility
Digestion and absorption of Carbohydrates
Digestion and absorption of Proteins
Digestion and absorption of Fats
Physiology of colon

2. Should Know
Pathophysiology of peptic ulcer
Introduction to nutrition
Liver function tests
Dietary fiber
Gastrointestinal diseases

3. May Know:
Recommended dietary allowances
Diet during pregnancy and lactation
Diet during infancy and childhood
Pathophysiology of diarrheal disease

Endocrinology and Reproduction System

1. Must Know:
Hypothalamic – pituitary – gonadal axis
Pituitary Gland
Thyroid Gland

Endocrine Functions of the Pancreas and regulation of
Adrenal Medulla
Adrenal Cortex
Physiology of Bone and Parathyroid hormone
The Gonads: Development & Function
Reproductive System
Introduction to reproductive system
Male reproductive physiology
Female reproductive physiology
Puberty
Pregnancy
Parturition and lactation

2. Should Know

Carbohydrate, protein and fat metabolism
Control of Calcium and Phosphate metabolism
Applied aspects of each hormone
Gonads: Development
Methods of contraception

3. May Know:

Reproductive ageing
New advances in hormonal and reproductive physiology

Kidney

1. Must Know:

Introduction to organization of renal tissue
Renal hemodynamics, RBF and GFR
Renal tubular functions
Micturition

2. Should Know

Regulation of renal function
Physiological basis of renal function tests
Body pH regulation
Principles of dialysis

3. May Know:
Renal transplant

Nervous system:

1. Must Know:
Introduction to neurophysiology I
CSF
Neuroglial cells
Neurotransmitters
Synaptic transmission
Properties of synaptic transmission
Functional organization of sensory pathways
Thalamus
Sensory cortex
Perception of sensory stimuli
Physiology of pain
Characteristics and properties of reflexes and muscle spindle
Functional organization of motor system
Brain stem reflexes, stretch reflexes and tendon reflexes
Basal ganglia
Cerebellum
Vestibular neck reflexes: maintenance of equilibrium
Autonomic nervous system
Hypothalamus
Limbic system and emotions
Electroencephalography
Sleep and wakefulness
Learning and memory
Speech

2. Should Know
Blood brain barrier

Coding of sensory information
Pain control endogenous regulatory mechanisms
Spinal Shock
Localizing the level of lesion in neurological diseases
Amnesia - Dementia
Aphasia

May Know:
Physiology of addiction

Special Senses

1. Must Know:
Functional anatomy of eye
Functions of retina: photoreception, colour vision Central mechanisms of vision and visual perception
Functional anatomy of ear: impedance matching
Organ of Corti: peripheral auditory mechanism
Auditory pathway
Central auditory mechanism and auditory perception
Physiology of Olfaction
Physiology of taste

2. **Should Know:**
Applied aspects of different special senses
Auditory and Visual evoked potential

3. May Know:

Electroretinography