

# Physiology Generic (GEN) Syllabus

## Semester I/III

### Core Courses (CC) Theoretical (TH)

#### Cellular Basis of Physiology: (I) / (III)

Structure and functions of plasma membrane, nucleus and different cell organelles – Endoplasmic reticulum, Golgi bodies, Mitochondria, Lysosome and Peroxisome.

#### Biophysical Principles, Enzymes and Chemistry of Bio-molecules :

#### (I) / (III)

Physiological importance of the following physical processes: Diffusion , Osmosis and Surface tension. pH and Buffers – Significance in human body and maintenance of pH in the blood. Colloids - Classification and physiological importance. Enzymes: Classification, factors affecting enzyme action. Concept of coenzymes and isozymes.

Carbohydrates: Definition and classification. Monosaccharides – Classification, structure, physiological importance. Disaccharides – Maltose, Lactose and Sucrose: Structure, occurrence and physiological importance. Polysaccharides – Starch, Glycogen, Dextrin, Cellulose. Lipids : Definition and classification. Fatty acids Classification. — Definition and importance of, Saponification number and, Iodine number.. Phospholipids, Cholesterol & its ester -- physiological importance. Amino acids, Peptides and Proteins: Classification and structure. Structure of peptide bonds. Nucleic acids: Structure of DNA and RNA.

#### Digestion & Metabolism: (I)/(III)

Structure in relation to functions of alimentary canal and digestive glands. Composition, functions and regulation of secretion of digestive juices including bile. Digestion and absorption of carbohydrate, protein and lipid. Movements of the stomach and small intestine. 4 Glycolysis, TCA cycle, Importance of Glycogenesis, Glycogenolysis and. Gluconeogenesis. Beta oxidation of saturated fatty acid. Importance of Ketone bodies . Deamination & Transamination. Formation of urea.

## **Blood and Body Fluids Blood: (I) / (III)**

Composition and functions. Plasma proteins: origin and functions. Blood cells-- their morphology and functions. Erythropoiesis. Hemoglobin : different types of compounds and derivatives. Coagulation of blood: mechanism, procoagulants, anticoagulants.. Lymph and tissue fluids: composition, formation, and functions.

## **Cardiovascular System: (I) / (III)**

Anatomy and histology of the heart. Properties of cardiac muscle. Origin and propagation of cardiac impulse. Cardiac cycle : Events. Heart sounds. Heart rate. Cardiac output: Determination by following Fick principle, factors affecting. Pulse - arterial and venous. Blood pressure and factors controlling. Baro- and chemoreceptors. Vasomotor reflexes. Peculiarities of regional circulations: coronary and cerebral.

## **Respiratory System : (I) / (III)**

Anatomy and histology of the respiratory passage and organs. Role of respiratory muscles in breathing. Lung volumes and capacities. Exchange of respiratory gases between lung and blood and between blood and tissues. Transport of oxygen and carbon dioxide in blood. Regulation of respiration - neural and chemical. Hypoxia.

## **CCI P / CC III P: (I) / (III)**

Examination and staining of fresh tissues : Squamous, Ciliated and Columnar Epithelium by Methylene Blue stain. Qualitative tests for identification of : Glucose, Fructose, Lactose, Sucrose, Starch, Dextrin, Lactic acid, Hydrochloric acid , Albumin, Acetone, Glycerol and Bile Salts. Quantitative estimation of amino nitrogen by Sorensen's formol titration method (percentage to be done).

Preparation and staining of human blood film with Leishman's stain and identification of different types of blood cells. Preparation of hemin crystals. Demonstration- kymographic recording of the unperfused heart of toad and effects of warm and cold saline.

Measurement of systolic and diastolic pressure by sphygmomanometer and determination of pulse and mean pressure. Measurement of peak expiratory flow rate. Pneumographic recording of normal respiratory movements and effects of hyperventilation and breath-holding.