



**BLDE**  
**(DEEMED TO BE UNIVERSITY)**

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**SYLLABUS FOR Ph.D.PROGRAMME**  
**ENTRANCE EXAMINATION 2022-23**  
**(FACULTY OF ALLIED HEALTH SCIENCE)**

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# ANATOMY

## 1. General Anatomy

### 1.1 Terminology

General anatomy includes introduction to anatomy Terminology related to anatomy, Different anatomical planes and subdivisions.

### 1.2 Bone

Skeleton system with classification, types of bone, features of long bone, ossification, blood supply.

### 1.3 Joints

General classification with examples, structure of typical synovial joints, Classification of synovial joint with examples, Fibrous joints, Cartilaginous joints, Nomenclature.

### 1.4 Muscles

General features of muscles, classification with examples, types of skeletal muscles, Structures associated with muscle, Cardiac muscle and Smooth muscle, Functions, Naming of muscles.

### 1.5 Cardiovascular system

Types of circulations, Classification of blood vessels, Anastomosis, Collateral circulation, End arteries, Vasa vasorum.

### 1.6 Nervous System

Subdivisions of nervous system, Spinal cord and spinal segments, nerve fibers and myelination, Autonomic nervous system.

### 1.7 Integumentary System

Introduction to skin and fascia, Skin components and layers, types of skin, Fascia, Appendages of skin, Functions.

## 2. General Histology

### 2.1 Epithelium and glandular tissue

Classification of epithelia, Simple epithelium and types, Stratified epithelium and types, Goblet cells, Transitional epithelium, Basement membrane, Surface projections and junctions, Classification of glandular tissue with suitable examples.

### 2.2 Connective tissue

Components of connective tissue, Fibres, Ground substance, Cells of connective tissue, Loose connective tissue, Dense connective tissue, Adipose tissue.

### 2.3 Skeletal system

Classification of cartilage with examples, Composition of Cartilage and bone, Cells of bone, Bone matrix Microscopic anatomy of bones.

### 2.4 Muscular system

Microscopic structure of skeletal muscle, cardiac muscle and smooth muscle, Differences between the muscle structures.

### 2.5 Cardiovascular

Microscopic structure of Medium sized artery, Elastic artery, Vein, Structure of neuron, neuroglia, peripheral nerve, Ganglia.

### 2.6 Lymphoid system

Cells of lymphoid system, Lymphatic vessels, Microscopic structure of lymphnode, thymus, spleen and tonsil.

### **3. General Embryology**

#### **3.1 Introduction to Embryology and cell cycles**

Basic terminology, Stages of human development, Cell Cycle, Cell division – Mitosis and Meiosis, related abnormalities.

#### **3.2 Gametogenesis**

Primordial germ cells, Spermatogenesis, Spermiogenesis, Oogenesis.

#### **3.3 Female reproductive Cycles**

Ovarian cycle, Structure of Ovum, Changes in Menstrual cycle, Strata of endometrium.

#### **3.4 Fertilization**

Definition, Stages of fertilization, Effects of fertilization.

#### **3.5 First week of development**

Cleavage division, blastocyst, Implantation, Normal and abnormal sites of implantation and related applied embryology.

#### **3.6 Second week of development**

Formation of 2 germ layers, Yolk sac, Chorion and amnion.

#### **3.7 Third week of development**

Gastrulation, Notochord, Neurulation, Folding of embryo.

#### **3.8 Placenta**

Fetal membranes, Chorionic villi, Placenta formation, functions of placenta, Umbilical cord.

### **4. Muscular system**

#### **4.1 Muscles of upper limb**

Muscles of Pectoral region, muscles of arm, Axilla, spaces of axilla, Cubital fossa, muscles of forearm, intrinsic muscles of palm, flexor and extensor retinacula, carpal tunnel and syndrome, Brachial plexus and related nerves.

#### **4.2 Muscles of lower limb**

Femoral triangle, Front of the thigh, Adductor canal, gluteal region, Hamstrings, Popliteal fossa, Muscles of leg, Arches of foot, Nerve supply to lower limb – Femoral nerve, Obturator nerve and Sciatic nerve, Blood supply to lower limb.

#### **4.3 Muscles of Abdomen**

Muscles of anterior abdominal wall, Inguinal canal and hernia, Diaphragm, Muscles of posterior abdominal wall.

#### **4.4 Muscles of head and neck**

Muscles of scalp and face, Muscles of mastication Posterior triangle, Anterior triangle, Sternocleidomastoid, Trapezius Related nerve supply.

#### **4.5 Muscles of thoracic cage**

Intercostal space, Inter costal muscles, respiratory movements.

### **5. Skeletal System**

#### **5.1 Bones of Head and neck**

Norma verticalis, Norma Basalis, Norma Occipitalis, Norma Lateralis, Interior of

skull, Mandible.

### **5.2 Vertebral column**

Curvatures of vertebral column, General features of vertebrae, Typical and atypical vertebrae, intervertebral disc.

### **5.3 Thoracic bones**

Sternum, Classification of ribs, General features of typical rib, 1st, 2nd, 10th, 11th and 12th rib features.

### **5.4 Upper limb skeleton**

Clavicle, Scapula, Humerus, Shoulder joint, Elbow joint, Radius, Ulna, Radioulnar joints, Wrist joint, Bones of hand.

### **5.5 Lower limb skeleton**

Hip bone, Femur, Hip joint, Knee joint, Tibia, Fibula, Ankle joint, Bones of foot.

## **Reference Books:**

1. B D Chaurasia Vol-1,2 and 3
2. Vishram Singh Vol-1,2,and 3
3. General Anatomy- B.D.Chaurasia
4. General Histology – Krishna Garg
5. General Embryology – Inderbir Singh

# PHYSIOLOGY

## 1. General Physiology

- Homeostasis, feedback mechanisms
- Structure & function of cell & organelles
- Transport across Cell Membrane

## 2. Hematology

- Composition & functions of blood, plasma protein
- RBC, Erythropoiesis
- Haemoglobin, Anaemia
- Blood Groups
- WBC
- Immunity
- Haemostasis
- platelets
- Coagulation of blood
- Lymphatic, reticuloendothelial / Tissue Macrophage System

## 3. Nerve Muscle Physiology

- Structure, function & classification of Nerve Fibres
- Properties of Nerve Fibres
- Resting membrane Potential, Action Potential
- Neuromuscular Junction
- Structure of skeletal muscle
- Mechanism of muscle contraction, Excitation Contraction coupling
- Properties of skeletal muscle

## 4. Respiratory System

- Introduction, physiological anatomy & Functions of RS
- Lung volume & capacities
- Mechanism of breathing
- Diffusion
- Transport of O<sub>2</sub>
- Transport of Co<sub>2</sub>
- Neural Regulation
- Chemical regulation
- Hypoxia

## 5. Cardiovascular system

- Introduction – functional anatomy, structure of cardiac muscle
- Properties of cardiac muscle
- Cardiac impulse
- ECG
- Cardiac cycle
- Cardiac output

- CVS regulation
- Heart Rate
- Blood Pressure
- Hemodynamics
- Coronary circulation

**Reference Books:**

- 1 Concise Human Physiology - A K Jain
- 2 Essential of Medical Physiology - K Sembulingam Physiology: Prep
- 3 Manual For Undergraduates - Joshi, V.D.
- 4 Manual of Practical Physiology - A K Jain

# BIOCHEMISTRY

## 1. Module 1

Cell Biology- Biophysical principles of Basic Sciences, Structure & function of different cell organelles, Separation of cell organelles, Markers for cell organelles, Structure & function of cell membrane, Cytoskeleton elements, Transport mechanism, Ion channels, Artificial membrane (liposome & its application)

## 2. Module 2

- a) Chemistry of Carbohydrate- Definition, Physiological functions, Classification, Monosaccharide, Disaccharide, Polysaccharides, Properties of Carbohydrates, Epimers, Isomers, Mutarotation.
- b) Chemistry of Lipids- Definition, Physiological functions, Classification of lipids, fatty acids, Essential fatty acids , Simple lipids , Compound Lipids, Derived Lipids.

## 3. Module 3

- a) Chemistry of Protein- Amino acids & their Classification, various ways of Classification of protein, Structure of protein, Properties of proteins, Isoelectric pH, Denaturation, Biologically important peptides
- b) Chemistry of Nucleic acids- Nucleosides, Nucleotides, Purine & Pyrimidine bases, Types & structure of DNA, Types & structure of RNA.

## 4. Module 4

Enzyme- Definition, Nomenclature & Classification - Systematic & recommended nomenclature, IUBMB Classification of enzymes only (names, definition, general reaction catalyzed and one example for each class). Properties of enzymes - Mechanism of action of an enzyme with regard to its effect on activation energy of a reaction. Concept of active sites in enzymes, Lock & key & induced fit models of enzyme-substrate binding, Specificity of enzymes- reaction & substrate specificity-definition & an example for each, Cofactors- metals & coenzymes (definition, examples of coenzymes) & examples of enzymes that require them, Factors that influence enzyme activity- Effect of pH (concept of optimal pH with examples).

Effect of temperature (concept of optimal temperature). Overview of concept of effect of substrate concentration (Michaelis- Menton equation(no derivation required), basic concept of  $K_m$  &  $V_{max}$ ). Effects of enzyme & product concentration. Inhibition of enzymes- Types of enzyme inhibition – competitive, non- competitive, suicide inhibition, Examples of commonly used drugs that act by competitive inhibition of enzymes. Regulation of enzyme activity – Overview of mechanisms involved in regulating the activity of enzymes, Allosteric activation & inhibition. Covalent modification- (phosphorylation & de phosphorylation ) Induction & repression , Concept of feedback inhibition. Isoenzymes , Therapeutic & diagnostic uses of enzymes.



## **5. Module 5**

- a) Vitamins- Sources , RDA, Functions & deficiency manifestation of Fat soluble vitamins(A, D, E, K), Water soluble vitamins (B complex & Vitamin C)
- b) Biological Oxidation- Role of ATP, The respiratory chain & oxidative phosphorylation, Role of brown fat (non-shivering thermogenesis & role of uncoupling protein / thermogenin).
- c) Minerals- Sources, Functions & deficiency manifestation of Calcium, Phosphorus, Iron, Copper, Zinc, Magnesium, Manganese, Iodine, Sodium, Potassium, Fluoride, Selenium.

## **6. Module 6**

- a) Hb Chemistry- Structure & functions of Hb, Physiological Hb , Abnormal Hb, Hb derivatives
- b) Hormone- Classification of hormones: Group 1 & Group 2 hormones
- c) Signal Transduction – Mechanism of intracellular signaling of hormones, G protein coupled receptors. Second messengers in hormone action: cAMP, cGMP, Ca<sup>2+</sup> & phosphatidyl inositol. Hormone receptors as gene-specific transcription factors.

## **Reference Books:**

1. Textbook of Medical Biochemistry (As per the revised curriculum of MCI, 2019),Dr. S K Gupta.
2. Textbook of Biochemistry for Medical Students (As per revised MCI curriculum),D M Vasudevan, Sreekumari S, Kannan Vaidyanathan .
3. Textbook of Medical Biochemistry, M.N. Chatterjee, Rama Shinde.
4. Textbook of Biochemistry, Debajyoti Das