1.2.2 SYLLABUS (Including Teaching Hours)

A. GENERAL PHYSIOLOGY

MUST KNOW - 100HRS

1. HOMEOSTASIS:
   Basic concept, Feedback mechanisms
   Structure of cell membrane, transport across cell membrane Membrane potentials

2. BLOOD:
   Composition & functions of blood.
   Specific gravity, Packed cell volume, factors affecting & methods of determination.

   Plasma proteins - Types, concentration, functions & variations.


   ESR- Methods of estimation, factors affecting, variations & significance.

   Haemoglobin - Normal concentration, method of determination & variation in concentration.

   Anaemia - Definition, classification, life span of RBC’s destruction of RBCs , formation & fate of bile pigments, Jaundice - types.

   Leucocytes : Classification, number, percentage, distribution morphology, properties, functions & variation. Role of lymphocytes in immunity, leucopoiesis life span & fate of leucocytes.

   Thrombocytes - Morphology, number, variations, function & thrombopoiesis.

   Haemostatis - Role of vasoconstriction, platelet plug formation in haemostasis, coagulation factors, intrinsic & extrinsic pathways of coagulation, clot retraction.


   Blood volume: Normal values, variations.

3. MUSCLE AND NERVE:

   Classification of nerves, structure of skeletal muscle – Molecular mechanism of muscle contraction, neuromuscular transmission. Properties of skeletal muscle.

   Structure and properties of cardiac muscle & smooth muscle.

4. DIGESTIVE SYSTEM:

   Introduction to digestion: General structure of G.I. tract, Innervation.

Stomach: Composition and functions of gastric juice, mechanism and regulation of gastric secretion.

Exocrine Pancreas - Structure, composition of pancreatic juice, functions of each component, regulation of pancreatic secretion.

Liver : structure, composition of bile, functions of bile, regulation of secretion

Gall bladder : structure, functions.

Small intestine - Composition, functions & regulation of secretion of intestinal juice.

Large intestine - Functions.

Motor functions of GIT: Mastication, deglutition, gastric filling & emptying, movements of small and large intestine, defecation.

5. EXCRETORY SYSTEM:

Structure & functions of kidney, functional unit of kidney & functions of different parts.

Juxta glomerular apparatus, renal blood flow.

Formation of Urine: Glomerular filtration rate - definition, determination, normal values, factors influencing G.F.R. Tubular reabsorption - Reabsorption of sodium, glucose, water & other substances.


Role of kidney in the regulation of pH of the blood.

Micturition, anatomy & innervation of Urinary bladder mechanism of micturition & abnormalities.

6. BODY TEMPERATURE

7. ENDOCRINOLOGY


Hormones of anterior pituitary & their actions, hypothalamic regulation of anterior pituitary function.

Disorders of secretion of anterior pituitary hormones.
Posterior pituitary: Functions, regulation & disorders of secretion.

Thyroid: Histology, synthesis, secretion & transport of hormones, actions of hormones, regulation of secretion & disorders, Thyroid function tests.

Adrenal cortex & Medulla - synthesis, secretion, action, metabolism, regulation of secretion of hormones & disorders.

8. REPRODUCTION
Sex differentiation, Physiological anatomy of male and female sex organs,

Female reproductive system: Menstrual cycle, functions of ovary, actions of oestrogen & Progesterone, control of secretion of ovarian hormones, tests for ovulation, fertilisation, implantation, maternal changes during pregnancy, pregnancy tests & parturition.

Lactation, composition of milk, factors controlling lactation, milk ejection, reflex, Male reproductive system: spermatogenesis, semen and contraception.

9. CARDIO VASCULAR SYSTEM
Functional anatomy and innervation of heart. Properties of cardiac Muscle Origin & propagation of cardiac impulse and heart block.

Electrocardiogram - Normal electrocardiogram. Two changes in ECG in myocardial infarction.

Cardiac cycle - Phases, Pressure changes in atria, ventricles & aorta.
Volume changes in ventricles. arterial pulse.

Heart sounds: Mention of murmurs.

Heart rate: Normal value, variation & regulation.
Cardiac output: Definition, normal values, one method of determination, variation, factors affecting heart rate and stroke volume.
Arterial blood pressure: Definition, normal values & variations, determinants, regulation & measurement of blood pressure.

10. RESPIRATORY SYSTEM
Physiology of Respiration: External & internal respiration.
Functional anatomy of respiratory passage & lungs.
Respiratory movements: Muscles of respiration, Mechanism of inflation & deflation of lungs.
Intra pleural & intra pulmonary pressures & their changes during the phases of respiration.
Mechanics of breathing - surfactant, compliance & work of breathing.
Spirometry: Lung volumes & capacities definition, normal values, significance, factors affecting vital capacity, variations in vital capacity, FEV & its variations.
Pulmonary ventilation - alveolar ventilation & dead space – ventilation.
Exchange of gases: Diffusing capacity, factors affecting it.
Transport of Oxygen & carbon dioxide in the blood.
Regulation of respiration – neural & chemical.
Hypoxia, cyanosis, dyspnoea, periodic breathing.

11. CENTRAL NERVOUS SYSTEM
Organisation of central nervous system
Neuronal organisation at spinal cord level
Synapse receptors, reflexes, sensations and tracts
Physiology of pain
Functions of cerebellum, thalamus, hypothalamus and cerebral cortex.
Formation and functions of CSF
Autonomic nervous system

12. SPECIAL SENSES
Fundamental knowledge of vision, hearing, taste and smell.

EXPECTED TO KNOW- 20 HRS
Blood Indices - MCV, MCH, MCHC - definition, normal values, variation.
Body fluids : distribution of total body water, intracellular & extracellular compartments, major anions & cations in intra and extra cellular fluid.
Oedema - causes.
Functions of reticulo endotrelial system.
Functions Of Skin.
Other hormones - Angiotensin, A.N.F.
Coronary circulation.
Cardio vascular homeostasis - Exercise & posture
Jugular venous pulse
Artificial respiration, pulmonary function tests.
Composition of inspired air, alveolar air and expired air.

HUMAN BIOCHEMISTRY , NUTRITION & DIETETICS

MUST KNOW 50HRS

A) Chemistry of Carbohydrates:
Definition, Classification &Functions of Carbohydrates
Biological importance of Monosaccharides
Chemical properties of Monosaccharides
Osazone Formation of Monosaccharides
Derivatives of Monosaccharides
Structure of maltose, sucrose & Lactose,
Structure of starch &Glycogen & their functions.
Structure and functions of glycose aminoglycons.

B) Chemistry of Lipids
Definition, Classification & Functions of Lipids
Fatty acids and their classification & functions.
Essential fatty acids and its functions.
Phospholipids and their Functions.
Glycolipids and its functions
Prostaglandins and its functions
Steroids, Bile salts, micelle
Cholesterol and its functions
Lipoproteins and its classification.
Lipoproteins and their site of synthesis and functions.

C) Chemistry of Proteins
Structure of Aminoacids found in protein, classification,
Nutritional classification of amino acids.
Importance of Amino Acids
Biologically important compounds formed by amino acids.
Properties of amino acids
Biologically important Peptides
Structure of proteins
Primary, secondary, tertiary And quaternary
Zwitter ion, isoelectric PH
Definition, classification (functional) of proteins
Classification based on physical & chemical properties.
Functions of Albumin

D) Enzymes
Definition, zymogen or Proenzyme
Co-factors,
Mechanism of enzyme action
Classification of enzymes
Specificity factors affecting enzymes activity.
Enzyme inhibition, types of Inhibitors.
Types,composition, location and diagnostic importance of lactate dehydrogenase, creatine kinase.
Isoenzymes.
Diagnostic importance of different enzymes

E) Vitamins (Micronutrients):
Definition, Classification, Sources, Daily Requirement, Functions & deficiencies of
Vit. B1 & B2
Vit B3 & B5
Vit B6 & B7
Folic acid (Vit B9)
Cynocobalmin (Vit B12)
Ascorbic acid with functions, sources, daily requirement
Functions, sources, daily requirement of Vit.A with its deficiencies including visual process.
Vit D & its role in calcium Metabolism
Vit. E & Vit K.

F) Hemoglobins (Haemoglobin):
Bilirubin.
Chemistry & Functions of Haemoglobin.
Introduction to hemesynthesis
Heme degradation and types of normal and abnormal haemoglobin.
Types of Jaundice

G) **Nucleic Acids**
   - Introduction of nucleic acids
   - Building units Nucleotides
   - Types of RNA
   - Outline structure & functions of DNA & RNA

H) **Biological Oxidations**
   - Introduction, Enzymes & Coenzymes of Biological Oxidation.
   - ETC (Electron Transport Chain) Or Respiratory Chain
   - Reactions of electron transport chain.
   - Oxidative Phosphorylation, Inhibitors & uncouplers of oxidative phosphorylation

I) **Nutrition:**
   - Nitrogen Balance, essential amino acids, protein quality and requirement.
   - Protein Calorie Malnutrition
   - Kwashiorkar’s disease
   - Marasmus
   - Balance Diet

J) **Energy Metabolism:**
   - Enzymaic hydrolysis of dietary carbohydrates, mechanism of uptake of monosaccharides
   - Synthesis and breakdown of Glycogen (glycogenesis & Glycogenolysis)
   - Outline of glycolysis, Rapaport Luebering cycle, lactate metabolism.
   - Glucogenic & Ketogenic amino Acids.
   - Pyruvate oxidation & citric acid cycle.
   - Oral GTT & glycosuria, diabetes mellitus and related disorder.
   - Blood glucose level & its regulation.
   - Gluconeogenesis
   - Digestion and Absorption of Triglycerols.
   - Metabolism of Ketone bodies:
     a) Ketogenesis
     b) Ketolysis
     c) Ketosis
   - Functions of Cholesterol
   - Adipose tissue metabolism
   - Lipolysis, Lipogenesis
   - Digestion and Absorption of Proteins
   - Amino acid pool
   - Nitrogen Balance
     a) Transamination
     b) Deamination
     c) Transmethylation
   - Fate & Formation of ammonia Urea cycle
K) **Mineral Metabolism:**
Definition, Classification and Daily Requirement of Calcium, Phosphorus sources, uptake, excretion and function.
Trace Elements Def. eg. Copper, zinc, magnesium, Chromium, Cobalt, Manganese, Molybdenum, Selenium
Serum Calcium regulation, iron sources, uptake, transport.
Iodine: Brief introduction to Thyroxine synthesis, general functions of thyroxine .
Fluoride: Functions, deficiency & excess.
Role of other minerals Sodium, Potassium, Chloride.

L) **Metabolic Regulation:**
Hormones: Definition, General characteristics, Classification.
Mechanism action of steroid Hormones.
Epinephrine, glucagon & insulin in brief.
Acid base regulation.
Water and electrolyte balance
Detoxification Mechanism.

M) **Structural components & blood proteins:**
Connective tissue, collagen & Elastin, Structure of bone and membranes.
Myofibrils & Muscle Contraction.

N) **Medical Biochemistry:**
Blood sugar level and its regulation.
Oral GTT & glycosuria
Diabetes mellitus & related disorders.
Jaundice: Classification & evaluation.
Liver Function tests:-
Kidney Function tests
Gastric Function tests
Gout; Lesch Nyhanes Syndrome,

O) **Genetics:**
DNA as genetic material
Replication & Transcription
Gebetuc cide & mutations
Translation process
Introduction to cancer, viruses Oncogenes.
PCR Recombinant DNA Technology Applications.

**DESIRED TO KNOW 20HRS**
Structure of glucose, Isomerism, Epimerism, Anomerism, Mutarotation
Prostaglandins and its functions
Steroids, Bile salts, micelle
Properties of proteins
Denaturation, denaturing agents
Significance of denaturation.
Coagulation of proteins.
Plasma proteins, Separation of plasma proteins.
Immunoglobulins: Structure Types and their functions.
Michaelis – Menton Equation and its significance.

Allosteric Enzymes

Active forms of all water soluble vitamins and Vit A & Vit D.
To know the absorption, transportation and storage of
Vit A,D, E & K

Direct bilirubin & indirect

Haemoglobin derivatives.
Difference between DNA & RNA
Nucleotides, Biologically important free nucleotides

Substrate level phosphorylation
S.D.A (Specific dynamic action)

HMP shunt pathway and its significance.
Glucuronic acid formation.
Hyperglycemia & Hypoglycemia
- Outline of Cholesterol biosynthesis & breakdown
- Fatty acid synthesis
Fatty liver, Lipotropic factor
Atherosclerosis

Metabolism of glycine
a) Synthesis
b) degradation.
Metabolism of sulphur containing aminoacids
Eg. Methionine, cystein, Cystine one carbon metabolism
Heme & non-heme iron & its functions, deficiency.
Second messenger
C’Amp, Calcium ion
Inositol triphosphate

Hyperglycemia
Hypoglycemia
Hyperlipoproteinemia

1.2.3 EXAMINATION PATTERN

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