| Paper I | | |
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| **Course Title** | **Basic Health Science I** | |
| **Hours: 120** | **Full Mark: 100** | **Pass Mark: 50** |

**Course Introduction**

This course has been designed to develop the basic knowledge on anatomy, physiology, pathology, biochemistry, pharmacology and toxicology in relation to structures and functions of body systems and organs which will help to the students to understand the health applications in the course. The course aims to impart the basic concept of drug management and importance of emergency medicine, rational use of medicine and public health importance of drug resistance. The course will apply the theoretical and practical knowledge to the student.

**Course objectives**

1. Explain the structures and functions of different systems, tissue and cell of human body in relation to health and diseases
2. Understand patho-physiology of inflammation, necrosis, neoplasia, hypersensitive reaction, shock, thrombosis, embolism, AIDS, complement, antigen antibody, ischemia, infarction and spread of cancer
3. Understand the functions and rational use of medicine, logistics system of medicine/ vaccines, public health importance of drug resistance
4. Describe the basic concept of toxicology in public health

**Course Contents**

**Group A: Anatomy** **24 hrs**

**Introduction**

Define the terminologies used in anatomy.

Describe different components of animal cell.

Describe basic types of tissues with their characteristic features.

**Organ systems**

**Unit 1. Musculoskeletal system**

Name and identify the bones of appendicular and axial skeleton.

Classify joints with their characteristic features and examples.

Name the major muscles of the axial and appendicular skeleton.

**Unit 2. Neurosensory System**

Mention different components of nervous system; describe a typical spinal nerve.Mention the extent and coverings of spinal cord. Describe the transverse section of spinal cord; name the main tracts of spinal cord.

Name and identify different parts of brain and its coverings;

Name the cranial nerves and their area of supply.

Name the sensory organs; mention briefly on the gross features of eyeball and ear.

**Unit 3. Respiratory System**

Name different organs of respiratory system

Name paranasal sinuses

Describe briefly the extent and morphology of larynx, trachea and bronchi

Identify different parts of lungs and pleura

Mention different parts of bronchial tree

**Unit 4. Cardiovascular system**

Name and identify the parts, chambers and valves of heart. Mention briefly on fibrous pericardium, serous pericardium and pericardial cavity. 1hr

Mention the characteristic features of arterial, venous and lymphatic vessels.

Name the extent and branches of different parts of aorta.

Name the extent and branches of external carotid artery and internal iliac artery.

Mention the extent of the following arteries: axillary, brachial, radial, ulnar, femoral, popliteal, anterior tibial, posterior tibial.

Mention the extent and major tributaries of: superior vena cava, inferior vena cava and dural venous sinuses.

Mention and locate important superficial veins of upper and lower limbs.

Define lymphatic system.

Mention the area of drainage of: thoracic duct, right lymphatic duct, axillary group of lymph nodes, inguinal group of lymph nodes, pre and para-aortic groups of lymph nodes.

**Unit 5. Reproductive system**

Name different parts, location and extent of male genital tract.

Name different part, location and extent of female genital tract.

**Unit 6. Urinary system**

Name different parts of urinary system.

Expain parts of kidney in a coronal section.

Explain different parts of a nephron.

Mention the extent of ureter.

Describe briefly on urinary bladder, male and female urethra.

**Unit 7. Gastrointestinal system**

Name different parts of GIT. Mention the general architecture of GIT.

Mention the positions of salivary glands and pancreas.

Mention the position, lobes and structure of liver.

Name extra-hepatic biliary apparatus.

Explain the basic concept of peritoneal folds. Mention briefly on portal system.

**Unit 8. Endocrine system:**

Enumerate different endocrine glands.

Mention their position, secretion and their functions.

**Groub B: Physiology** **24 hrs**

**Unit 1. General Physiology**

Name different components of animal's cell and their function

List different tissue of body and their characteristics

Define body fluids and electrolyte balance. Classify them and mention their composition.

**Unit 2. Cardiovascular system and Blood**

Describe the organization of the cardiovascular system and mention the function of its different components.

Describe cardiac cycle , heart sounds and systemic circulation

Define arterial blood pressure, cardiac output , venous return, vasodilation, vaso constriction.

Describe briefly mechanisms of blood pressure regulation

Correlate physiological aspects of hypertension, coronary artery disease , heart failure, rheumatic heart disease, atherosclerosis

Mention composition and function of blood

Define haemopoiesis and correlate physiological aspects of common blood disorders.

Explain physiological basis of blood groups, define Rh- incompatibility and mention dangers of mis-matched blood transfusion.

List clotting factors and explain mechanism of clotting.

List the functions of spleen

Define immunity and mention its types and correlate physiological aspects of hypersensitivity reactions and AIDS.

**Unit 3. Respiratory system**

List the functions of the lungs , describe mechanism of breathing and mention control of breathing

Describe gaseous exchange , and transport of oxygen and carbon dioxide in blood

Define tidal volume, vital capacity and timed vital capacity

Correlate physiological aspects of COPD , Bronchial asthma and high altitude sickness

**Unit 4. Gastrointestinal system**

List the functions of different parts of GIT

Explain the process of digestion and absorption

Enumerate the functions of accessory digestive glands including liver

Correlate physiological aspects of diarrhea, constipation, peptic ulcer, jaundice and cirrhosis

**Unit 5. Musculo-skeletal system**

Name the functions of different types of muscles

Explain neuro-muscular transmission and mechanism of skeletal muscle contraction

Explain the physiological effects of exercise and training (2hrs)

**Unit 6. Nervous system and Special senses**

List the functions of different parts of the central nervous system and peripheral nervous system

Mention the functions of sensory and motor tracts

Mention the functions of different cranial nervous

Enumerate the functions of autonomic nervous system

Correlate the physiological aspects of paralysis, cerebrovascular accidents (stroke), meningitis , encephalitis and epilepsy

Describe the functional anatomy of the eyes and ear and mention their functions

Correlate the physiological aspects of refractive errors, deafness and color blindness

**Unit 7. Renal/ electrolyte and skin**

Describe the mechanism of formation of urine

Explain how urine is concentrated and diluted

Describe micturition reflex

Describe the role of kidney in blood pressure regulation

Correlate the physiological aspects of renal failure, polyuria, retention of urine, renal stones, renal colic and electrolyte disorders.

Mention the functions of the skin , describe body temperature regulation and explain the pathogenesis of fever

**Unit 8. Endocrine and reproductive system**

Correlate the physiological aspects of dwarfism, acromegaly ,goiter, diabetes mellitus and Cushing's syndrome

Explain the physiology of menstruation, spermatogenesis, pregnancy and lactation

Explain the physiological basis of contraceptives

**Demonstrations / Practical**

Recordings of blood pressure and pulse

Demonstration of principles of CPR, Vital Capacity and Timed Vital Capacity

Examination of cranial nerves

Motor and sensory examinations

Hearing tests

Tests for visual acuity and color blindness

**Group C: Biochemistry** **24 hrs**

Describe the basic concept of acid, base, salt and acid-base indicator.

Describe the properties and ionization of water.

Explain the concept of pH and pH meter.

Define buffer solution and enumerate types of buffers present in body fluid and their significances. 2hrs

Define, classify and enumerate the physical and chemical properties of carbohydrate.

Describe glucose homeostasis.

Define, classify and enumerate the physical and chemical properties of protein.

List the essential and non essential amino acids and their significances.

Define, classify and enumerate the physical and chemical properties of lipid.

Enumerate essential fatty acids.

Enumerate enzymes and list their important properties.

Enumerate the clinical significance of enzymes.

Discuss the concept of nucleic acid; define the terms: DNA, RNA, nucleotide and nucleoside.

**Practical:**

Measurement of pH (solutions, buffers etc.)

- pH paper
- pH meter

Preparation of different types of solution: normal solution, molar solution, 1% solution

Colorimetric estimation of serum glucose, protein and albumin

**Group D. Pathology** **24 hrs**

**General Pathology**

Describe the concept of cell injury and various change produced by such injury and necrosis.

Define basic terminologies.

Describe important causes of inflammation and its types

Explain the concept of wound healing

Describe the definition and types of thrombosis, embolism, ischemia infarction, shock and edema

Describe disorders of tissue growth and enumerate predisposing factors of neoplasia, mechanism of spread and metastasis

Define antigen, antibody and complement

Describe different types of immunity and hypersensitivity

Understand the patho-physiology, sign, symptoms and diagnosis of AIDS.

**Systemic Pathology**

Explain basic concepts of fracture, arthritis, osteomyelitis, pathophysiology, signs, symptoms and diagnosis

**Unit 1. Cardiovascular system**

Patho-physiology, signs, symptoms and diagnosis of hypertension, atherosclerosis, myocardial infarction, anemia, leukemia – classification and definition

**Unit 2. Respiratory system**

Tuberculosis, patho-physiology, signs, symptoms and diagnosis

**Unit 3. Endocrine system**

Diabetes mellitus, hypothyroidism, hyperthyroidism: Patho-physiology, signs, symptoms and diagnosis

**Unit 4. Gastrointestinal system**

Gastritis, Peptic Ulcer, acute viral hepatitis: Pathogenesis, signs, symptoms and diagnosis

**Group E: Pharmacology and Toxicology** **24 hrs**

**Unit 1. Pharmacology**

a. Basics of pharmacology

Concept and functions of medicine
Pharmaco-dynamic and pharmacokinetic
Classification of medicines
Concept of essential medicine, life saving medicine

Development of new medicines

Experiment in lab animal

Healthy human

Patients and community trial

b. Rational use of medicine

Concept of rational use of medicine

Maintaining quality of medicine: quality during

Production

Transportation

Storage in the stock and at the household

Consumption: right dose, right time, right duration, expiry

Cost of drugs, rational prescription

Factors contributing to irrational use of medicine

Consequences of irrational use of medicine

inappropriate use of medicine

'drug resistance'

Role of health professionals and users in promotion of rational use of medicine

c. Regulatory authority of medicine

Steps of regulation of medicines

Regulation of production, marketing, import

Concepts of prescription medicine and 'over the counter medicine'

**Unit 2. Toxicology**

a. Introduction

Concept of toxicology

Historical perspective of toxicology

Toxicology as an analytic science

Importance of toxicology in Public Health

b. Dimension of toxicology

Environmental toxicology

Occupational toxicology

Clinical toxicology

Forensic toxicology

c. Concept of toxins and toxicity in relation to dimension of toxicology

Toxin and toxicity

Toxic substances

Toxicity value

Poison and causes of poisoning

Factors that influencing toxicity

d. Approaches to prevent and control of health risk due to various dimension of toxicology.

**Teaching learning method**

Didactic lectures, group demonstration/practical discussion in class room setting, OPD , ward, laboratory, and field exposure

**Evaluation**

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| Internal Assessment in different forms | 20% |
| Final examination | 80% |

| Subject | Internal assessment | Final examination | Total marks |
|---|---|---|---|
| Group A. Anatomy | 4 | 16 | 20 |
| Group B. Physiology | 4 | 16 | 20 |
| Group C. Biochemistry | 4 | 16 | 20 |
| Group D. Pathology | 4 | 16 | 20 |
| Group E. Pharmacology and Toxicology | 4 | 16 | 20 |
| **Total marks** | **20** | **80** | **100** |

**References**


1. Muirs Textbook of Pathology
2. Robbin's Pathology