

COURSE OBJECTIVES

The following course objectives indicate what you will be able to do when you successfully master the materials presented under each of the topic headings. They are grouped under "Major Concept Objectives", which give an overview to the topic, and also under "Detailed Content Objectives", where each of the major concepts is broken down into its component details.

The objectives stipulate what you need to know in order to pass the course. Evaluations in the course will be designed to determine how well you have achieved these objectives. The evaluations will therefore be based on the objectives, but you should be aware that the formal evaluations will be for the most part in multiple choice format, with questions which ask about the objectives, rather than simply turning the objectives into questions. For example, referring to Unit I (Introductory), Objective 1, you will not be asked:

Identify the levels of structural organization in the body.

Instead, you might be asked:

Which level of structural organization is next above the cell?

- A. *chemical*
- B. *organism*
- C. *organ*
- D. *system*
- E. *tissue.*

Bear this in mind when you are studying.

UNIT I: INTRODUCTORY

MAJOR CONCEPT OBJECTIVES

1. Identify and define the levels of structural organization in the body.
2. List 11 systems of the body, giving their major components and general functions.
3. Name the closed body cavities and the major organs of each.
4. Correctly use the standard terms denoting directional relationships.
5. Describe how the principal sectional planes divide the body.

DETAILED CONTENT OBJECTIVES

1. Identify and define the following levels of structural organization in the body
 - 1.1 chemical
 - 1.2 organelle
 - 1.3 cellular
 - 1.4 tissue
 - 1.5 organ
 - 1.6 organ system
 - 1.7 organism
2. List 11 systems of the body, giving their major components and general functions.
 - 2.1 Identify the organs which comprise each of the following systems:
 - 2.11 integumentary
 - 2.12 skeletal
 - 2.13 muscular
 - 2.14 nervous
 - 2.15 endocrine
 - 2.16 cardiovascular
 - 2.17 lymphatic and immune
 - 2.18 respiratory
 - 2.19 digestive
 - 2.20 urinary
 - 2.21 reproductive.
 - 2.2 Identify the overall functions of each of the above systems
3. Identify the following closed body cavities and the major organs of each:
 - 3.1 Dorsal body cavity
 - 3.11 Cranial cavity
 - 3.12 Vertebral (spinal) canal

- 3.2 Ventral body cavity
 - 3.21 Thoracic cavity
 - 3.211 Pleural cavities
 - 3.212 Pericardial cavity
 - 3.22 Abdominopelvic cavity
 - 3.221 Abdominal cavity
 - 3.222 Pelvic cavity.
- 3.3 Identify the serous membranes associated with the cavities
- 4. Correctly use the following standard terms denoting directional relationships:
 - 4.1 superior – inferior
 - 4.2 anterior – posterior
 - 4.3 medial – lateral
 - 4.4 proximal – distal
 - 4.5 superficial – deep
 - 4.6 parietal – visceral
 - 4.7 ventral – dorsal
- 5. Describe how the following principal sectional planes divide the body:
 - 5.1 sagittal
 - 5.11 midsagittal (median)
 - 5.12 parasagittal
 - 5.2 frontal (coronal)
 - 5.3 transverse (cross or horizontal).
- 6. Identify the abdominal regions and quadrants

UNIT II: THE CELL

MAJOR CONCEPT OBJECTIVES (lab and self review)

1. Define and describe the cell and distinguish between prokaryotic and eukaryotic cells and between plant and animal cells.
2. Describe the structure and overall functions of the cell's membrane.
3. Describe the structural components and major functions of the nucleus and the cytoplasm.

DETAILED CONTENT OBJECTIVES

1. Define and describe the cell as the basic functional unit of life.
 - 1.1 Distinguish between prokaryotic and eukaryotic cells and give examples
 - 1.2 Describe major structural differences and similarities between plant and animal eukaryotic cells.
2. Describe the structure and overall functions of the plasma membrane.
 - 2.1 Give major functions of the plasma membrane.
 - 2.2 Describe the makeup of the fluid mosaic model.
3. (Self Study) Describe the structural components and major functions of the nucleus and the cytoplasmic organelles and the cytosol.
 - 3.1 Nucleus
 - 3.11 Chromatin/chromosomes
 - 3.12 Nucleolus
 - 3.2 Ribosomes
 - 3.3 Endoplasmic reticulum (ER), smooth and rough
 - 3.4 Golgi complex
 - 3.5 Mitochondria
 - 3.6 Lysosomes
 - 3.7 Centrioles
 - 3.8 Flagella and cilia.
 - 3.9 Microvilli
 - 3.10 Cytoskeleton and cytosol

UNIT III: TISSUES, The Fabric of Life.

MAJOR CONTENT OBJECTIVE

1. Describe the structure and give the functions and typical locations of the four principal types of tissue found in the human body.

DETAILED CONTENT OBJECTIVES

1. Describe the structure and give the functions and typical locations of the four principal types of tissue found in the human body.
 - 1.1 Name the four principal tissues.
 - 1.2 Give the main structural characteristics and overall functions of epithelial tissue.
 - 1.21 Describe the structure, functional specialization and typical location of each of the following forms of covering and lining epithelium:
 - 1.211 Simple
 - squamous
 - cuboidal
 - columnar
 - 1.212 Stratified
 - squamous
 - cuboidal
 - columnar
 - transitional
 - 1.213 Pseudostratified.
 - 1.22 Describe the functional specialization, overall structure and typical locations and products of each of the following forms of glandular epithelium:
 - 1.221 Exocrine glands and distinguish (with examples) between:
 - unicellular and multicellular
 - simple and compound
 - tubular and acinar.
 - merocrine, holocrine and apocrine
 - 1.222 Endocrine glands
 - 1.3 Describe intercellular relationships in terms of surfaces and connections
 - 1.4 Give the major structural characteristics and overall functions of connective tissue.
 - 1.41 Identify connective tissue cells, fibers and ground substance molecules.
 - 1.42 Describe the structure, functions and typical locations of each of the following forms of connective tissue
 - areolar or loose
 - adipose
 - reticular
 - dense regular
 - dense irregular
 - cartilage – 3 types
 - bone – 2 types
 - blood

UNIT IV: THE INTEGUMENTARY SYSTEM

MAJOR CONCEPT OBJECTIVE

1. Describe the structure and function of the integumentary system and its derivatives.

DETAILED CONTENT OBJECTIVES

1. Describe the structure and function of the integumentary system and its derivatives.
 - 1.1 Identify and describe the principal components of the integumentary system.
 - 1.11 Name the two principal layers of the skin.
 - 1.12 Describe the structure and function of the epidermis
 - 1.13 Describe the structure and function of the dermis including the main regions and their inclusions.
 - 1.14 Describe the structure of hypodermis.
 - 1.2 Identify and describe selected epidermal derivatives.
 - 1.21 Describe the growth and functions of hair and nails
 - 1.22 Name the principal skin glands.
 - 1.221 Describe the structure, location and function of sebaceous glands.
 - 1.222 Describe the structure, location and function of the two types of sudoriferous glands: apocrine, eccrine.
 - 1.223 Describe the structure, location and function of ceruminous glands.
 - 1.224 Describe the mammary gland as a modified apocrine sweat gland

UNIT V: BONE AND THE SKELETAL SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Describe the basic functions and structure of bone.
2. Describe the processes of bone growth and how selected factors affect them.
3. Identify selected components of the gross skeleton.
4. Describe the structure and function of articulations and bursae.

DETAILED CONTENT OBJECTIVES

1. Describe the basic functions and structure of bone.
 - 1.1 Describe the basic functions of the skeletal system.
 - 1.2 Identify and describe the following bone anatomy.
 - 1.21 Epiphysis
 - 1.22 Diaphysis
 - 1.23 Periosteum
 - 1.24 Endosteum
 - 1.25 Medullary cavity
 - 1.26 Epiphyseal plate and line
 - 1.27 Articular cartilage
 - 1.28 Compact and spongy bone
 - 1.3 Describe the microstructure of bone and distinguish between cancellous (spongy) and compact (Haversian) bone and between red and yellow marrow.
 - 1.4 Describe how mineral salts and collagenous fibres contribute to the structure and function of bone.
2. Describe the processes of bone formation and growth.
 - 2.1 Describe the processes of intramembranous and endochondral ossification.
 - 2.11 Give examples of bones formed by each of the above processes.
 - 2.12 State the significance of the epiphyseal plate and epiphyseal line in the growth of long bones.
 - 2.13 Describe the roles of osteoblasts, osteocytes and osteoclasts in bone growth and remodeling.
2. Identify selected components of the gross skeleton. (Laboratory Study)
 - 3.1 Identify the two major divisions of the skeleton and name selected bones and their characteristic landmarks according to the following lists.

3.2 THE AXIAL SKELETON

3.21 The Skull – Bones and Landmarks

Cranium

parietals
temporals (exterior auditory meatus, zygomatic process, mastoid process)
frontal (sinus)
occipital (foramen magnum, occipital condyles)
sphenoid (sella turcica, sinus)
ethmoid(perpendicular plate, cribriform plate, superior and middle conchae, sinus)

Facial

maxilla (tooth sockets, sinus)
zygomatics (frontal, temporal processes)
lacrimals (lacrimal duct)
nasals
mandible (tooth sockets)

Ossicles

malleus, incus, stapes

Hyoid

3.22 The Vertebral column, Ribs, Sternum.

General features of one vertebra: body, vertebral foramen, spinous process, arch, articulating facets, intervertebral foramen

Cervicals	(7)	<i>atlas, axis</i> , bifid spine, transverse foramina
Thoracics	(12)	articulation facets for ribs
Lumbar	(5)	largest, interlocking facets
Sacrum	(5 fused)	sacroiliac articular surface sacral hiatus sacral foramina
Coccyx		
Ribs	12 pairs (7 true, 5 false including 2 floating)	head, tubercular articulation facets
Sternum		manubrium (notches) body xiphoid process

3.3 THE APPENDICULAR SKELETON

3.31 Upper Limb

3.311 Pectoral girdle

Scapula glenoid fossa, spine, supra spinous fossa, acromion and coracoid processes
Clavicle acromial, sternal ends

3.312 Arm

Humerus head, greater and lesser tubercles, intertubercular groove, deltoid tuberosity, capitulum, trochlea

Radius head, neck, radial tuberosity, styloid process.

Ulna olecranon process, trochlear notch, styloid process.

Carpals
Metacarpals
Phalanges

3.32 Lower Limb

3.321 Pelvic Girdle

Coxal or pelvic bone

Major divisions – pubis, ischium, ilium
acetabulum, obturator foramen, iliac crest,
anterior superior iliac spine, ischial spine, pubic symphysis,
superior and inferior pubic rami.

Note the differences between male and female pelvic girdles

3.322 Leg

Femur head, neck, greater and lesser trochanters, medial and lateral condyles

Tibia head, medial and lateral condyles, tibial tuberosity, medial malleolus.

Fibula head, lateral malleolus.

Patella
Tarsals calcaneus, talus

Metatarsals
Phalanges

4. Describe the structure and function of articulations, bursae and tendon sheaths.
 - 4.1 Define articulation.
 - 4.11 Classify articulations functionally.
 - 4.12 Classify articulations structurally.
 - 4.121 Name and give examples of fibrous, cartilaginous and synovial joints in terms of structure and function
 - 4.122 Describe the parts of a synovial joint.
 - 4.13 Describe the structure, function and general locations of bursae and tendon sheaths.
 - 4.2 Briefly describe the following structural features of the shoulder, elbow, hip and knee joints. (Laboratory Study)
 - 4.21 Shoulder

<i>bones involved:</i>	humerus, scapula, clavicle
<i>articulating surfaces:</i>	glenoid cavity, humerus head
 - 4.22 Elbow

<i>bones involved:</i>	radius, ulna, humerus
<i>articulating surfaces:</i>	capitulum, trochlea, trochlear notch, radial head
 - 4.23 Hip

<i>bones involved:</i>	pelvis and femur
<i>articulating surfaces:</i>	acetabulum and femoral head
 - 4.24 Knee (in detail)

<i>bones involved:</i>	femur, tibia, fibula
<i>articulating surfaces:</i>	medial and lateral condyles of the femur and tibia
<i>cartilages:</i>	medial and lateral menisci
<i>ligaments:</i>	patellar, medial and lateral collateral, cruciate

UNIT VI: MUSCLES AND THE MUSCULAR SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Describe the characteristics and general functions of muscle tissue.
2. Describe the gross and micro structure of each of the different types of muscle tissue.
3. Identify the terminology describing body movements.
4. Identify selected muscles and muscle groups in the body and their actions.

DETAILED CONTENT OBJECTIVES

1. Describe the characteristics and general functions of muscle tissue.
 - 1.1 List and explain principal characteristics of muscle tissue.
 - 1.2 List and give examples of main functions of muscle tissue.
2. Describe the gross and micro structure of each of the different types of muscle tissue.
 - 2.1 Describe the major structural characteristics and overall functions of skeletal, cardiac and smooth muscle.
 - 2.2 Describe the structure of a whole skeletal muscle including:
 - 2.21 Fascia
 - 2.22 Epimysium
 - 2.23 Fascicle
 - 2.24 Perimysium
 - 2.25 Fiber (cell)
 - 2.26 Endomysium
 - 2.28 Nerves and blood vessels
 - 2.3 Describe the microstructure of a single muscle fibre (cell) including:
 - 2.31 Sarcolemma
 - 2.32 Sarcoplasm
 - 2.33 Sarcoplasmic reticulum, terminal cisternae
 - 2.34 Transverse tubules (T-tubules), triad
 - 2.35 Myofibrils
 - 2.36 Myofilaments; thin (actin), thick (myosin)
 - 2.37 sarcomere
 - Z line
 - A band
 - I band
 - H zone
 - M line.

3. Identify the terminology describing body movements.
 - 3.1 Describe and distinguish between and give examples of the following sets of movements.
 - flexion vs extension
 - dorsiflexion vs plantar flexion
 - abduction vs adduction
 - medial vs lateral rotation
 - pronation vs supination
 - elevation vs depression
 - protraction vs retraction
 - circumduction
 - inversion vs eversion

4. Identify selected muscles and muscle groups and describe their actions according to the following list. (Laboratory Study)
 - 4.1 Head Muscles
masseter, temporalis, orbicularis oris, orbicularis oculi, sternocleidomastoid, trapezius, glossals, extraocular eye muscles.
 - 4.2 Thoracic muscles
intercostals, diaphragm
 - 4.3 Abdominal muscles
rectus abdominis, internal and external oblique.
 - 4.4 Perineal muscles
sphincter ani externus, sphincter urethrae
levator ani, bulbospongiosus.
 - 4.5 Upper limb muscles
trapezius, deltoid, supraspinatus, rhomboids, latissimus dorsi, pectoralis minor and major, biceps and triceps brachii, regions of wrist and finger flexors and extensors.
 - 4.6 Lower limb muscles
gluteus maximus, gluteus medius, adductor group, quadriceps femoris, tensor fasciae latae, sartorius, hamstrings, gastrocnemius, soleus, tibialis anterior, regions of ankle and toe flexors and extensors

UNIT VII: THE NERVOUS SYSTEM

MAJOR CONCEPT OBJECTIVES

1. State the functions of the nervous system and list and describe its major divisions.
2. Review the structure of nervous tissue and describe the structure of a nerve.
3. Identify and describe the major components of the brain, their locations and functions.
4. Identify and describe the structure and function of the spinal cord.
5. Identify and describe the structure and function of the peripheral nervous system.
6. Identify and describe the structure and function of the autonomic nervous system.
7. Identify and describe the structure and function of the major components of sensory reception.

DETAILED CONTENT OBJECTIVES

1. State the functions of the nervous system and list and describe its major divisions:
 - 1.1 Describe the overall functions of the nervous system as they apply to homeostasis.
 - 1.2 Describe the nervous system in terms of its divisions:
 - 1.21 Structural division: central vs. peripheral.
 - 1.22 Functional division: afferent vs. efferent and somatic vs. autonomic.
 - 1.221 Within the autonomic nervous system, distinguish between the sympathetic and parasympathetic systems.
2. Describe the structure of nervous tissue and the structure of a peripheral nerve.:
 - 2.1 Describe the structure and function of neural support tissue:
 - 2.11 Neuroglial cells in the CNS.
 - 2.12 Neuroglial cells in the PNS.
 - 2.2 Describe the structure and function of a "typical" efferent and afferent neuron and classify neurons by structure and function.
 - 2.3 Describe the composition of a nerve. (Compare with muscle structure in Unit VII; Obj 2.2)

3. Identify and describe the major components of the brain, their locations and functions:
 - 3.1 Briefly describe the development of the brain.
 - 3.2 Identify and describe the following major components of the brain, their locations and functions:
 - 3.21 Ventricles.
 - 3.22 Cerebrum, including the major areas of the cortex, the white matter and the basal nuclei.
 - 3.23 Diencephalon, consisting of the thalamus, hypothalamus, epithalamus and hypophysis.
 - 3.24 Midbrain.
 - 3.25 Hindbrain, consisting of the pons, medulla oblongata and cerebellum.
 - 3.3 Describe the structures that protect the brain within the skull:
 - 3.31 Meninges
 - 3.32 Cerebrospinal fluid (production, flow, reabsorption)
 - 3.33 Blood-brain barrier.
4. Identify and describe the structure and function of the spinal cord:
 - 4.1 Describe the location and extent of the spinal cord and the clinical significance of the extent.
 - 4.2 Describe the spinal cord in cross section.
 - 4.21 Identify the gray horns and white columns.
 - 4.22 Describe the anterior (ventral) and posterior (dorsal) roots of spinal nerves, and the dorsal root ganglia.
 - 4.23 Identify the major ascending and descending tracts within the white columns.
5. Identify and describe the structure and function of the peripheral nervous system:
 - 5.1 State the names and numbers of the 12 pairs of cranial nerves
 - 5.2 Identify the function and origin or target of each of the following cranial nerves
 - I Olfactory
 - II Optic
 - III Oculomotor
 - IV Trochlear
 - V Trigeminal
 - VI Abducens
 - VII Facial
 - VIII Vestibulocochlear
 - IX Glossopharyngeal
 - X Vagus.
 - XI Accessory
 - XII Hypoglossal

5.3 Identify the following spinal nerves, their origins from the spinal cord, the muscles and areas of skin they innervate. (Laboratory Study)

- | | | | |
|------|--|-----------------|---|
| 5.31 | from Cervical Plexus
Phrenic Nerve | <i>muscle:</i> | diaphragm |
| 5.32 | from Brachial Plexus
Axillary Nerve | <i>muscle:</i> | deltoid |
| | | <i>skin:</i> | over shoulder |
| | Radial Nerve | <i>muscles:</i> | triceps brachii, wrist extensors.
abductors, adductors, digit
extensors |
| | | <i>skin:</i> | posterior aspect of arm |
| | Musculocutaneous Nerve | <i>muscle:</i> | biceps brachii |
| | | <i>skin:</i> | lateral aspect of forearm |
| | Median Nerve | <i>muscles:</i> | wrist flexors and abductors, digit
flexors |
| | | <i>skin:</i> | lateral 2/3 of hand and digits |
| | Ulnar Nerve | <i>muscles:</i> | wrist flexors and adductors, digit
flexors |
| | | <i>skin:</i> | medial 1/3 of anterior hand and
digits |
| 5.33 | from Thoracic Region
Individual Thoracic nerves | <i>muscles:</i> | intercostal |
| | | <i>skin:</i> | thoracic dermatomes |
| 5.34 | from Lumbar plexus
Obturator Nerve | <i>muscles:</i> | femoral adductors |
| | | <i>skin:</i> | superior medial thigh |
| | Femoral Nerve | <i>muscles:</i> | quadriceps femoris, sartorius,
iliacus |
| | Saphenous Branch | <i>skin:</i> | anterior and medial thigh,
medial leg |
| 5.35 | from Sacral Plexus
Tibial Nerve (part of Sciatic) | <i>muscles:</i> | hamstrings, gastrocnemius,
soleus plantar flexors, digit
flexors |
| | | <i>skin:</i> | posterior lateral leg, sole of foot |
| | Peroneal Nerve (part of Sciatic) | <i>muscles:</i> | dorsi flexors, digit (extensors)
peroneus |
| | | <i>skin:</i> | dorsal foot, lateral leg |

6. Identify and describe the structure and function of the autonomic nervous system in terms of overall structure and function:
 - 6.1 Distinguish between the autonomic (visceral) and somatic efferent nervous systems, in terms of overall structure and function.
 - 6.2 Distinguish between the sympathetic and parasympathetic divisions of the autonomic nervous system in terms of:
 - overall effect
 - origin in CNS
 - location of ganglia
 - distribution of neurons
 - neurotransmitters
7. Describe and identify the structure and function of the major components of sensory reception:
 - 7.1 Classify sensory reception by major locations, types of stimuli and types of receptors.
 - 7.2 Identify the sensory receptors associated with olfaction and gustation.
 - 7.3 Identify and describe the component structures of the eye.
 - 7.31 Describe the production, flow, reabsorption and function of aqueous humor.
 - 7.32 Trace the pathway of light through the eye.
 - 7.4 Identify and describe the component structures of the ear associated with hearing and balance.
 - 7.41 Trace the pathway of sound through the ear.

UNIT VIII: THE ENDOCRINE SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Describe the general characteristics of the endocrine system.
2. Describe the location, structure, major hormones produced and their functions of the endocrine glands other than the reproductive glands.

DETAILED CONTENT OBJECTIVES

1. Describe the general characteristics of the endocrine system and define endocrine gland, hormone.
2. Describe the location, structure, major hormones produced and their functions of the endocrine glands other than the reproductive glands.
 - 2.1 Describe the hypophysis (pituitary) gland, its location, development, structure, hormones and functions.
 - 2.11 Describe the origin and development of the two lobes of the pituitary gland.
 - 2.12 Describe the structure of the adeno and neurohypophysis and their relationship with the circulatory system.
 - 2.13 Identify the two neurohypophyseal hormones and their functions.
 - 2.14 Identify the seven major adenoypophyseal hormones and their functions.
 - 2.2 Describe the adrenal glands (as above).
 - 2.41 Identify the two major components of this gland and their origins.
 - 2.42 Describe the hormones of the adrenal medulla and their functions
 - 2.43 Describe the layers of the adrenal cortex, their hormones and functions.
 - 2.3 Describe the thyroid gland in terms of its location, microstructure, the hormones produced and their functions (in brief).
 - 2.4 Describe the parathyroid gland (as above).
 - 2.5 Describe the pancreas in terms of its endocrine functions.
 - 2.51 Describe the structure of the Islets of Langerhans.
 - 2.52 Identify the hormones of the Islets and their functions.

UNIT IX: THE CARDIOVASCULAR SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Describe the major functions of blood, the substances transported, the system components and the subsystems.
2. Describe blood, the tissue, its cellular and non-cellular components and their functions.
3. Describe the heart, its location, its gross and micro-structure, its blood supply and the vessels that carry blood to and from it.
4. Describe the structure of the different types of blood vessel and relate structure to function. Identify and locate the major arteries and veins.

DETAILED CONTENT OBJECTIVES

1. Describe the major functions of blood, the substances transported, the system components and the subsystems.
 - 1.1 State the overall functions of blood under the headings of transport, maintenance, protection.
 - 1.2 Define the components of the circulatory system: heart, arteries and arterioles, capillaries, venules and veins, blood, lymphatics
 - 1.3 Identify the major circulatory subsystems: pulmonary, systemic, coronary, hepatic portal systems.
2. Describe blood, the tissue, its cellular and non-cellular components and their functions.
 - 2.1 Describe plasma, the ground substance, and list its components.
 - 2.11 Describe the functions of the plasma proteins: albumins, globulins, complement, clotting factors.
 - 2.2 Describe the cell types in terms of their histology and functions
 - 2.21 erythrocytes
 - 2.22 leukocytes
 - 2.221 granulocytes
 - neutrophils
 - basophils
 - eosinophils
 - 2.222 agranulocytes
 - lymphocytes
 - monocytes
 - 2.223 thrombocytes
 - platelets

3. Describe the heart, its location, its gross and micro-structure, its blood supply and the vessels that carry blood to and from it.
 - 3.1 Describe the location and orientation of the heart in the mediastinum.
 - 3.2 Describe the parietal and visceral pericardia and the significance of pericardial fluid.
 - 3.3 Describe the structure of the wall and its components: epicardium, myocardium and endocardium.
 - 3.4 Describe and identify the atria and ventricles and give the function of each.
 - 3.5 Describe the coronary/cardiac circulation and identify its components.
 - 3.6 Identify and describe the two sets of valves and their associated structures and the function of each.
 - 3.7 Describe the internal conduction system of the heart and its components: sinoatrial and atrio-ventricular nodes, fibrous "skeleton", AV bundle (bundle of His), bundle branches, Purkinje fibres.
4. Describe the structure of the different types of blood vessel and relate structure to function. Identify and locate the major arteries and veins.
 - 4.1 Describe the structure and function of capillaries.
 - 4.2 Describe the structure and function of elastic arteries, muscular arteries and arterioles.
 - 4.3 Describe the structure and function of veins and venules.
 - 4.4 Compare the arterial and venous systems in terms of structure, function and capacity.
 - 4.5 Identify and locate the major arteries and veins on the "vessel list" that follows. (Laboratory Study)
 - 4.5.1 Describe the distribution of the listed vessels and be able to trace the route of a blood cell through them.
 - 4.5.2 State the overall function of the systemic, pulmonary and hepatic portal systems.
 - 4.5.3 Name the vascular inputs and outputs of the liver.
 - 4.5.4 Define collateral circulation.

UNIT XI: THE LYMPHATIC SYSTEM

MAJOR CONCEPT OBJECTIVE

1. Describe the major functions of the lymphatic system and the locations, structure and functions of its components.

DETAILED CONTENT OBJECTIVES

1. Describe the major functions of the lymphatic system and the location, structure and functions of its components.
 - 1.1 Describe the major functions of the lymphatic system.
 - 1.2 Describe the structure and functions of the lymphatic structures as in
 - 1.21 Lymph capillaries – location, microstructure
 - 1.22 Lymph vessels – general location
 - 1.23 Major lymphatic ducts – right and left lymphatic (thoracic), and body drainage plan.
 - 1.24 Lymph nodes – location of major groups, microstructure
 - 1.25 Other related organs - in general
 - 1.251 Tonsils – lingual, palatine, pharyngeal
 - 1.252 Spleen
 - 1.253 Thymus gland

UNIT XI: THE RESPIRATORY SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Define respiration and state the overall function of the respiratory system.
2. Describe the locations, structure and functions of the components of the respiratory system.

DETAILED CONTENT OBJECTIVES:

1. Define respiration and state the overall function of the respiratory system.
 - 1.1 Define respiration.
 - 1.11 Distinguish between external, internal and cellular respiration.
 - 1.12 Define ventilation and gas transport.
 - 1.2 State the overall functions of the respiratory system.
2. Describe the locations, structure, and functions of the components of the respiratory system:
 - 2.1 Nasal cavities.
 - 2.2 Pharynx, distinguishing between the naso-, oro-, and laryngopharynx.
 - 2.3 Larynx.
 - 2.4 Trachea.
 - 2.5 Bronchi and bronchioles.
 - 2.6 Lungs.
 - 2.61 Describe the visceral and parietal pleurae, the pleural cavities and their relationship to the mediastinum.
 - 2.62 Describe the microstructure of the alveoli

UNIT XII: THE DIGESTIVE SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Identify the organs of the digestive system and define the digestive process (alimentation) and its component processes.
2. Describe the membranes associated with the GI tract and the microstructure of the wall of the GI tract.
3. Describe the location, structure and function of the organs of the GI tract.

DETAILED CONTENT OBJECTIVES

1. Identify the organs of the digestive system and define the digestive process (alimentation) and its component processes.
2. Describe the membranes associated with the GI tract and the microstructure of the wall of the GI tract.
 - 2.1 Identify the following membranes associated with the GI tract and locate them with respect to the GI tract and the abdominopelvic cavity:
 - 2.11 Peritoneum (visceral and parietal)
 - 2.12 Falciform ligament
 - 2.13 Greater omentum
 - 2.14 Lesser omentum
 - 2.15 Mesentery
 - 2.16 Mesocolon
 - 2.2 Describe the micro structure of the wall of a "typical" portion of the GI tract, including the following tunics.
 - 2.21 Mucosa
 - 2.22 Submucosa
 - 2.23 Muscularis
 - 2.24 Serosa (adventitia)
3. Describe the location, structure and function of the following organs of the GI tract and accessory organs of digestion:
 - 3.1 Mouth.
 - 3.11 Describe the structure and functions of the tongue
 - 3.12 Identify the salivary glands and their locations
 - 3.13 Describe the general structure of a tooth
 - 3.14 Identify the four major tooth types and their numbers in children and adults.
 - 3.2 Pharynx: three major segments
 - 3.3 Esophagus
 - 3.4 Stomach:
 - 3.41 Identify the four major regions and the gross anatomy of the stomach.
 - 3.42 Describe the histology of the stomach and the origin and composition of gastric juice.

- 3.5 Small intestine:
 - 3.51 Identify the three major regions, their approximate length, principal functions of the small intestine.
 - 3.52 Describe structural adaptations that increase its surface area
 - 3.53 Describe the histology of the small intestine.

- 3.6 Liver and gallbladder:
 - 3.61 (Laboratory study) Locate and describe the gross anatomy of the liver and its lobes.
 - 3.62 Describe the histology of a liver lobule.
 - 3.621 Identify the relationships between the portal triads, the hepatic sinuses and the central veins
 - 3.622 Identify the location and function of the bile canaliculi
 - 3.63 Describe the location and function of the gallbladder.
 - 3.64 Identify and locate the component parts of the biliary drainage.
 - 3.65 Summarize the major functions of the liver

- 3.7 Pancreas:
 - 3.71 Describe and locate the pancreas and its ducts.
 - 3.72 Describe the microstructure of the pancreas, including:
 - 3.721 The exocrine secretory units
 - 3.722 The endocrine secretory units

- 3.8 Large intestine:
 - Identify and locate its main regions and describe its gross anatomy.

UNIT XIII: THE URINARY SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Describe the major overall functions of the urinary system.
2. Identify and locate the major organs of the system.
3. Describe the gross and microstructure of the kidney including the special vascular relationships.

DETAILED CONTENT OBJECTIVES

1. Describe the major overall functions of the system:
 - 1.1 Removal of metabolic wastes.
 - 1.2 Balancing internal fluids, electrolytes and pH.
2. Identify and locate the major organs.
 - 2.1 Location, size, inputs and outputs of kidneys.
 - 2.2 Location, function – ureters
 - 2.3 Location, size – urinary bladder
 - 2.4 Location, extent (male vs female) urethra.
3. Describe the gross and microstructure of the kidney including special vascular relationships.
 - 3.1 Describe the extent and location of the renal cortex, medulla and sinus.
 - 3.11 Describe the contents of the sinus as the renal pelvis, i.e. ureter and calyces, and the initial ramifications of the renal artery
 - 3.12 Describe the medulla in terms of renal columns and pyramids and interlobar arteries and veins.
 - 3.13 Describe the cortex in terms of location of renal corpuscles, convoluted tubules, and special vasculature.
 - 3.2 Describe the nephron in terms of:
 - 3.21 Bowmans capsule (podocytes/filtration membrane)
 - 3.22 Afferent arteriole, glomerulus, efferent arteriole.
 - 3.23 Juxtaglomerular apparatus.
 - 3.24 Proximal and distal convoluted tubules.
 - 3.25 Loop of Henle, collecting ducts, vasa recta.

UNIT XIV: THE REPRODUCTIVE SYSTEM

MAJOR CONCEPT OBJECTIVES

1. Identify and describe the reproductive organs of the adult male in terms of location, gross and microstructure, and functions..
2. Identify and describe the reproductive organs of the adult female in terms of location, gross and microstructure, and functions.

DETAILED CONTENT OBJECTIVES

1. Identify and describe the reproductive organs of the adult male in terms of location, gross and microstructure, and functions.
 - 1.1 Describe the location and contents of the scrotum.
 - 1.11 Describe the microstructure of the testes including seminiferous tubules, interstitial cells, Sertoli cells, developing sperm, rete testis, efferent ducts.
 - 1.12 Describe the location, extent and function of the epididymis.
 - 1.2 Describe the location, extent and function of the vas/ductus deferens, ejaculatory duct and urethra.
 - 1.3 Describe the location and function of the accessory glands.
 - 1.4 Describe the microstructure of the penis.
2. Identify and describe the reproductive organs of the adult female in terms of location, gross and microstructure and function.
 - 2.1 Describe the ovaries in terms of location, size and microstructure.
 - 2.2 Describe the uterine tubes; location, extent, functions.
 - 2.3 Describe the uterus; location, size, gross and micro wall structure and function.
 - 2.4 Describe the vagina; location, size, gross and micro wall structure and functions.
 - 2.5 Describe the external genitalia in terms of vulva, labia majora and minora, clitoris, urethral orifice, vaginal orifice, accessory glands, vestibule.
 - 2.6 Define the area known as the perineum.