INTRODUCTION

Anatomy is the science that deals with studying the structure of the human body & the relationship of its constituent parts to each other. It includes embryology that studies the formation and development of the human embryo.

It is the gateway of medicine as without proper knowledge of anatomy, it is impossible to understand how the body organs perform their function and hence be able to detect abnormalities of the structure or function caused by diseases. Without a good knowledge of anatomy, medicine cannot be accurately and safely practiced.

It is also essential for the surgeon to know the proper anatomy of the area upon which he is operating.

Aims and intended outcomes:
1. Teaching Anatomy at DMCG aims to produce a female doctor of distinction, equipped with Islamic morals and capable of discharging her reasonability’s after obtaining the degree of Bachelor in Medicine and Surgery.
2. The department of Anatomy stress on teaching the students clinically oriented Anatomy so they could be able to solve clinically based problems.
3. Stress on encouraging self learning during the practical lessons as well as during the lectures.
4. Students are given clinically related assignments to prepare and present in order to encourage them to speak in scientific way infront of the staff members and their colleague.

Objectives of the course
Teaching the course of human anatomy to medical students aims that the students should:

1. Recognize the anatomical terms, use them correctly and develop a positive approach to the subject.

2. Recognize anatomical structures correctly and comprehend the topographic anatomy of the regions of the upper & lower limbs, the thorax, abdomen, pelvis, perineum & head & neck by actual dissection & museum study.
3. Understand the classification of bones, their general features, structure, functions & the mechanism of displacement of bone fragments at the common sites of fractures.

4. Understand the important joints of the body, their movements & the muscles producing these movements.

5. Be able to identify different body organs, their form, shape and their relation to each other.

6. Be able to correlate the structural design of each organ to its function.

7. Distinguish about the different fascial planes in the different regions of the body & their surgical importance.

8. Understand the general plan of lymphatic drainage of the body & the regional lymph node where common malignant growth can spread.

9. Interpret the normal structural images of body organs as they appear in X-ray films & C.T scans and demonstrate by inspection, palpation & percussion important bony landmarks, muscles, tendons, blood vessels, nerves & viscera on the living body.

10. Review the up to date knowledge about the formation and development of the human embryo.

11. Discuss congenital abnormalities, their aetiology and the mechanism of their development.

12. Be able to apply the anatomical and embryological information given with each part of the body for the interpretation of some medical and surgical problems (applied Anatomy).

13. Develop sufficient understanding of the subject to be able to pursue post-graduate studies, continue medical education and develop the habits of self-learning.
The course of the Anatomy is studied under the following titles

1) **Introduction**

   At the end of this course, the student will be familiar with the different terms used in the study of anatomy.

   1-1 She will be able to use descriptive anatomical terms of position to describe the different body structures in relation to each other.

   1-2 She will be able to describe the movements of head and neck, trunk & limbs using proper anatomical terms of movement.

   1-3 The students will be able to identify the different structures met in the dissection of the body. This includes the skin, superficial fascia, deep fascia, arteries, veins, nerves and muscles.

   1-4 The students will also be able to classify the structure of bones, their types, the names of all bones of the body, joints, their types and the movement produced by each type.

2) **Lower limb**

   On completion of this course, the student will be able to recognise & understand:

   2-1 The general and particular features of bones of the lower limb and differentiate the side of the bone, including the hip bone, femur, tibia, fibula and bones of the foot.

   2-2 The arches of the foot with the factors maintaining them and the causes underlying conditions as flat foot.

   2-3 The differences between male and female hip bone.

   2-4 The front of the thigh (femoral triangle, femoral sheath and adductor canal, boundaries and contents).

   2-5 The clinical importance of the femoral canal (femoral hernia).

   2-6 The muscles of the front of the thigh (extensor muscles of the knee joint), sartorius and tensor fascialata.

   2-7 The femoral blood vessels and femoral nerve, their course and relations. How to detect the pulsation of the femoral artery and know its surface anatomy.
2-8 Medial side of the thigh, the adductor muscles and their nerve supply.

2-9 Gluteal region: muscles, sacrotuberous ligament, sacrospinosus ligament, greater sciatic foramen with its contents, lesser sciatic foramen, gluteal vessels, sciatic nerve and the nerves of the gluteal region. The upper lateral quarter of the buttock is the site for intramuscular injection to avoid the sciatic nerve injury.

2-10 The flexor muscles of the knee joint with its nerve supply.

2-11 The poplitial fossa with its boundaries and contents.

2-12 Course, relation and distribution of the medial & lateral poplitical nerves and the related applied anatomy.

2-13 The anterior compartment of the leg, extensor muscles of the toes, course, relation and branches of the anterior tibial artery with its site of pulsation and the anterior tibial nerve with its distribution to detect any injury.

2-14 The posterior compartment of the leg, flexor muscles of the toes, course, relation, branches and site of pulsation of the posterior tibial artery and nerve.

2-15 The layers of the muscles of the sole with course, relation and distribution of the plantar nerves and vessels.

2-16 The joints of the lower limb (hip joint, knee joint, ankle joint & tibiofibular joints)

2-17 The student will be able to recognize the axis of the body weight in the erect and the sitting postures as well as the mechanism of walking.

3) **Abdomen**

On completion of this course, the student will be able to recognise & understand:

3-1 The structures of the anterior abdominal wall including muscles and the direction of their fibers, nerves and vessels and the rectus sheath and its contents.
3-2 The areas of the abdomen and the position of the organs in relation
to each other.

3-3 The surface anatomy of the different organs including stomach,
duodenum, liver, spleen, kidneys ureters, and large intestine as well as the
surface anatomy of the blood vessels; the aorta and its branches and the
inferior vena cava.

3-4 The student will acquire the skills and abilities required to
differentiate between the direct & indirect inguinal hernias and between
the inguinal and femoral hernias.

3-5 The students will be able to distinguish the 2 layers of the
peritoneum (parietal and visceral) and the foldings, ligaments, omenta
and lesser and greater mesenteries.

3-6 The 2 sacs of the peritoneum; lesser and greater sacs are also
studied.

3-7 The student will be able to recognize the different parts of gastro-
inestinal tract (oesophagus, stomach, duodenum, jejunum ileum,
cecum, ascending, transverse descending and pelvic colon), their
relations, blood supply, nerve supply and lymph drainage.

3-8 The student should know the difference between the large and the
small intestines.

3-9 The student will be able to describe of the position, relations &
blood supply of the liver, spleen, kidneys, pancreas, gall bladder, bile
duct and suprarenal glands.

3-10 The student will be able to recognize the blood supply of the G.I.T:
- Coeliac artery for foregut.
- Superior mesenteric artery for midgut.
- Inferior mesenteric artery for hindgut and anastomosis between these
  arteries.

3-11 The student will be able to define the portal circulation and site of
porto systemic anastamosis:
- At lower part of oesophagus.
- At anal canal.
- Around the umbilicus.
- Patent ductus arteriosus.
Bare area of the liver and stomach.

3-12 The student will be able to describe the abdominal aorta, its branches and surface anatomy.

3-13 The student will be able to identify the inferior vena cava; its tributaries and surface anatomy.

3-14 The student will develop a clear understanding about the incision for different organs e.g. gall bladder, appendix.

3-15 The student should recall the lymph drainage of the different organs.

3-16 The student will be able to describe the posterior abdominal wall with the important relations of the psoas major muscle and diaphragm with its important openings.

4) Pelvis and perineum

At the end of this course, the student should be able to recognize the:

4-1 Walls of the pelvis (bones, muscles, blood supply and nerve supply).

4-2 Boundaries of the outlet and inlet of the pelvis with the difference between male and female pelvis and pelvic diaphragm.

4-3 The dimensions of the normal adult female pelvis and their clinical importance in the mechanism of delivery.

4-4 Peritoneal covering of the pelvic organs.

4-5 Relation and blood supply of different organs including:
- Rectum and anal canal.
- Urinary bladder and urethra in male and female.
- Internal and external genital organs prostate, vas-deference, seminal vesicle, ejaculatory duct, penis, scrotum in male, ovary, uterine tube, uterus, vagina, labia minora and majora, mons pubis and clitoris in female.

4-6 The structures of the perineum including:
- Urogenital triangle (boundaries, contents; muscles, nerve and blood supply and fascia of superficial and deep perineal pouches).
Anal triangle (boundaries and contents of ischiorectal fossa) and the anatomical basis of clinical conditions of the area.

5) Thorax
On completion of this course, the student will be able to differentiate:

5-1 The structure of the thoracic wall; bones: ribs, vertebrae and sternum, muscles, nerve supply and its distribution, blood supply including anterior and posterior intercostal vessels and azygos vein and its tributaries.

5-2 Boundaries and contents of the inlet of the thorax.

5-3 Relation, surface anatomy and nerve supply of the pleura and parts of the respiratory tract including trachea, main bronchi, bronchial tree and lungs.

5-4 Mediastinum (superior, inferior, middle and posterior), contents and boundaries.

5-5 External and internal features of the four chambers of the heart, relation, blood supply and surface anatomy of the heart with its valves.

5-6 The parietal and visceral layers of the pericardium with its sinuses, nerves and blood supply.

5-7 Course, relation and surface anatomy of the big blood vessels including, ascending, arch and descending thoracic aorta, pulmonary trunk, innominate vein, superior and inferior vena cavae.

5-8 Course & relations of the oesophagus, the two vagi and the phrenic nerves.

6) Upper Limb
At the end of this course, the student will be able to describe the following:

6-1 The general and particular features of the bones of the upper limb (clavicle, scapula, humerus, radius, ulna, and bones of hand).

6-2 The pectoral region (muscles, nerves and blood supply).
6-3 Shoulder region (muscles connecting the upper limb with the trunk of the body).

6-4 Axilla (boundaries, contents, axillary blood vessels and nerves).

6-5 Course, relation, branches and areas for pulsation of the axillary artery to prevent bleeding.

6-6 The brachial plexus and the effects of nerve injury.

6-7 The anterior and posterior compartments of the arm including the flexor and extensor muscles, course, relation and branches of the blood vessels and nerves.

6-8 The flexor muscles of the hand and fingers with their attachment and arterial and nerve supply.

6-9 Course, relation and distribution of the radial and ulnar nerves in the forearm and hand to detect the effects of nerve injury.

6-10 Course, relations and branches of the radial and ulnar arteries.

6-11 Extensor muscles of the hand and fingers with their nerve supply and blood supply.

6-12 The student will be able to recognize the structure of the hand including:
a- The muscles, their nerve supply and function.
b- The blood vessels; superficial and deep palmar arches and how to differentiate the bleeding from each one and the palmar and dorsal carpal arches.
c- Cutaneous innervation of the hand

6-13 The student will be able to know the structures and movement of the joints of the upper limb; shoulder, elbow wrist and radioulnar joints.

6-14 The student will be able to locate the sites of arterial anastomosis and the importance of these anastomosis.

6-15 The student will be able to differentiate the different parts of the body by X-rays. (Plane and stained films) and how to spot fractures of bones as they appear in X-rays.
7) **Head and Neck**

At the end of the course, the student should be able to identify:

7-1 Bones of Head and Neck:
- At the end of this session, the student will be able to identify: the different bones forming the skull, identify the different foraminae and fissures of the skull, the names of the cranial nerves and blood vessels which pass through these foraminae and fissures.
- The skull at birth and the fontanelles and their clinical importance.
- The mandible, its general features, its parts, muscle attachments, vessels and nerves related to it and age changes of the mandible.
- The number and characters of the cervical vertebrae.
- The anatomy of atlantoaxial and atlantooccipital joints giving their clinical significance.

7-2 The anatomy of the scalp with its layers, nerves, vessels and lymph drainage of the scalp knowing the characters of the wounds of the scalp, infection of the scalp & bleeding from the scalp.

7-3 The anatomy of the face,
- Identify the muscles of facial expression, and their nerve supply, illustrate the sensory supply and superficial blood supply of the face and the lymph drainage of the face.
- The structure of the eyelids and conjunctiva.
- The anatomy of the lacrimal apparatus.
- The dangerous area of the face, facial nerve and facial palsy.

7-4 The anatomy of the posterior triangle of the neck, which includes, its boundaries, roof, floor and contents, the cervical plexus, spinal part of accessory nerve, brachial plexus, 3rd part of subclavian artery & external jugular vein and the related applied anatomy.

7-5 The anatomy of the back of the neck including the muscles, the suboccipital triangle of the neck and the arteries of the back of the neck e.g. vertebral, & occipital arteries.

7-6 The anatomy of the cranial cavity including the bones forming different parts of the cranial cavity, the contents of the cranial cavity e.g. the brain & its meninges, the blood vessels of the brain and meninges, the cranial nerves, the venous sinuses, hypophysis cerbri, the emissary veins, their function and their clinical significance.
7-7 The anatomy of the orbit; the bony orbit, the orbital fascia & the contents of the orbit. List the extrinsic muscles of the eye giving their attachments, function, blood supply and innervations & the movements of the extraocular muscles.

7-8 The front of the neck which includes, the structures in the median part of the front of the neck, the anterior triangle of the neck; its boundaries, subdivisions and contents such as blood vessels, nerves and other structures of clinical importance, the infrahyoid muscles: actions & nerve supply.

7-9 The anatomy of the parotid gland; its position, surfaces and relations, the structures inside it, its capsule, duct, blood supply and innervation as well as the related applied anatomy.

7-10 The anatomy of the temporal region includes the fascia and muscles of temporal region.

7-11 The anatomy of the infratemporal region includes:
- Superficial content: muscles of mastication, temporomandibular joint, maxillary artery, pterygoid plexus of veins and the maxillary vein.
- Deep contents, which include mandibular nerve, chorda tympani, otic ganglion, maxillary nerve, tensor palati muscle and sphenomandibular ganglion.

7-12 The anatomy of the submandibular region includes the muscles of submandibular region, submandibular salivary glands, sublingual salivary glands, nerves and blood vessels of submandibular region & the clinically important points as regards the submandibular and sublingual salivary glands.

7-13 Deep structures in the front of the neck.
- The thyroid and parathyroid glands: their position, parts, relations, capsule, arterial supply, venous drainage and lymph vessels of the gland.
- Clinically important points as regards the thyroid gland, as pretracheal fascia, goitre and operations on the thyroid gland.

7-14 Trachea, oesophagus, subclavian artery, vertebral artery, thyrocervical trunk, internal thoracic artery, costocervical trunk, common carotid artery, external carotid artery, ascending pharyngeal artery,
superior thyroid artery, posterior auricular artery, internal carotid, internal jugular vein, the thoracic duct & the cervical part of the sympathetic trunk.

7-15 Cranial nerves: their numbers, names, cells of origin of each nerve, type of fibers, course, relations, branches, function of each nerve and the effects of its injury.

7-16 The prevertebral muscles.

7-17 Deep cervical fascia.

7-18 Anatomy of the mouth, lips, cheeks, teeth and nerve supply of the palate.

7-19 Anatomy of the tongue, the intrinsic and extrinsic muscles of the tongue and their actions, nerves and blood supply of the tongue & its lymph vessels.

7-20 Anatomy of the pharynx including its attachments, openings, parts, walls, fascia, muscles and their actions, blood supply, innervation and the clinically important points related to the pharynx.

7-21 The tonsils, their position, relations, blood supply, importance and operations on tonsils.

7-22 Anatomy of the nose including the nasal wall, nasal cavity, arteries & nerves and the related clinically important points as epistaxis, infection of the nose & deviation of the nasal septum.

7-23 Anatomy of paranasal sinuses, their significance & infection of the paranasal sinuses.

7-24 Anatomy of larynx: its function, position, structure, cartilages, muscles, ligaments and membranes, cavity of larynx, inlet, wall, sensory nerves and arteries of the mucous membrane of the larynx, movements of the vocal cords and the production of voice and the clinically important points as regards the larynx and laryngeal nerve injuries & the examination of larynx.

7-25 Anatomy of the ear including the external ear (auricle, the external acoustic meatus and the tympanic membrane).
The middle ear (position, parts, walls, ossicles, muscles, mucous membrane, blood supply and lymph vessels) & the auditory tube.

The internal ear (position, parts, and semicircular ducts) nerve supply, mechanism of hearing and examination of the tympanic membrane and otitis media.

7-26 The anatomy of the eye ball.

7-27 Lymph drainage of the head and neck includes superficial and deep cervical lymph nodes, & the clinical importance of the lymph drainage of head and neck.

7-28 Joints of head and neck.

7-29 Surface anatomy of the head and neck.

7-30 Radiological anatomy of the head and neck.

8) Neuroanatomy
This course aims that the student should:

a) Recognize the structure of the nervous system.

b) Correlate the functions of different parts of the nervous system to their structure.

The course contents are:

8-1 Overview of the central nervous system

- At the end of this session, the student should be able to identify the different parts of the central nervous system, be acquainted with the terms used in the neuroanatomy and understand the neuron theory.

8-2 The spinal cord

- Describe the external features of the spinal cord.
- Define the spinal nerves, their roots and divisions.
- Define the internal structure of the spinal cord and how it varies in shape at different levels.
- List the names and position of different tracts (ascending and descending) and the type of information conveyed by each tract.
- Describe the blood supply of the spinal cord.
- Apply the anatomical facts to the understanding of lesions of the spinal cord and application of lumbar puncture.
8-3 Brain stem
At the end of this part, the student should be able to:
- Describe the internal features of the brain stem and fourth ventricle.
- Describe the internal structures of the brain stem.
- Identify the central connections of the cranial nerves.
- Apply the anatomical information to understand the manifestations of the lesions of the brain stem.

8-4 The Cerebellum
At the end of this part the student should be able to:
- Identify the different parts of the cerebellum at the gross level.
- Recognize the main central nuclei of the cerebellum and their connections.
- Recognize the basic facts about the evolution of the cerebellum.
- Apply the anatomical information to understand the manifestations of cerebellar lesions.

8-5 The Diencephalon & third ventricle
At the end of this part, the student should be able to:
- Define the thalamus, hypothalamus, subthalamus, and pineal body.
- Describe briefly the location, internal structures and connections of these structures.
- Identify the position and relations of the third ventricle.

8-6 The Cerebral hemispheres
At the end of this part, the student should be able to:
- Identify the surfaces, borders and lobes of the cerebrum.
- Identify the major sulci and gyri of the brain.
- Identify the parts of the lateral ventricles.
- Identify the mamillary bodies, fornix, hippocampal commissure, fimbria, dentate gyrus and hippocampus.
- Identify the different types of fibers in the cerebral hemispheres.
- Identify the different functional areas of the cerebral cortex.

8-7 The basal ganglia and internal capsule.
At the end of this part, the student should be able to:
- Name the basal ganglia.
- Describe the relationship of different parts of the internal capsule.
- Describe the fiber content and the function of the internal capsule.
- Define the blood supply of the internal capsule.
- Apply the anatomical information to understand the manifestations of lesions of different parts of the internal capsule and basal ganglia.

8-8 The meninges, sinuses and blood supply of the brain.
At the end of this part, the student should be able to:
- Identify the different layers of the meninges.
- Identify the dural venous sinuses of the brain.
- Identify the arterial supply of the brain.

8-9  The CSF:
At the end of this part, the student will recognize the sites of production, circulation and absorption of C.S.F. & comprehend the clinical conditions arising from blockage of its absorption or circulation.

8-10 The cranial nerves
At the end of this part, the student should be able to:
- Recognize the different nuclei of each cranial nerve.
- Illustrate the different fiber components of each cranial nerve.
- Describe the function of each fiber component of the cranial nerves.
- Describe the parasympathetic ganglia.
- Apply the anatomical information to understand the manifestations of lesions of different cranial nerves.

8-11 The visual pathway
At the end of this part, the student should be able to:
- Describe different parts of the visual pathway.
- Explain the effects of lesions at different levels of the visual pathway.
- Describe the anatomy of light reflex and accommodation reflex.

8-12 Auditory, olfactory and vestibular pathways:
At the end of this part, the student should be able to:
- Describe the different parts of each pathway & understand the effect of their lesions.

8-13 The autonomic nervous system:
On completion of this part, the student should be able to:
- Differentiate between the sympathetic & parasympathetic nervous systems.
- Identify the nerves carrying the parasympathetic outflow.
- Identify the nerves carrying the sympathetic outflow.
- Describe the central control of the autonomic nervous system.

9. Embryology
Studying embryology is necessary for proper understanding of anatomy because it explains certain relations, which are seen in the adult
body. It is also important to the study of histology because it explains how different tissues and organs develop from a single cell.

It also helps to understand pathology because abnormalities which may occur during development result in malformation which appear in the adult. The course of embryology is studied under two categories:

A- General Embryology:

9-1 The reproductive organs and the germ cells.
At the end of this session, the student will be able to:
- Illustrate the site of formation, migration and differentiation of the primordial germ cells.
- Describe the structure of the testis and the process of spermatogenesis.
- Describe the normal and abnormal morphology of the sperm.
- Describe the structure of the ovary, and the process of oogenesis.

9-2 Discuss the cyclic changes in the female genital tract, which include:
   a- The ovarian cycle (phases and hormonal control).
   b- The uterine cycle (phases and hormonal control)

9-3 Fertilization and formation of germ cells.
At the end of this session, the student should be able to recognize
- The definition, site & results of fertilization and the abnormal sites of fertilization.
- How the following structures are formed: morula, blastocyst, inner and outer cell masses.

9-4 Implantation
- The students will be able to illustrate the normal site, the time of beginning and completion of implantation.
- The formation of trophoblast, cytotrophoblast and syncytium.
- The changes which occur in the endometrium after implantation.
- The abnormal sites of implantation.

9-5 Bilaminar germ disc (second week of development).
- At the end of this session, the student will be able to describe the differentiation of both inner and outer cell masses.
- Describe the formation of the following structures: Embryonic ectoderm, endoderm, amniotic cavity, extra-embryonic mesoderm & primary stem villi.
9-6 Trilaminar germ disc.
- At the end of this session, the student will be able to describe the formation of embryonic mesoderm germ layer.
- Define and describe the formation of the following structures: - Primitive streak and node, notochord, allantois and describe the further development of trophoblast; formation of secondary and tertiary stem villi.

9-7 Embryonic period I:
- The students will be able to describe the formation of the neural plate, tube and crest.
- Describe the different parts of the embryonic mesoderm and their derivatives and the formation of the intraembryonic coelom.
- Describe the main organ system, the change in the shape of the embryo which occur during the embryonic period and the derivatives of each layer of the germ disc.

9-8 Embryonic period II:
- Describe the head, tail and lateral foldings of the embryo.
- Describe the formation of the gut, vitelline duct, buccopharyngeal membrane and the umbilical cord.

9-9 Fetal membranes:
- The students will be able to describe the formation, structure, function and circulation of the placenta.
- The student will be able to recognize the placental changes at the end of pregnancy & its congenital anomalies.
- The student will be able to describe the formation, significance and fate of the following structures: Amnion and amniotic fluid, yolk sac, allantois and umbilical cord.

9-10 Outlines of the development of the body cavities and serous membranes.
- At the end of this session, the student will be able to:
  - Describe the formation of the intraembryonic coelom,
  - Define the term pleuroperitoneal fold and septum transversum.
  - Describe the formation of the diaphragm.

B- Systemic embryology:
- At the end of this course, the student will be able to discuss the development of different body systems and the mechanism of congenital abnormalities in each system.
1- The development of the digestive system:
At the end of this session, the student will be able to:
- Describe the relationship between folding of the embryo and the development of the foregut, midgut and hindgut.
- The development of oesophagus, stomach, duodenum, pancreas, liver and biliary system.
- The development of midgut derivatives and rotation of midgut loops.
- Development of the hind gut derivatives
- Describe the origin of the anomalies of the oesophagus, stomach, duodenum, pancreas, liver and biliary system.
- Describe the origin of the anomalies of the intestines as vitelline fistula & Meckel's diverticulum.
- Describe the origin of the anomalies of hind gut loop as imperforate anus, rectal atresia and fistula.

2. The development of the cardiovascular system:
- At the end of this session, the student will be able to describe the formation of the heart tube and its dilatation, the contribution of the sinus venosus and bulbus cordis to the heart development and describe the formation of interventricular septa in order to understand the basis of common congenital defects which may occur.

3. The development of the urogenital system:
- At the end of this session, the student will be able to describe the role of the intermediate mesoderm in development of the urinary system.
- Define the term pronephros, mesonephros and metanephros.
- List the derivatives of the ureteric bud and metanephric mesoderm.
- Compare the fate of the genital tubercle, urethral folds and genital swellings in the male and female.
- Describe the embryological origin of some diseases in the urogenital system.

4. The development of the central nervous system:
At the end of this session, the student will be able to describe:
- The formation and closure of the neural tube, the brain vesicles, neuro epithelial and neural crest derivatives.
- Define anencephaly, hydrocephalus and spina bifida.
- Development of medulla oblongata, cerebellum, midbrain & forebrain.
- Development of the meninges & cranial nerves.
- Congenital anomalies of the brain and spinal cord.

5. **The development of the eyes and ears:**
At the end of this session, the students will be able to illustrate how the different parts of the eyes and ears develop & the mechanism of development of congenital anomalies of the eyes and ears.

6. **The development of the integumentary system:**
The student will recognize how the epidermis of skin, hairs, nails, sweat and sebaceous glands are formed. She will also be able to the anomalies of the skin and other structures of the integumentry system.

7. **The development of the mammary gland:**
The student will be able to explain how the mammary gland is formed and the most common congenital anomalies, which can occur during its development.

8. **Development of the muscles:**
The students will be able to illustrate how the vertebral column, skull, sternum, ribs, mandible, hyoid bone, appendicular skeleton and muscles are formed. They will also be able to the congenital anomalies of musculoskeletal system.

9. **Development of the mouth, face, nose and palate:**
The student will be able to explain how these structures are formed as well as the development of the salivary glands and the pituitary gland. Congenital anomalies of face and palate will be also studied.
INSTRUCTION MEDIA AND METHODS OF TEACHING

1- Lecturing programs: of 256 lectures of 60 minutes each, distributed over four semesters for the first two years. These lectures cover as much as possible the objectives of anatomy and are continuously updated. These lectures are helped by educational aids as plastic models, skeleton, X-ray films, overhead projector transparencies, videotapes and CDs as well as multimedia show.

- Lectures on gross anatomy topics reinforce learning from the dissection sessions & mainly aim at emphasizing the clinical applications of the relevant anatomical information.
- Participation of students is essential, they are informed previously about the topic of the lecture.
- At the beginning of the lecture, the teacher inquires about students’ expectation and sets objectives of the lecture.
- Some important points of the previous lecture are asked about.
- Students ask about any unclear points and the teacher merges the previous lecture with the new one.
- Teacher proposes some simple problems to be solved by students currently during the lecture.
- At the end an organized summary is presented by the teacher.
- Visual aids like transparencies, power point presentations are used in the lecture.
- Audio - visual video films are also used to illustrate and clarify theoretical lectures and make it easier to remember.

2- Practical programs: 58 sessions of 120 minutes each. The students are offered practical attachment in the dissecting room for the purpose of training on dissection, demonstration and differentiation of the different structures of the body. The major part of teaching/learning in gross anatomy takes place during the dissection sessions, where the students get an actual opportunity to see and identify the different structures of the body & their relations to each other.

3- Seminars: integrated with other departments. It is the participation of the student in the learning process, encouraging them to present themselves in a scientific meeting with the staff members and their colleagues.

4- Assignments: clinically related assignments are given to all students to prepare and present.
TOPICS OF THE LECTURES

1- **Introduction:**

   i- Anatomical terms.
      - Terms related to position.
      - Terms related to movement.
   
   ii- Basic anatomical structures:
      - Skin.
      - Fascia.
      - Muscles.
      - Joints.
      - Ligaments.
      - Skeleton.
      - Cardiovascular system.
      - Gastrointestinal system.
      - Respiratory system.
      - Urinary system.
      - Genital system in male and female.
      - The Nervous System

2- **Lower Limb:**

   i- Bones of the hip and thigh.
      - The hip bone
      - The femur
      - The patella

   ii- The front of the thigh
      - Superficial fascia.
      - Superficial inguinal arteries.
      - Long saphenous vein.
      - Cutaneous nerves.
      - Deep fascia.
      - Femoral triangle.
      - Femoral sheath.
      - Femoral canal.
      - Adductor canal.
      - The muscles of the front of the thigh.
      - Femoral blood vessels.
      - The femoral nerve.

   iii- The medial side of the thigh:
      - Cutaneous nerves.
      - The muscles of the medial side.
- The obturator nerve.
- The accessory obturator nerve.
- The obturator artery.

iv- The gluteal region:
- Cutaneous nerves.
- The muscles of the gluteal region.
- Sacrotuberous ligament.
- Sacrospinous ligament.
- Greater sciatic notch.
- Lesser sciatic notch.
- Superior gluteal artery.
- Inferior gluteal artery.
- Internal pudendal artery.
- The pudendal nerve.
- Nerve to obturator internus.
- Nerve to quadratus femoris.
- Superior gluteal nerve.
- Inferior gluteal nerve.

v- The back of the thigh
- Posterior cutaneous nerve of the thigh.
- The muscles of the back of the thigh.
- Sciatic nerve.

vi- The poplitial fossa.
- Tibial nerve. (medial popliteal).
- Common peroneal (lateral popliteal) nerve.
- Popliteal blood vessels (artery and vein).

vii- The hip joint.

viii- Bones of the leg and foot.
- The tibia.
- The fibula.
- The skeleton of the foot.

ix- The front and lateral sides of the leg.
- Superficial veins.
- Cutaneous nerves.
- Deep fascia and retinacula.
- Muscles of front of the leg.
- Deep peroneal nerve.
- Anterior tibial artery.
- Muscles of the lateral side of the leg.
- Synovial sheath of peroneal tendons.
- Superficial peroneal nerve.

x- The back of the leg.
- Small saphenous vein.
Cutaneous nerves.
- Deep fascia.
- Muscles of back of the leg.
- Tibial (posterior tibial) nerve.
- Posterior tibial artery.

xi- The knee joint.

xii- The tibiofibular joint.

xiii- The ankle joint.

xiv- The sole of the foot.
- Cutaneous nerves.
- Deep fascia and plantar aponeurosis.
- Synovial sheaths of the digits.
- Medial and lateral plantar nerves.
- Medial and lateral plantar arteries.
- Layers of the sole of the foot.

xv- The joints and ligaments of the foot.

xvi- Arches of the foot & their applied anatomy.

xvii- Applied anatomy of the lower limb regarding:
- Lymph drainage of lower limb.
- Arteries and veins of lower limb.
- Nerves of lower limb.

3- Abdomen

i- The anterior and lateral abdominal walls.
- Superficial fascia.
- Muscles.
- Rectus sheath.
- Fascia tranversalis.
- Nerves.
- Blood vessels.
- Lymph drainage.
- Inguinal canal.
- Spermatic cord.
- Scrotum, testis and epididymis.

ii- The posterior abdominal wall
- Superficial and deep fasciae.
- Thoracolumbar fascia.
- Lumbar vertebrae.
- Muscles.
- Nerves.
- Blood vessels.
- Lymph vessels.
iii- The diaphragm.
  - The abdominal cavity.
  - The peritoneum.

iv- The Gastrointestinal tract
  - Abdominal part of the oesphagus.
  - The stomach.
  - The small intestines (duodenum, jejunum and ileum).
  - The large intestine (caecum, appendix, the ascending, transverse, descending and pelvic colon.).
  - The pancreas.
  - The liver.
  - The gall bladder.
  - Bile duct.
  - Blood supply of the gastrointestinal tract
  - Portal vein

v- The spleen.

vi- The urinary system (kidneys and ureters).

vii- The suprarenal glands.

viii- Blood vessels of the abdomen.
  a. Arteries.
     - Abdominal aorta.
     - Coeliac (left gastric. splenic and hepatic)
     - Superior mesenteric artery.
     - Inferior mesenteric artery.
     - Inferior phrenic artery.
     - Middle suprarenal.
     - Renal artery.
     - Gonadal artery (testicular or ovarian).
     - Lumbar arteries.
     - Median sacral artery.
     - Common and external iliac arteries.
  b. Systemic veins.
     - Inferior vena cava.
  c. Nerves of the abdomen.
     - Lumbar plexus.

4- The pelvis and perineum

i. The Pelvis:
   a. The Pelvic wall
      - Bones.
      - Muscles.
      - Pelvic fascia.
- Perineum.
- Nerves (spinal and autonomic nerves).
- Arteries and veins.
- Lymphatic drainage.
- Joints of the pelvis.
- Difference between male and female pelvis.

b. The pelvic cavity
- The pelvic peritoneum.
- The rectum and anal canal.
- Urinary bladder and pelvic part of the ureter.
- The male and female urethera.
- Male genital system.
- Female genital system.

ii- Perineum
a. Anal triangle.
b. Urogenital triangle.

5. Thorax

i- Thoracic wall.
- Bones (Thoracic vertebrae, ribs and sternum).
- Joints of the thoracic wall.
- Muscles.
- Nerves (intercostal nerves).
- Blood vessels.
- Intercostal and subcostal vessels.
- Internal thoracic vessels.

ii- Inlet of the thorax.

iii- Outlet of the thorax.

iv- Thoracic cavity:
- The respiratory system.
- Pleurae.
- Lungs.
- Bronchopulmonary Segments.
- Trachea.
- Bronchi.

v- Heart.
- External and internal features of the heart.
- Chambers of the heart.
- Blood supply of the heart.

vi- Mediastinum.

vii- Large arteries of the thorax.
- Aorta (ascending, arch and descending).
- Innominate artery.
- Left common carotid and left subclavian arteries.
- Pulmonary trunk.

viii- Large Veins:
- Right and left innominate veins.
- Superior and inferior vena cava.
- Azygos Vein:
  - Superior and inferior hemiazygos veins.

ix- Nerves: (Thoracic part)
- Right and left vagi.
- Right and left phrenic nerves.
- Sympathetic trunk.

x- Esophagus.

xi- Thymus gland.

xii- Lymphatic system.
- Thoracic duct
- Right lymphatic duct.
- Lymph nodes of the thoracic wall & cavity and the bronchomediastinal lymph nodes.
- Lymph vessels of the thorax.

xiii- Surface anatomy:
- Pleurae and lungs, trachea & bronchi.
- Heart and its valves and pericardial Sinuses.
- Ascending, arch & descending aorta.
- Superior and inferior vena cava.
- Suprasternal notch, xiphisternal joint, clavicle & ribs.

6. **Upper Limb:**

i- Bones of the upper limb.
  The scapula, clavicle, humerus, radius, ulna & skeleton of the hand.

ii- The pectoral region.
  - Cutaneous nerves and arteries.
  - Mammary glands.
  - Pectoral muscles
  - Clavipectoral fascia.
  - Serratus anterior muscle

iii- The axilla:
  - Subscapularis muscle.
  - Axillary blood vessels.
  - Brachial plexus.
  - Dorsal scapular nerve.
  - Long thoracic nerve.
- Nerve to subclavius muscle.
- Supra scapular nerve.
- Lateral and medial pectoral nerves.
- Axillary and infraclavicular lymph nodes.

iv- The back:
- Cutaneous nerves and blood vessels.
- Lymph drainage.
- Muscles of the back (trapezius, teres major, latissimus dorsi, rhomboidus major and minor).
- Accessory nerve.
- Lumbar triangle.

v- The shoulder region
- Cutaneous nerves.
- Muscles (deltoid, supraspinatus, infraspinatus, teres minor).
- Coraco acromial ligament and arch.
- Quadrangular and triangular spaces.
- Circumflex humeral arteries.
- Axillary nerve.
- Anastomosis around the scapula.
- Acromioclavicular joint.
- Shoulder joint.

vi- The arm:
- Cutaneous nerves.
- Cephalic & basilic veins and the dorsal venous arch.
- Lymph vessels of the arm.
- Muscles of anterior compartment.
- Blood vessels.
- Nerves (median, ulnar and radial nerves).

vii- The Posterior Compartment:
- Muscles.
- Nerve (radial nerve).

viii- The cubital fossa.

ix- The forearm and hand.

x- Anterior compartment.
- Muscles (flexor group)
- Nerves (median, ulnar and radial nerves)
- Arteries (radial and ulnar).
- Anastomosis around the elbow joint.

xi- Posterior compartment
- Muscles.
- Deep branch of radial nerve.

xii- Elbow joint
**xiii-** Radioulnar joint  
Wrist joint.  

**xiv-** The hand:  
1- The dorsum of the hand:  
   - Cutaneous nerves.  
   - Dorsal venous arch.  
   - Insertion of long extensor tendons.  
   - Radial artery.  
   - Dorsal carpal arch.  
2- The palm of the hand.  
   - Cutaneous nerves.  
   - Palmar aponeurosis.  
   - Muscles of hand.  
   - Nerves of the hand.  
   - Arteries of the hand.  

**7- Head & Neck:**  

- Bones of the Head and Neck  
  1- Skull: different aspects:  
     - Norma verticalis, frontalis, lateralis, occipitalis & basalis externa.  
     - Internal surface of the skull cap.  
     - Norma basalis interna.  
     - Difference between male and female skull.  
     - The skull at birth and some clinical notes on the skull.  
  2- Mandible.  
  3- Hyoid bone and cervical vertebrae.  
- Scalp.  
- Face, eyelids and lacrimal apparatus.  
- Posterior triangle of the neck  
   - Spinal root of accessory nerve.  
   - Cervical plexus of nerves.  
   - Brachial plexus of nerves.  
   - Third part of subclavian artery.  
   - Transverse cervical artery.  
   - Suprascapular artery.  
   - Subclavian vein.  
   - External jugular vein.  
- Back of the neck.  
- Cranial cavity.  
- Orbit.
- Front of the neck.
- Parotid gland.
- Temporal region.
- Infratemporal fossa.
- Superficial and deep contents.
- Submandibular region.
- Deep structures in front of the neck.
- Cranial nerves.
- Prevertebral muscles and deep cervical fascia.
- Mouth, lips, cheeks, teeth, palate, tongue, pharynx, nose, paranasal sinuses.
- Larynx, ear, eyeball.
- Lymph drainage of the head and neck.
- Joints of the neck.
- Clinical anatomy.
- Surface and radiological anatomy.

8. **Neuroanatomy:**

- The nervous system.
- The spinal cord.
- The brain stem.
- The medulla oblongata: external and internal features.
- The pons.
- The midbrain.
- The cerebellum.
- The fourth ventricle.
- Circulus arteriosus of Willis.
- The cerebrum.
- Lateral ventricle.
- Diencephalon.
- 3rd ventricle.
- Internal capsule.
- Arterial supply of the brain.
- The veins of the brain.
- The meninges of the brain.
- The circulation of cerebro-spinal fluid.
- Pyramidal tract.
- Spinothalamic tract and spinal leminiscus.
- Trigeminal leminiscus.
- Gracile and cuneate tracts and medial leminiscus.
- Dorsal and ventral spino-cerebellar tracts.
- Spinal or stretch reflex arc.
- The pathway of hearing.
- The vestibular nerve and its connections.
- The pathway of vision and visual reflexes.
- Olfactory pathway.
- Medial longitudinal bundle.
- Autonomic nervous system.
- Notes on applied neuroanatomy.

9. **Embryology:**

- The reproductive organs and the germ cells.
- Cyclic changes in the female genital tract.
- Fertilization and formation of germ layers.
- Differentiation of the three germ layers.
- Changes in the trophoblast and development of the foetal membranes.
- The external features of the embryo.
- Development of mouth, face, nose and palate.
- Development of pharynx and associated structures.
- Development of the digestive system.
- Body cavities, mesenteries, diaphragm and spleen.
- Development of the urinary system.
- Development of the genital system.
- Development of the cardiovascular system.
- Development of the central nervous system.
- Development of the eye and ear.
- Development of the integumentary system.
- Development of the skeletal system.

Students Evaluation Procedure:

The total marks for Anatomy subject are 280 marks distributed as follow:
First year: 200 marks
Second year :180 marks

**Assessment Marks count for 30% of the final grade:**

**Class sharing**
Class sharing counts for 5% of students final grade.

**Seminars**
Seminars marks count for 5% of students final grade.
Attendance
  Attendance counts for 5% of students final grade.

**Final Exams Marks count for 70% of the final grade:**

Written Papers
  Written papers count for 35% of students final grade.

Oral exam. marks
  Oral marks count for 20% of students final grade.

Practical exam. marks
  Practical marks count for 20% of students final grade.