

**Learning Outcomes:**

The educational objectives of the course are to educate students to attain the following:

- Develop the understanding of the human anatomy and physiology to the biomedical students who do not have the background in biology.
- Students will understand the basics of system level organization of human body.
- The course contents will enable the students for the investigative study of anatomical structures and their functions required for Biomedical Engineers.
- The contents will allow the students to fill the gap of knowledge to relate the Human Anatomy and Physiology with Engineering.

**SYLLABUS**

<b>Unit</b>	<b>Topics</b>	<b>Lectures (Hours)</b>
<b>1</b>	<b>SKELETAL SYSTEM:</b> <b>Bone:</b> Types, Functions Structure and Development of bone; <b>Axial Skeleton:</b> Skull, Cranial Cavity, Vertebral Column, Thoracic Cage, Bones of Limbs and Disorders of bones. <b>Joints:</b> Types of joints, structure and movements; Main synovial joints of the limbs, Disorder of joints.	<b>7</b>
<b>2</b>	<b>MUSCULAR SYSTEM:</b> Classification of muscles, Anatomy and Physiology of skeletal muscle, Muscles of body, Physiology of muscle contraction, Structure and physiology of smooth muscle, cardiac muscle, difference of skeletal, smooth and cardiac muscle, Anatomy and Physiology of neuromuscular junction, EMG, Disorders of Muscles.	<b>7</b>
<b>3</b>	<b>NERVOUS SYSTEM:</b> Neuro-anatomy in brief. Receptor, neuron, synapse and neurotransmitters. Central nervous system, peripheral nervous system and autonomic nervous system. Various parts of nervous system; <b>Brain:</b> Parts and functions; Extra pyramidal system, Spinal cord. Neural circuits for processing information. Neuro chemical environment of brain. Sensory and motor activity of the brain. States of brain activity. Behavioral and motivational activity of brain. Autonomic nervous system. Reflex actions, Sensation. Ventricles and cerebrospinal fluid. Methods to study neural structure and function. EEG; MRI; Sleep, Speech, Disorders of nervous system.	<b>8</b>
<b>4</b>	<b>EXCRETORY SYSTEM:</b> <b>Various parts of excretory system, their structure and functions:</b> Kidneys, Ureters, Urinary Bladders, Urethra; Physiology of urine formation, physiology of micturition, Concentration and Dilution of urine, Regulation of acid-base balance, Composition of urine, Kidney function tests, renal disorders, Diuretics, artificial kidney and Dialysis	<b>9</b>
<b>5</b>	<b>DIGESTIVE SYSTEM:</b>	<b>9</b>

Digestive system-Introduction. **Various parts of digestive system, their structure and function:** mouth, tongue, teeth, salivary glands, pharynx, esophagus, stomach, small intestine, large intestine, rectum.

Accessory digestive organs: pancreas, liver, gall bladder. Digestion of proteins, carbohydrates, fats. Mechanisms of Ingestion, Mixing and propulsion, Secretion, Digestion, Absorption, Assimilation and Egestion.

Disorders of digestive system.

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| <b>6</b> | <b>ENDOCRINE SYSTEM:</b>   | <b>4</b> |
|          | Endocrine glands, Hormones; <b>Location, physiology and hormones secreted by various endocrine glands:</b> pituitary, thyroid, parathyroid, adrenal, pancreatic islets, thymus, pineal body, pancreas, Disorders of all glands; Mechanism of hormone regulation. |          |
| <b>7</b> | <b>REPRODUCTIVE SYSTEM:</b>  | <b>3</b> |
|          | Anatomy and Physiology of male and female reproductive system.   |          |
| <b>8</b> | <b>SPECIAL SENSES:</b>   | <b>4</b> |
|          | Structure, function and physiology of vision, hearing, taste & smell. Mechanism of vision, color vision, mechanism of hearing, tests of hearing, Physiology of olfaction & smell. Disorders of eyes and ears, physiology of balance.                             |          |

**Term Work and Practical shall be based on the above syllabus.**

**Text Books:**

1. Anatomy and Physiology in Health and Illness By: Ross and Wilson
2. Text book of Medical Physiology By: Guyton and Hall

**Reference Books:**

1. Human Anatomy and Physiology By: Dr. Padma Sanghani
2. Human Physiology and Anatomy By: Fox Staurt Ira
3. Human Anatomy (Volume 1,2,3) By: B.D.Chaurasia