

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BIOMEDICAL ENGINEERING (03)**  
HUMAN ANATOMY AND PHYSIOLOGY

**SUBJECT CODE: 2130304**

**B.E. 3<sup>RD</sup> SEMESTER**

**Type of course:** Core.

**Prerequisite:** Details of anatomy and physiology.

**Rationale:** The students need to learn fundamentals of anatomical structures and physiology of body organs. This knowledge is helpful to design any instrument. Students get to know about body composition, organs and systems.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits C	Examination Marks						Total Marks
L	T	P		Theory Marks			Practical Marks			
			ESE (E)	PA (M)		PA (V)		PA (I)		
				PA	ALA	ESE	OEP			
3	2	0	5	70	20	10	30	0	20	150

**Contents:**

Sr. No.	Content	Total Hrs	% Weightage
1	<b>Introduction to the human body, physiology of human cell &amp; tissues:</b> Definition of anatomy and physiology, Terms related to anatomy and physiology, Anatomical planes and positions, Structural Organization, The internal environment and homeostasis, Structure And Function of Cell & Cell organelles, Elementary tissues of the body: epithelial, muscular,	4	10
2	<b>Body Fluid (Blood):</b> Composition of Blood, Functions of Blood, Cellular Content of Blood: their properties and functions, Blood Groups, Hemoglobin and its estimation.	4	10
3	<b>Respiratory System:</b> Structure and function of various Organs of respiratory system, Mechanism of respiration, Muscles of respiration, Control of respiration Physiological variables affect ingpiration, Physical principle of gas exchange, pulmonary volumes and	5	10
4	<b>Cardiovascular System:</b> External features and structure of heart, Blood vessels, Physiology and properties of cardiac muscle, Cardiac cycle, Cardiac output, Heart rate, Heart Sound, and Introduction to ECG, Blood pressure and blood pressure control.	5	15
5	<b>Nervous System:</b> Neurons, Synapse and neurotransmitters, Central and Peripheral nervous system, various parts of nervous system; Brain: Parts and functions; Spinal cord, CSF, Ventricles of the brain, Autonomic nervous system, Reflex action.	5	10
6	<b>Special Senses: Eye:</b> Anatomy of Eye & Physiology of Vision, <b>Ear:</b> Structure of Ear & Physiology of Hearing, <b>Nose:</b> Sense of Smell, <b>Tongue:</b> Sense of Taste, <b>Skin:</b> Structure &	5	15
7	<b>Digestive System:</b> Various organs of digestive system, movement of gastrointestinal tract, mastication, deglutination, physiological activities in mouth, pharynx, esophagus, stomach, pancreas, liver, gall bladder, small and large Intestine, Digestion and absorption.	5	10
8	<b>Excretory System:</b> Anatomy of Urinary System, Physiology of urine formation, physiology of micturition, Concentration and Dilution of urine, Composition of Urine.	4	10

9	<b>Skeletal and muscular System: Bone:</b> Types, Functions Structure and Development of bone; Axial Skeleton: Skull, Cranial Cavity, Vertebral Column, Thoracic Cage <b>Joints:</b> Types of joints, Main synovial joints of the limbs <b>Muscular System:</b> Classification of muscles, Anatomy and Physiology of skeletal muscle, Muscle of body, Physiology of muscle contraction, Structure and physiology of smooth muscle, cardiac muscle, difference of cardiac muscle, smooth and cardiac muscle, Anatomy and Physiology of neuromuscular junction.	5	10
<b>Total:</b>		<b>42</b>	<b>100</b>

### Reference Books:

1. Anatomy and Physiology in Health and Illness by Ross and Wilson
2. Human Anatomy and Physiology by Dr. Padma Sanghani
3. Text book of Medical Physiology by Guyton and Hall
4. Human Physiology and Anatomy by Fox Staurt Ira
5. Human Anatomy (Volume 1,2,3) by B.D.Chaurasia

### Course Outcome:

After learning the course the students will be able to

1. Explain the structures of different body parts.
2. Describe the physiology of body organs.
3. Explain the mechanism of system functioning.
4. Get knowledge about the medical field too.
5. Describe the structure and functions of the blood & blood vessel.
6. Understand how the nervous system controls the body parts.
7. Understand the exchange and transportation of gases.

**Active learning Assignments (AL) :** Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The Power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.