

**GANPAT UNIVERSITY**

**FACULTY OF ENGINEERING & TECHNOLOGY**

Programme	Bachelor of Technology					Branch/Spec.	Biomedical Engineering		
Semester	II					Version	1.0.0.0		
Effective from Academic Year			2022-23			Effective for the Batch admitted in		July 2022	
Course Code	2BM2101		Course Name			Human Anatomy and Physiology			
Teaching Scheme						Examination Scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	4	-	1	-	5	Theory	40	60	100
Hours	4	-	2	-	6	Practical	30	20	50

Pre-requisites
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Basic knowledge of human biological systems.

Course Outcomes
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On successful completion of the course, the students will be able to:

CO1	<b>Define</b> the components of blood and their functions, types of bones and its structure and functions, and different types of muscle contraction.
CO2	<b>Explain</b> the anatomical structures and physiological process of various biological systems. i.e cardiovascular system, respiratory system, digestive system and excretory system.
CO3	<b>Identify</b> the relation between different biological systems and its <b>influence</b> in different physiological processes.
CO4	<b>Combine</b> the human anatomy & physiology knowledge with engineering principals for the parameter measurement.

## Theory Syllabus

Unit	Content	Hrs.
1	<b>HAEMATOLOGY:</b> Composition of blood, blood cells, their properties and functions, blood groups, hemoglobin and its estimation, coagulation of blood/Hemostasis.	5
2	<b>RESPIRATORY AND CARDIOVASCULAR SYSTEM:</b> Cardiovascular System: Anatomy of Heart and the blood vessels, heart valves, systemic and pulmonary circulation, conduction system of the heart, structure and function of arteries, capillaries and veins, cardiac action potential, electrocardiogram (ECG), cardiac cycle, cardiac output, blood pressure. Respiratory System: Structure and function of various parts of respiratory system, mechanism of respiration, principle of gas exchange,/ transport between the lungs and tissues, pulmonary volumes and capacities, pulmonary function test.	12
3	<b>SKELETAL AND MASCULAR SYSTEM:</b> Skeletal System: Bones – types, structure and function, structure and function of skull, vertebral column, thoracic cage, basic knowledge of Bones of Limbs, types of joints, synovial joints of the limbs. Muscular system: Classification of muscles, anatomy and physiology of skeletal muscles, cardiac muscles and smooth muscles, Different types of muscle contraction: Isometric, Isokinetic, Isotonic, anatomy and physiology of neuromuscular junction, Electromyogram (EMG)	10
4	<b>DISGESTIVE AND EXCRETORY SYSTEM:</b> Digestive System: Anatomy and physiology of various parts of digestive system, anatomy and physiology of accessory organs, digestion of protein, carbohydrates, and fats. Excretory System: Anatomy and physiology of various parts of excretory system, physiology of micturition and urine formation.	10
5	<b>NERVOUS SYSTEM:</b> Structure of neuron, synapse, receptors and neurotransmitters, central nervous system, peripheral nervous system, various parts of Brain and its functions, spinal cord, autonomic nervous system, reflex action, sensation, electroencephalogram (EEG).	8
6	<b>LYMPHATIC SYSTEM, ENDOCRINE SYSTEM AND BODY DEFENCE:</b> Lymphatic system: Structure and function of Lymphatic system, spleen. Endocrine system: Endocrine glands, Location, physiology and hormones secreted by	5

	endocrine glands such as thyroid, parathyroid gland, adrenal, pancreatic, thymus, pineal body, and pancreas. Body defense and Immunity: Specific and nonspecific defense mechanism	
7	SPECIAL SENSES, INTEGUMENTARY SYSTEM: Special Senses: Structure and function of vision, hearing, taste & smell. Mechanism of vision, color vision, mechanism of hearing, tests of hearing, Physiology of olfaction & smell. Physiology of balance and stability. Integumentary system: Structure and function of skin, regulation of body temperature	8
8	REPRODUCTIVE SYSTEM: Anatomy and physiology of male and female reproductive system.	2
<b>Practical Content</b>		
Practical, assignments and tutorials are based on above syllabus.		
<b>Text Books</b>		
1	Anatomy and physiology in Health and Illness by Ross and Wilson, Pub: Churchill Livingstone (Elsevier) 13e.	
2	Text book of Medical Physiology By: Guyton and Hall, 12e.	
<b>Reference Books</b>		
1	Human Anatomy (Volume 1,2,3) By: B.D. Chaurasia	
2	Human Physiology and Anatomy By: Fox Staurt Ira	
3	Human anatomy and Physiology with Health Education by Padma B Sanghani, Pub: McGrawHill.	
<b>ICT/MOOCs Reference</b>		
1	<a href="http://nptel.ac.in/courses/102104058/">http://nptel.ac.in/courses/102104058/</a>	
2	<a href="http://nptel.ac.in/courses/102104042/">http://nptel.ac.in/courses/102104042/</a>	
3	<a href="https://www.edx.org/course/anatomy-cardiovascular-urinary-michiganx-anatomy403-2x">https://www.edx.org/course/anatomy-cardiovascular-urinary-michiganx-anatomy403-2x</a>	
4	<a href="https://www.edx.org/course/human-anatomy-hkpolyux-ana101x-1">https://www.edx.org/course/human-anatomy-hkpolyux-ana101x-1</a>	
5	<a href="https://www.edx.org/course/anatomy-human-neuroanatomy-michiganx-anatomy403-3x">https://www.edx.org/course/anatomy-human-neuroanatomy-michiganx-anatomy403-3x</a>	
6	<a href="https://www.edx.org/course/anatomyx-musculoskeletal-cases-harvardx-at1x">https://www.edx.org/course/anatomyx-musculoskeletal-cases-harvardx-at1x</a>	
7	BODY software	
8	Video Lecture & Presentation slides from physio.net Course	

<b>Mapping of CO with PO and PSO:</b>															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	1	1	0	2	0	0	0	1	1	1	1	2	2
CO2	3	1	1	1	0	2	0	0	0	1	1	1	1	2	2
CO3	3	1	1	1	0	2	0	0	0	1	1	1	1	2	2
CO4	3	1	1	1	0	2	0	0	0	1	1	1	1	2	2