



Subject: Human Anatomy, Physiology and Pathophysiology I

Subject Code: BPHBP11354

Type of course: Major

Prerequisite: 12th Biology

Rationale: This course provides fundamental knowledge of the structure, functions, and basic pathological alterations of the human body. It enables students to understand the relationship between normal physiology and disease processes, forming the scientific basis for the study of pharmacology, pathophysiology, pharmacotherapeutics, and clinical pharmacy. The course aligns with the competency-based framework of NEP 2020 by developing analytical thinking, scientific reasoning, and an integrated understanding of human health, thereby preparing students for effective pharmaceutical practice and patient-centred healthcare.

Teaching and Examination Scheme:

Course Code	Course Title			Course Type
BPHBP11354	Human Anatomy, Physiology and Pathophysiology I (Theory)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
4	4	--	--	60
Maximum Marks	MSE			ESE
100	40			60

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Understand the structural organization of the human body from cells to systems.
2. Comprehend physiological functions of various body systems and the principles of homeostasis.
3. Learn the cellular basis of disease including injury, adaptation, and inflammation.
4. Recognize common pathological conditions related to skin, bones, joints, blood, cardiovascular system, and special senses.
5. Establish the groundwork for clinical interpretation of symptoms and disease mechanisms relevant to pharmacy and therapeutics.

Course Outcomes (CO):



CO No.	Upon successful completion of this course, the students will be able to:
1	Explain the fundamental concepts of Human Anatomy, Physiology and Pathophysiology.
2	Explain the gross morphology, structure and functions of various organs of the human body.
3	Understand the etiology and pathogenesis of diseases/disorders associated with integumentary system, peripheral nervous system and cardiovascular system
4	Understand the basic mechanism behind inflammation
5	Identify and differentiate the various tissues and organs of different systems of human body.

Course Content:

Unit No.	Topics	No. of Lectures
I	Introduction to human body Cellular and tissue level of organization. Definition and scope of anatomy, physiology and pathophysiology. Levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminologies. Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, forms of intracellular signalling- a) Contact-dependent, b) Paracrine, c) Synaptic, d) Endocrine Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues. Basic principles of cell injury and adaptation Components and types of feedback systems, causes of cellular injury, pathogenesis (cell membrane damage, mitochondrial damage, ribosome damage and nuclear damage), morphology of cell injury – adaptive changes (atrophy, hypertrophy, hyperplasia, metaplasia, dysplasia), cell swelling, intra cellular accumulation and cell death. Definitions of commonly used relevant medical terminologies.	12 hours
II	Integumentary system and wound healing Structure and functions of skin. Skin disorders: Psoriasis and dermatitis and pathophysiology of Leprosy. Basic principles of wound healing. Skeletal system and joints Divisions of skeletal system, types of bones, salient features and functions of bones of axial and appendicular skeletal system. Organization of skeletal muscle physiology of muscle contraction, neuromuscular junction. Structural and functional classification of joints. Diseases of bones and joints Pathophysiology of rheumatoid arthritis, osteoporosis and gout.	12 hours
	Body fluids, blood and lymphatic system Body fluids, composition and functions of blood, hemopoiesis, formation of haemoglobin, mechanisms of coagulation, blood grouping, Rh factors and transfusion. Lymphatic organs and tissues, lymphatic vessels, lymph formation,	



III	circulation and functions of lymphatic system. Basic mechanism of inflammation and repair Introduction, classification and pathophysiology of inflammation, mediators of inflammation. Haematological diseases Pathophysiology of iron deficiency, megaloblastic anaemia (Vit B12 and folic acid), sickle cell anaemia, Thalassemia, hereditary acquired anaemia and haemophilia.	12 hours
IV	Peripheral nervous system Classification of peripheral nervous system: structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves. Special senses Structure and functions of eye, ear, nose and tongue. Pathophysiology of special sense disorders- glaucoma, cataract, myopia, otitis externa, otitis media, vertigo and anosmia	12 hours
V	Cardiovascular system Anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heartbeat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram. Pathophysiology of hypertension, cardiac arrhythmias, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and coronary artery disease).	12 hours

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Drawing and Labeling of Human Organ System Faculty will assign each student any one human organ system (such as the cardiovascular system, respiratory system, digestive system, nervous system, skeletal system, or urinary system) and explain its basic anatomy in the classroom. Students will draw a neat and well-labeled diagram of the assigned organ system on an A4 sheet, write the functions of its major parts in brief, and mention the importance of the organ system in maintaining normal body functions. At the end of the activity, students shall prepare a short report containing the diagram and description and submit it in PDF format through the University ERP Portal within the prescribed deadline.	10
2	Model Preparation and Functional Explanation of Human Organ System Faculty will divide the class into small groups and assign each group one human organ system, such as the cardiovascular, respiratory, digestive, nervous, endocrine, or urinary system. Students will prepare a simple working or non-working model using chart paper, clay, thermocol, or other suitable materials, explain the anatomy and physiological functions of the assigned organ system. After the presentation, students shall submit the report in PDF form at through the University ERP Portal within the stipulated time for evaluation.	10
Total		20



Suggested Specification table with Marks (Theory):75

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20%	45%	25%	05%	05%	--

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Recommended References (Preferably Latest Editions):

1. Sembulingam, K. and Sembulingam, P., Essentials of Medical Physiology. Jaypee Brothers Medical Publishers. New Delhi.
2. Guyton, A.C. and Hall, J.E., Textbook of Medical Physiology. Elsevier Saunders, Philadelphia, USA.
3. Tortora, G.J. and Grabowski, S.R., Principles of Anatomy and Physiology. Wiley, Palmetto, GA, USA.
4. Kumar, V., Cotran, R.S. and Robbins, S.L., Basic Pathology. W.B. Saunders Company, Philadelphia.



PRACTICAL HAP-1
CODE: BPHBP11354

Course Code	Course Title			Course Type
BPHBP11354	Human Anatomy, Physiology and Pathophysiology I (Practical)			Core
Credit	Hours Per Week (L-T-P)			Max. Hours
	L	T	P	
1	--	--	3	45
Maximum Marks	MSE			ESE
50	20			30

Legends: CI-Classroom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

COURSE OBJECTIVES:

The objectives of this course are to:

1. Provide fundamental knowledge of the structure and functions of various organ systems of the human body.
2. Understand the mechanisms of homeostasis and their role in maintaining normal physiological functions.
3. Introduce the basic concepts of pathophysiology and the causes of diseases affecting different organ systems.
4. Explain the body's physiological responses to disease-producing agents.
5. Lay the foundation for understanding clinical conditions through the study of functional alterations in organs and systems.

Course Outcomes (CO):

CO No.	Upon successful completion of this course, the students will be able to:
1	Explain the principles, applications, and experimental use of microscopy techniques, and perform basic laboratory experiments related to the nervous system and special senses.



2	Describe the gross morphology, microscopic structure, and coordinated functioning of major human organs and organ systems, emphasizing their roles in maintaining normal physiology.
3	Estimate and interpret key hematological parameters, and explain the mechanisms of homeostasis along with related physiological and pathological disorders.
4	Discuss the etiology and pathogenesis of selected disease states, linking structural and functional changes to clinical manifestations.
5	Identify and explain common diseases with respect to their signs and symptoms, risk factors, diagnostic methods, preventive measures, treatment strategies, and possible complications.

Course Content:

List of practicals

(Minimum 12 experiments must be performed)

Practical HAPP allows the verification of physiological processes discussed in theory classes through experiments on living tissues, simulated videos, models and charts.

1. Study of compound microscopes.
2. Microscopic study of epithelial and connective tissue.
3. Microscopic study of muscular and nervous tissue.
4. Identification of axial bones.
5. Identification of appendicular bones.
6. Introduction to hemocytometry.
7. Demonstration of total blood count by cell analyser.
8. Enumeration and interpretation of white blood cell (WBC) count, differential count.
9. Enumeration and interpretation of total red blood corpuscles (RBC) count.
10. Determination of bleeding time and clotting time.
11. Estimation and interpretation of hemoglobin content.
12. Determination of blood group.
13. Determination and interpretation of erythrocyte sedimentation rate (ESR).



14. Determination of pulse rate, heart rate and blood pressure.
15. Recording and interpretation of ECG.
16. To study the cardiovascular system and integumentary system.
17. Case studies/files of patients with anaemia, thalassemia, haemophilia, leprosy, gout, hypertension and ischemic heart disease.

Recommended References (*Preferably latest editions*):

1. Wilson, K.J.W., *Anatomy and Physiology in Health and Illness*. New York: Churchill Livingstone.
2. Guyton, A.C. and Hall, J.E., *Textbook of Medical Physiology*. Philadelphia: Elsevier.
3. Tortora, G.J. and Grabowski, S.R., *Principles of Anatomy and Physiology*. New York: Wiley.

