UNIVERSITY OF HEALTH SCIENCES, LAHORE

NOTIFICATION

The Academic Council, in its 42nd meeting held on 10th April 2026, on the recommendation of the Board of Studies (Allied Health Sciences) and in exercise of its powers under Section 31.(2)(ii) of the UHS Ordinance 2002, has approved the integration of Basic Sciences Courses (Anatomy, Biochemistry & Physiology) offered in the 1st, 2nd, and 3rd semesters of the 4-year degree programs in Allied Health Sciences into Basic Sciences Foundation Modules I, II, and III, to be distributed over the same semesters.

This decision shall be implemented with effect from the Spring 2026 intake of Session 2025–2026.

REGISTRAR

No. UHS/REG-26/381

Dated: 16-04-2026

Copy forwarded for information to:

i. Principals of affiliated Allied Health Sciences Institutions
ii. Director, Institute of Allied Health Sciences, UHS
iii. Controller of Examinations, UHS
iv. Director Medical Education, UHS
v. Director, Directorate of Undergraduate Studies, UHS
vi. Director Students' Affairs, UHS
vii. PSO to Vice Chancellor, UHS
viii. PS to Pro-Vice Chancellor, UHS

REGISTRAR

Basic Sciences Foundation Course 1: Introduction to Human Structure and Function

Credit Hours: 3

Course Learning Outcomes (CLOs)/Objectives By the end of this course, students will be able to:

1. Explain the general structure of the human body and its organisation.
2. Describe basic physiological functions at the cellular and organ system levels.
3. Understand the chemical basis of life, including biomolecules and enzymes.

Topic	Anatomy	Physiology	Biochemistry
Introduction to Human Body	Descriptive anatomical terms, planes, axes, general body organization		Water, pH balance, buffer systems
	Basic structure of skin, musculoskeletal, vascular and nervous systems.	Basic cell physiology Homeostasis, control mechanisms	
Cell Structure and Function	Cell structure, organelles		Introduction of carbohydrates . Introduction of lipids.
	Histology of Cells, Epithelium, Connective tissue, Cartilage, Bone, Muscle, cardiovascular, Blood and Lymphoid system	Basic functions of cell and its organelles	Cell structure, Cell to cell signaling and cytoskeleton, Receptors
Musculoskeletal System	Overview of bones, muscles, and joints	Muscle physiology, types of muscles, differences between skeletal, smooth and cardiac muscles	Enzyme structure, function, regulation Classifications, functions. regulation and diagnostic significance. Michaelis Menten equation.
	The basic structural overview of the axial and	RMP, Action potential: Origin, phases.	

Basic Sciences Foundation Course 2: Systemic Structure and Function

Credit Hours: 3

Course Learning Outcomes (CLOs)/Objectives

By the end of this course, students will be able to:

1. Explain the structure and function of major organ systems.
2. Discuss physiological mechanisms governing different systems.
3. Apply biochemical concepts to understand metabolism and energy production

Topic	Anatomy	Physiology	Biochemistry
Digestive System	Gross anatomy of GIT organs. Basic structural overview of Oral Cavity, pharynx, esophagus, stomach, small, large intestine and major abdominal viscera.	Basic structure and functions of alimentary tract, GI motility (small and large intestine) secretions of saliva and gastric juice, vomiting reflex, defecation reflex	Carbohydrate metabolism),digestion Glycolysis, TCA (Tricarboxylic acid cycle) Gluconeogenesis, Glycogen metabolism, metabolism of monosaccharaide and disaccharides, Pentose phosphate shunt. Glycosaminoglycan and Glycoproteins
Cardiovascular System	Basic structural overview of Heart, Pericardium, arterial, venous and Lymphatic system	Properties of myocardium, rhythmical generation of cardiac impulse, tachycardia and bradycardia, cardiac cycle, heart sounds. Classification and functions of blood vessels, [illegible] of	Dietary Lipid metabolism, Fatty acid metabolism Cholesterol metabolism

Reproductive System	Basic structural overview of Male: Testis, spermatic cord, penis and prostate Female: Ovaries, fallopian tubes, uterus, vagina, vulva and breast	Hormonal control of reproduction Spermatogenesis Menstrual cycle	Biochemical basis of fertility and pregnancy
Metabolic Integration		**Skin and body temperature** Functions of skin, mechanisms of heat production and heat loss, role of hypothalamus	**Vitamins, minerals and diabetes mellitus** Metabolic disorders, diabetes mellitus

BASIC SCIENCE FOUNDATION COURSE: INTRODUCTION TO HUMAN STRUCTURE AND FUNCTION (ANATOMY)- COURSE 1

Topics	Learning objectives: At the end of the session students should be able to:	MCQs	No. of Lectures (45 min)
Descriptive anatomical terms, planes, axis, general body organization	Describe & demonstrate the "Anatomical Position"	6	1
	Describe the anatomical terms both regional & directional.		
	Describe the anatomical planes of body.		
	Describe the organization of skeleton in human body		
	Identify the principal bones of axial & appendicular skeleton		
	State the boundaries of four body cavities.		
	Enlist the content of the body cavities.		
Skin	Describe the structure and function of Skin based on its two layers; Epidermis and Dermis	1	1
	List the sensory nerve endings		
	Enlist the appendages of skin		
Cell structure & organelles	Draw & label the fluid mosaic model of plasma membrane.	1	1
	Describe the structure of the following cellular organelles. 1. Nucleus 2. Mitochondria 3. Ribosomes 4. Endoplasmic reticulum (rough & smooth) 5. Golgi apparatus 6. Lysosomes		
	Enlist the structural components of cytoskeleton.		
	List in order the different stages of cell cycle.		
	Describe the different stages of cell cycle.		
Epithelium	Classify types of tissues.	1	1
	Classify and exemplify the epithelial tissue with their histological structure, locations, and functions.		
	Outline the structure and function of epithelial membranes		
	Differentiate the exocrine and endocrine glands		

	Give the structural classification of exocrine gland with example of each		
Connective tissue	Describe the histological structures of various types of cells of connective tissue.	1	1
Cartilage	Classify and exemplify the cartilages with their histological structure, locations, and functions.	6	1
Musculoskeletal System i) Muscle tissue	Classify and exemplify the muscles with their histological structure, locations, and functions.	1	1
ii) Bone	Describe, identify, and exemplify the bone according to their shape and structure bones.	1	2
	Outline the structure of long bone		
	Draw and label the structure of mature long bone		
	Outline the structure of compact and spongy bone tissue.		
	Enumerate various types of bone cells.		
	Outline the blood supply and nerve supply of bones.		
	Outline the development of long bones.		
	Briefly describe the remodelling of bones		
	Briefly describe the salient features of common types of fractures on X rays		
	List and describe the different stages of bone healing		
	Briefly dDescribe the factors that delay fracture healing.		
	Identify the various bony landmarks.		
Axial skeleton	Identify the bones of the skull.	2	1
	List the sinuses and give their functions		
	Outline the characteristics of typical vertebrae		
	Outline the characteristics of region-specific vertebrae.		
	Describe the structure of vertebral column		
	Describe the salient features of the vertebral column		
	Identify the bone forming thoracic cage.		
Appendicular skeleton	Identify the bone forming the appendicular skeleton		1
	State the characteristic features of shoulder girdle, bones of upper limb, pelvic girdle, and bones of lower limb.		
	Describe the arches of foot		
	Outline the difference in structure between the male & female pelvis		

Joints	Outline the characteristics of fibrous & cartilaginous joints	1	1
	Give the salient features of synovial joints		
	Describe and exemplify the different types of synovial joints		
	Appreciate the articulating surfaces of joints of upper & lower limbs along with their movements		
Muscles	Enlist the following muscles of the body & outline their functions. Muscles of the face & neck Muscles of the back Muscles of the anterior abdomen wall Muscles of thorax Muscles of pelvic floor Muscles of the shoulder and upper limb Muscles of the hip & lower limb	2	3
Blood Vessels	Describe the structure of arteries, veins & capillaries	7	1
Circulation	Describe the circulation of blood through the lung, naming the main vessels involved.		1
	List the arteries supplying blood to all major body structure		
	Outline the venous drainage involved in returning blood to heart from the body		
	Explain the arrangement of blood vessels relating to portal circulation		
Lymphatic system	Identify location & functions of main lymphatic vessels of the body		1
	Describe the composition, circulation, and the main function of lymph		
	Describe the location & anatomical structure of lymph node, spleen, thymus, and mucosa associated lymphoid tissue.		

BASIC SCIENCES FOUNDATION COURSE 2

System	Topic	Gross Anatomy-Learning objectives	MCQs	No. of Lectures (45 Min)
Gastrointestinal System	Basic structure of GIT	Define gastrointestinal tract. Describe the basic four layers of gastrointestinal tract.	9	1
	Oral cavity	Identify the boundaries of oral cavity		
		Describe the salient features of the tongue		
		Enlist the salivary glands by mentioning their location and basic histological structure		
	Pharynx	Define pharynx and identify its subdivision along with its blood supply and nerve supply		
	Esophagus	State the structure of esophagus with its blood supply.		1
	Stomach	Describe the structure, relations and blood supply of stomach		
	Small intestine	Define small intestine by naming its subdivisions, location and blood supply		1
	Large intestine	Describe the structure, subdivisions and blood supply of large intestine		
	Liver	Describe the structure, relations and blood supply of liver		1
	Biliary tree	State the structure and blood supply of gall bladder and bile duct		
	Pancreas	Describe pancreas by highlighting its exocrine and endocrine structure along with its blood supply		

System	Topic	Gross Anatomy-Learning objectives	MCQs	No. of Lectures (45 Min)
Cardiovascular System	Blood Vessels	Define basic structure of blood vessels by highlighting the difference between arteries and arterioles	7	1
		Define anastomosis and end arteries		

		Define the basic structure of capillaries		
		Define the basic structure of veins and venules		
	Pericardium	Define pericardium and state its layers		
	Heart	Describe the structure, relations and internal features of the heart		1
		Describe the blood supply and nerve supply of heart		
General circulation	Aorta	Describe aorta along with its major branches	3	2
	Head & Neck	Identify the arterial supply and venous return of head and neck		
	Upper limb	Identify the major arteries and veins supplying the upper limb		
	Lower limb	Identify the major arteries and veins supplying the lower limb		2
	Abdomen	Identify paired and unpaired branches of abdomen highlighting their area of supply		
		Identify portal vein by mentioning its role in portal circulation		
	Pelvis	Identify major vessels supplying the pelvis		

System	Topic	Gross Anatomy Learning objectives	MCQs	No. of Lectures (45 Min)
Respiratory System	Nasal cavity	Define the boundaries and openings of nasal cavity	6	1
	Pharynx	Define pharynx and its subdivisions. Name the structures associated with pharynx and name its blood supply		
	Larynx	Describe the structure, relations, blood supply and nerve supply of larynx		1
	Trachea	Describe the structure, relations, blood supply and nerve supply of trachea		
	Pleura	Describe pleura and pleural cavity.		1
	Lungs	Describe bronchopulmonary segment. Name the structural changes taking place in the bronchial tree from the primary bronchi to alveoli and mention its nerve supply		1

	Intercostal muscles	State intercostal muscles		1
	Diaphragm	Define diaphragm and mention its nerve supply		

System	Topic	Gross Anatomy- Learning objectives	MCQs	No. of Lectures (45 Min)
Renal/Urinary system	Kidney	Describe the structure and relations of kidney.	5	1
		Define a nephron with special emphasis on its microscopic structure.		
	Ureter	Describe the structure of ureter		1
	Urinary bladder	Describe the structure and relations of urinary bladder		
	Urethra	Define urethra by mentioning the difference between male and female urethra		1

Foundation Anatomy Course 3: Integrated organ system approach

System	Topic	Gross Anatomy- Learning objectives	MCQs	No. of Lectures (45 Min)
Endocrine System	Introduction	Identify the major endocrine glands (pituitary, thyroid, parathyroid, adrenal, pancreas, and gonads) and locate them on specimens and models	3	1
	Pituitary Gland (Hypophysis Cerebri)	Describe the divisions of the pituitary (adenohypophysis and neurohypophysis) and their relations. Identify the neurovascular supply. Briefly describe neuro-hormonal control of the pituitary gland. Enlist the secretions of acidophils, basophils, and chromophobes in the anterior lobe (adenohypophysis).		
	Thyroid gland	Describe the gross features and the relations of thyroid. Identify main hormones & neurovascular supply of the gland		1

	Parathyroid glands	Describe the gross features and the relations of parathyroid glands. Identify main hormones & neurovascular supply of the gland		
	Adrenal (Suprarenal) Gland	Describe the gross features and the relations of adrenal gland. Identify main hormones & neurovascular supply of the gland		1
	Pancreas	Describe the gross features and the relations of gland. Identify main hormones & neurovascular supply of the gland		
	Pineal gland	Describe the gross features and the relations of gland. Identify main hormones & neurovascular supply of the gland		
Nervous system	Introduction	Identify the main gross anatomical features of central and peripheral nervous system on models/ cadaveric specimens	6	1
		Differentiate between somatic and autonomic divisions based on structure and function.		
		Differentiate between myelinated and un-myelinated axons		
		Define neuroglial cells and enlist their main functions		
	Autonomic Nervous System	Differentiate the sympathetic and parasympathetic parts of autonomic nervous system		1
	CSF, Meninges & Ventricular System	Define meninges and cerebrospinal fluid (CSF)		1
		Enlist the ventricles of the central nervous system		
		Correlate CSF function to brain protection and homeostasis		
	Cerebrum	Identify the lobes (frontal, parietal, temporal, occipital, insula).and principal sulci (central sulcus, parieto-occipital, lateral) of the brain	2	1
		Enlist the vascular supply of the cerebrum		
	Basal Nuclei	Enlist the components forming the basal nuclei		1
	Diencephalon	Enlist the components of the Diencephalon		

	Brain stem	Identify the general features of each part. (midbrain, pons, and medulla oblongata)	2	1
		Define Reticular formation		
	Cerebellum	Identify the gross features (lobes and vermis) of cerebellum		1
	Spinal cord	Identify the gross structure of the spinal cord	2	2
		List the ascending and descending tracts		
		Define the simple reflex arc		
Special senses	Ear	Identify the main gross anatomical features of ear, eyes and nose on models/ cadaveric specimens	7	1
		Enlist the gross features of the external, middle and internal ear		
		Describe the neurovascular supply of the external, middle and internal ear		
	Eye	Describe the gross structure of the eyeball		1
		Tabulate the extraocular muscles with their nerve supply, and actions.		
		Identify the layers of the retina under the microscope (pigmented layer, photoreceptors, bipolar, and ganglion cells).		
		Identify the neurovascular supply of the eye		
		Identify the gross features of the lacrimal apparatus		
	Nose	Identify the gross features of nasal cavity		1
	Taste buds	Briefly describe the gross structure of tongue and taste buds		

System	Topic	Gross Anatomy- Learning objectives	MCQs	No. of Lectures (45 Min)
Reproductive system	Introduction	Identify the main gross anatomical components of male and female reproductive systems on models/ cadaveric specimens	5	2

	Female reproductive system	List the main organs of the female reproductive system — ovaries, uterine tubes, uterus, vagina, and external genitalia.		
		Identify the position, neuro-vascular supply and relations of the uterus, including its supports (ligaments).		
		Briefly describe the secretory changes in the endometrium during the menstrual cycle		
		Briefly describe the structure, neuro-vascular supply and parts of the uterine (fallopian) tubes and their role in gamete transport.		
		Briefly describe the location, structure and of the ovaries and their relation to the pelvic wall.		
		Briefly describe the structure of the vagina and its lining epithelium with blood supply		
		Briefly describe the structure, neuro-vascular supply of the breast		
	Male Reproductive system	List the components of the male reproductive system, including the testes, epididymis, vas deferens, seminal vesicles, prostate gland, urethra, and penis.	3	1
		Describe the coverings of the testes and outline its location within the scrotum.		
		Describe the neuro-vasculature of testes		
		Briefly describe the structure of seminiferous tubules under the microscope and differentiate spermatogenic cells in various stages of development.		
		Briefly describe the structure, position, and relations of the accessory glands — seminal vesicles, prostate, and		

		bulbourethral glands — and their secretions.		

Reference book: Ross & Wilson anatomy & physiology

3-CREDIT HOURS
Basic Sciences Foundation Course 1
INTRODUCTION TO HUMAN STRUCTURE AND FUNCTION

Learning Outcomes/Objectives:
By the end of this course, BSc-Hons students will be able to:

- Demonstrate an understanding of the structural and functional organization of cells and mechanisms maintaining homeostasis.
- Explain fundamental principles of nerve and muscle physiology.
- Describe the elemental composition and functions of blood, including defence and haemostatic mechanisms.
- Outline the physiological basis of respiration and gas exchange.

Physiology Course Content:	LOs	MCQs	No. of Lectures (45 minutes)
CELL AND HOMEOSTASIS	• Explain the basic structure of a cell and list its organelles • Explain the function of mitochondria, Golgi apparatus, endoplasmic reticulum, and ribosomes. • Enlist the functions of lysosomes and peroxisomes and give their differences • Explain the functions of the cell membrane and draw its structure. • Define homeostasis. What is a negative feedback mechanism? Explain with examples. • What is a positive feedback mechanism? Explain with the help of examples. • Define adaptive control (feed-forward control)	3	3

	and explain with the help of an example.		
NERVE AND MUSCLE	• Describe the Physiological basis of the generation of RMP. • Describe the Physiological anatomy of Neurons • Define and explain the phases of action potential • Explain absolute and relative refractory period • Differentiate b/w skeletal, smooth, and cardiac muscle • Describe the structure of Sarcomere • Differentiate between isometric and isotonic contraction by giving examples. • Describe the physiological anatomy of the Neuro Muscular Junction (NMJ) • Explain the mechanism of Neuromuscular transmission & generation of End Plate Potential. • Explain the mechanism of contraction of skeletal muscles. • Describe the mechanism of smooth muscle contraction. • Explain the LATCH mechanism. Describe	10	6

	the significance of the LATCH mechanism		
BLOOD PHYSIOLOGY	• Enumerate the functions of blood. • Give the composition of blood • Enumerate the plasma proteins. List the functions of plasma proteins • Discuss the characteristics of red blood cells. • Enumerate the different sites of erythropoiesis at different ages • Enumerate factors that regulate erythropoiesis (briefly explain the role of vitamin B12, Folic acid, and Intrinsic factor in the maturation of red blood cells • Enumerate different blood group types and explain the basis of ABO and Rh blood system • List the Hazards of mismatched blood transfusion. • List the Hazards of blood transfusion • Explain causes of iron deficiency anemia, megaloblastic anemia, aplastic anemia, and hemolytic anemias • Discuss the effects of anemia on the body	10	8

	• Define hemostasis and enumerate the mechanisms by which hemostasis is secured • Explain the characteristics and functions of platelets • Enlist the clotting factors • Define and list the causes of thrombocytopenia • Name the anticoagulants used in the laboratory and the factors that prevent intravascular clotting • Classify white blood cells and give their salient functions • Define immunity and enumerate its types (Innate immunity, Acquired immunity) • Define humoral immunity and cell-mediated immunity, explaining which cells are involved in each type of immunity. • What is passive immunity? Give its examples.		
RESPIRATION	• Enlist the muscles of inspiration and expiration in quiet and labored breathing. • Explain the mechanics of pulmonary ventilation • Define and explain lung compliance	7	5

	• Define different lung volumes and capacities & tell their normal values. • Define alveolar, pleural, and trans-pulmonary pressure. • Explain the different forms of transport of oxygen in the blood • Draw and explain the oxyhemoglobin dissociation curve • Enlist different forms in which Carbon dioxide is transported and explain its transport in the blood		
		30	22 lectures

Recommended Instructional / Reading Materials:

1. Guyton and Hall Text book of Physiology 15th ed
2. Ross and Wilson Anatomy and Physiology in Health and Illness, 13th ed.

BASIC SCIENCES FOUNDATION COURSE 2
SYSTEMIC STRUCTURE AND FUNCTION
CREDIT HOURS: 3

Learning Outcomes/Objectives:

By the end of this course, BSc-Hons students will be able to:

1. Explain the structure and function of major organ systems.
2. Discuss physiological mechanisms governing different systems.
3. Apply biochemical concepts to understand metabolism and energy production.

Physiology Course Content:	Los	MCQs	No. of Lectures (45 minutes)
HEART AND CIRCULATION	• Explain the structure and properties of myocardial muscles. • Name the components of the conducting system of the heart and the sequence of nerve impulse conduction • Explain the action potential in the ventricular musculature along with the help of a diagram. • Define tachycardia and bradycardia and list their causes. • Define and explain the phases of the cardiac cycle with the help of a diagram. • Name normal heart sounds and discuss the mechanism of their production • Classify the blood vessels and give their functions. • Enlist the types of blood flow.	11	11

	• Define blood pressure and make a flow chart to show how blood pressure is regulated in response to hemorrhage and postural changes. • Make a flow chart to show the role of the renin angiotensin system in the regulation of arterial blood pressure. • Define shock and list the causes of cardiogenic shock, hemorrhagic shock, neurogenic shock, septic shock, and anaphylactic shock.		
RENAL PHYSIOLOGY & BODY FLUIDS	• Describe the composition of intracellular and extracellular fluids • Explain the functions of the kidney • Enlist the steps of urine formation • Explain the physiological anatomy and functions of the glomerular capillary membrane • Define Glomerular Filtration Rate (GFR) and discuss the composition of filtrate • Enlist the determinants of GFR. • Define and explain micturition reflex	9	6
GIT	• Classify the components of the enteric nervous system	8	4

Basic structure and functions of alimentary tract, GI motility (small and large intestine), secretions of saliva and gastric juice, vomiting reflex, defecation reflex	• Explain the functions of myenteric and Meissner's plexuses • Enlist the hormones of GIT and explain the actions of each • Enumerate different types of movements that occur in GIT • Explain the storage function of stomach • Enlist the functions of saliva • Enumerate the types of movements taking place in colon • Describe the stages of vomiting act and vomiting reflex • Define and explain defecation reflex		
SKIN AND BODY TEMPERATURE	• Enlist the mechanisms of heat production and mechanisms of heat loss. • Explain the role of hypothalamus in temperature regulation. • Explain the mechanism of fever	2	1
		30	22

Recommended Instructional / Reading Materials:

3. Guyton and Hall Text book of Physiology 14th ed
4. Ross and Wilson Anatomy and Physiology in Health and Illness, 13th ed.

BASIC SCIENCES FOUNDATION COURSE 3:
INTEGRATED ORGAN SYSTEM APPROACH
CREDIT HOURS :3

Learning Outcomes/Objectives:

By the end of this course, BSc-Hons students will be able to:

4. Explain the structure and function of major organ systems.
5. Discuss how different organ systems interact to maintain homeostasis

Physiology Course Content:	Los	MCQs	No. of Lectures (45 minutes)
CNS & ANS	• Explain the types of neurons • Name and explain the types of synapses • Briefly explain the mechanism of nerve impulse transmission through the synapse. • Explain sensory and motor areas of the cortex. • Enlist different parts of the Basal ganglia and enumerate their functions. • Enlist the functions of cerebellum. • Enlist the functions of the thalamus and hypothalamus. • Classify the autonomic nervous system and list the functions of its components on Eye, Heart, arterial pressure, blood vessels, gastrointestinal tract and lungs	11	8
SPECIAL SENSES (EYE)	• Define the visual acuity and Emmetropia. Enlist	5	3

	and explain the errors of refraction • Explain the normal intraocular pressure and name the method for measuring the intraocular pressure • Enlist the causes and features of glaucoma • Describe the physiological anatomy and functions of the retina • Explain the location of the optic disc and its significance • Trace the visual pathway, the defects of the visual pathway • Explain the mechanism of accommodation		
ENDOCRINOLOGY	• Enlist endocrine organs and classify the hormones based on chemical nature. • Name the hormones of the anterior pituitary and the posterior pituitary. • Enlist the functions of the Growth hormone, antidiuretic hormone and oxytocin. • Enlist the functions of thyroid hormone • Name the hormones of the adrenal cortex. • Enlist the functions of cortisol	10	7

	• Enumerate the types of pancreatic cells with their hormones. • Enlist the functions of insulin, glucagon, and parathormone • Explain the functions of Vitamin D		
REPRODUCTION	• Define spermatogenesis. Explain the role of different hormones in spermatogenesis • Explain the site of secretion and functions of testosterone in intrauterine life and after birth • Enlist the functions of Estrogen and progesterone • Explain the female monthly cycle and the role of the hormones in different phases of the cycle	4	4
TOTAL		30	22

Recommended Instructional / Reading Materials:

5. Guyton and Hall Text book of Physiology 14th ed
6. Ross and Wilson Anatomy and Physiology in Health and Illness, 13th ed.

Basic Sciences Foundation COURSE 1: Introduction to Human Structure and Function

Credit hours:1 Biochemistry

Topic	Content	Biochemistry Learning Objectives	MCQ	Number of Lectures
Introduction to human body	1.Introduction of Carbohydrates 2, Introduction of Lipids	• Classify carbohydrates along with the structure and biomedical importance of each class • Classify lipids and fatty acids. Discuss the biomedical functions of lipids and fatty acids	4 4	3 3
Cell structure and function	1.Cell structure, cell to cell signalling and cytoskeleton, Receptors 2.Enzyme structure, function, regulation, and diagnostic significance, Michaelis Menten equation.	• Describe the composition and structure of cell on biochemical basis Describe cell to cell communications and cell signalling pathways (Gs, Gq) • Classify enzymes according to the reaction they catalyse and their nomenclature Explain the mechanism of enzyme action from reactants to products (catalysis). Explain the regulation of enzymatic activity (Michaelis Menten) Explain the role of enzymes in clinical diagnosis. • Classify amino acids based on polarity,	5 4 5	2 3

	3.Amino acids, structure and functions of proteins	nutritional importance and glucogenic/Ketogenic properties Classify proteins on the basis of functions, solubility and physicochemical properties • Explain the structural levels of proteins		3
Blood, Lymphatic and circulation	1.Haemoglobin structure, oxygen transport 2.GAG &Glycoprotein	• Describe the structure of haemoglobin Explain the process of oxygen transport to tissues by haemoglobin and oxy haemoglobin curve • Describe structure, functions and clinical significance of glycosaminoglycans and glycoproteins	2 4	2 2
Respiration	1.Water, pH balance, buffer systems	• Define pH, pKa.Discuss Henderson Hesselbach equation. Discuss different types of buffers and their role in maintaining pH under acidic and alkaline conditions.	2	2

Basic Sciences Foundation Course 2 Biochemistry: Systemic Structure and Function

Topic	Content	Biochemistry Learning Objectives	MCQ	Number of Lectures
Digestive System	1. Carbohydrate metabolism, Glycolysis, TCA Cycle, 2. Electron transport chain	• Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle • Discuss regulation of glycolysis and TCA pathway • Discuss oxidative phosphorylation and electron transport chain	9	8
Cardiovascular System	1.Digestion and absorption of dietary lipids, Transport of lipids	• Describe the Digestion of dietary lipids • Describe the absorption of dietary lipids • Describe the transport and storage of lipids	8	3

Renal, Urinary System	1.Digestion and absorption of dietary proteins, Transport of ammonia in liver, Urea Cycle	• Describe the digestion and absorption of proteins & uptake of amino acids by cells • Role of pyridoxal phosphate, glutamate, glutamine, alanine in ammonia transport • Illustrate steps of urea cycle with enzymes and its importance • Discuss the regulation of urea cycle	9	

BASIC ORGAN SYSTEM SCIENCES FOUNDATION COURSE 3: INTEGRATED APPROACH BIOCHEMISTRY

Topic	Content	Biochemistry Learning objectives	MCQ	Number of Lectures
Endocrine System	Hormonal regulation of carbohydrate, protein and lipid metabolism	• Discuss the hormonal regulation of carbohydrate, protein and lipid metabolism	8	3
Nervous System	DNA, RNA	• Describe the structure and different forms of DNA. • Describe the structure and functions of different types of RNA • Differentiate between nucleoside and nucleotide and RNA and DNA	8	2
Reproductive System	Biochemical basis of fertility and pregnancy	• Discuss mechanism of action of hormones in birth control (oral Contraceptives) • Discuss role of hormones in pregnancy	7	2
Metabolic Integration	Feed-fast cycle	• Define the feed–fast cycle and explain its importance in maintaining energy homeostasis. • Describe the metabolic changes in the fed (absorptive) state • Explain the metabolic adaptations in the post-absorptive (early fasting) state • Discuss the metabolism in prolonged fasting/starvation state	7	3