

# STUDY GUIDE

## Cardiovascular & Respiratory - I Module

Block - III

1<sup>st</sup> Year MBBS



Department of Medical Education  
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## **1. List of Abbreviations**

<b>Abbreviations</b>	<b>Subjects</b>
A	Anatomy
ABG	arterial blood gas
Ag	Aging
AKI	acute kidney injury
ALT	alanine transaminase
AMP	Adenosine monophosphate
ANS	Autonomic Nervous System
AST	aspartate aminotransferase
AV	Atrioventricular
B	Biochemistry
BhS	Behavioral Sciences
C	Civics
CBC	Complete Blood Count
C-FRC	Clinical-Foundation Rotation Clerkship
CK	Creatine kinase
CM	Community Medicine
CNS	Central Nervous System
CO	Carbon monoxide
CO <sub>2</sub>	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular

ECG	Electrocardiography
ECP	Emergency contraceptive pills
EEG	Electroencephalogram
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
ER	Emergency Room
F	Foundation
FEV1	Forced Expiratory Volume 1
FM	Forensic Medicine
FVC	Forced Vital Capacity
GFR	Glomerular Filtration Rate
GIT	Gastrointestinal tract
GMP	guanosine monophosphate
GO	Gynecology and Obstetrics
GTO	Golgi Tendon Organ
HCL	Hydrochloric acid
H & E	Hematoxylin and eosin
HL	Hematopoietic & Lymphatic
HMP	Hexose Monophosphate
HNSS	Head & Neck and Special Senses
ICF	Intra Cellular Fluid
IL	Interleukin
IN	Inflammation
INR	International Normalized Ratio
IUD	Intrauterine device
IUGR	Intra Uterine Growth Restriction

MSD	Musculoskeletal disorders
NEAA	non-essential amino acids
NMJ	Neuro Muscular Junction
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
PAF	Platelet activating factor
PBL	Problem Based Learning
PCR	Polymerase Chain Reaction
PDGF	Platelet derived growth factor
Pe	Pediatrics
PEM	Protein Energy Malnutrition
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
PNS	Peripheral Nervous System
Psy	Psychiatry
PVC	Premature Ventricular Contraction
QALY	Quality-Adjusted Life Year
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
RBCs	Red Blood cells
RDA	Recommended Dietary Allowance
Re	Respiratory

## 2. Curriculum 2k23 Framework

YEAR	MODULES
YEAR 1	<ul style="list-style-type: none"> <li>• Foundation-1</li> <li>• Hematopoietic &amp; Lymphatic</li> </ul> <p style="text-align: right;"><b>Block 1</b></p>
	<ul style="list-style-type: none"> <li>• Musculoskeletal &amp; Locomotion-1</li> </ul> <p style="text-align: right;"><b>Block 2</b></p>
	<ul style="list-style-type: none"> <li>• Cardiovascular-1</li> <li>• Respiratory-1</li> </ul> <p style="text-align: right;"><b>Block 3</b></p>
	<ul style="list-style-type: none"> <li>• PERLs 1</li> <li>• Quran-1</li> <li>• Islamiyat &amp; Pak Studies</li> </ul> <p style="text-align: right;"><b>Will be taught throughout the year</b></p>
	<ul style="list-style-type: none"> <li>• Clinical Skills Foundation</li> </ul> <p>C-FRC 1 (Clinical – Foundation, Rotation, Clerkships)</p>
YEAR 2	<ul style="list-style-type: none"> <li>• GIT &amp; Nutrition</li> <li>• Renal</li> <li>• Endocrinology &amp; Reproduction</li> <li>• Neurosciences</li> <li>• Head &amp; Neck, Special Senses</li> <li>• Inflammation</li> <li>• PERLs - 2</li> <li>• Quran-2</li> <li>• Islamiyat &amp; Pak Studies</li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Skills Foundation</li> </ul> <p>C-FRC 2 (Clinical – Foundation, Rotation, Clerkships)</p>
YEAR 3	<ul style="list-style-type: none"> <li>• Foundation-2</li> <li>• Infectious Diseases</li> <li>• Neoplasia</li> <li>• Musculoskeletal &amp; Locomotion-2</li> <li>• Hematopoietic, Immunity &amp; Transplant-2</li> </ul>

	<ul style="list-style-type: none"> <li>• Cardiovascular-2</li> <li>• Respiratory-2</li> <li>• Forensic medicine</li> <li>• Community Medicine &amp; family Health-1</li> <li>• PERLs - 3</li> <li>• Quran-3</li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Rotations</li> </ul> <p>C-FRC 3 (Clinical – Foundation, Rotation, Clerkships)</p>
<b>YEAR 4</b>	<ul style="list-style-type: none"> <li>• Renal-2</li> <li>• Endocrine &amp; Reproduction-2</li> <li>• GIT &amp; Nutrition-2</li> <li>• Neurosciences-2</li> <li>• Maternal &amp; Child Health</li> <li>• Ophthalmology</li> <li>• Otorhinolaryngology</li> <li>• Community Medicine &amp; family Health-2</li> <li>• Psychiatry &amp; Behavioral Sciences</li> <li>• PERLs - 4</li> <li>• Quran-4</li> <li>• <b>Electives</b></li> <li>• <b>BLS workshop</b></li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Rotations</li> </ul> <p>C-FRC 4 (Clinical – Foundation, Rotation, Clerkships)</p>
<b>YEAR 5 (Clerkships)</b>	<ul style="list-style-type: none"> <li>• Gynecology &amp; Obstetrics</li> <li>• Pediatrics</li> <li>• Medicine</li> <li>• Surgery</li> </ul> <p><b>Clinical Clerkships</b> C-FRC 5 (Clinical – Foundation, Rotation, Clerkships)</p>

### **3. Introduction to Study Guide**

The study guide serves several crucial purposes:

**1. Communicating information on the organization and management of the module:**

This aids students in identifying the appropriate point of contact in case they encounter any difficulties during the semester.

**2. Defining the objectives expected to be achieved by the end of the module:**

It outlines clear learning goals, ensuring that students understand what is expected of them academically.

**3. Identifying the learning strategies employed to achieve module objectives:**

These strategies may encompass various methods such as lectures, small group sessions, clinical skills practice, demonstrations, tutorials, and case-based learning.

**4. Providing a list of learning resources:**

Students are offered a comprehensive list of resources, including books, computer-assisted learning programs, web links, and journals. These resources empower students to maximize their learning potential.

**5. Highlighting information on the contribution of continuous assessment and semester examinations:**

This section emphasizes the significance of ongoing assessments and final exams in determining a student's overall performance in the module.

**6. Including information on assessment methods:**

Details about the various assessment methods employed to evaluate students' progress in achieving the objectives are outlined.

**7. Focusing on examination policies, rules, and regulations:**

This section clarifies the policies and regulations governing examinations, ensuring that students are well-informed about the rules they must adhere to during their assessments.

By providing students with this comprehensive guide, educational institutions aim to enhance their learning experience, facilitate effective academic management, and foster compliance with academic standards and regulations.



#### **4. Block-3 Module Committee**

<b>BASIC HEALTH SCIENCES</b>	<b>CLINICAL SCIENCES</b>
<b>Anatomy:</b> Prof. Dr. Quddus Ur Rehman	<b>Medicine:</b> Prof. Dr. Ghulam Abbas Sheikh
<b>Physiology:</b> Prof. Dr. Qamar Mehboob	<b>Surgery:</b> Prof. Dr. Asrar
<b>Biochemistry:</b> Prof. Dr. Shakeel Ahmad	<b>Radiology:</b> Dr Shemoona
<b>Community Medicine:</b> Prof. Dr. Humayun Suqrat	<b>Gynecology:</b> Prof. Dr. Nazia Mussarat
<b>Pathology:</b> Prof. Dr. Kashif Baig	
<b>Pharmacology:</b> Dr. Sarwat Jahan	
<b>Behavioral Sciences:</b> Dr. Yawar	
<b>Medical Education:</b> Dr. Ayesha Sadiq	

<b>Block Coordinator</b>	<b>Dr. Hania</b>
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<b>Principal AFMDC</b>	<b>Prof. Dr. Ghulam Abbas Sheikh</b>
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# CARDIOVASCULAR-1 MODULE

## **5. Introduction of Cardiovascular-I Module**

Welcome to the Cardiovascular Module, an essential component of our comprehensive medical education program. In this module, we will embark on a journey through the intricacies of the cardiovascular system, exploring its vital functions, components, and the various conditions that can affect it.

The cardiovascular system, often referred to as the circulatory system, is one of the most critical systems in the human body. It plays a fundamental role in maintaining overall health and sustaining life by ensuring the efficient transport of oxygen, nutrients, hormones, and waste products throughout the body. Understanding this system is pivotal for healthcare professionals and anyone interested in learning about the complexities of human physiology.

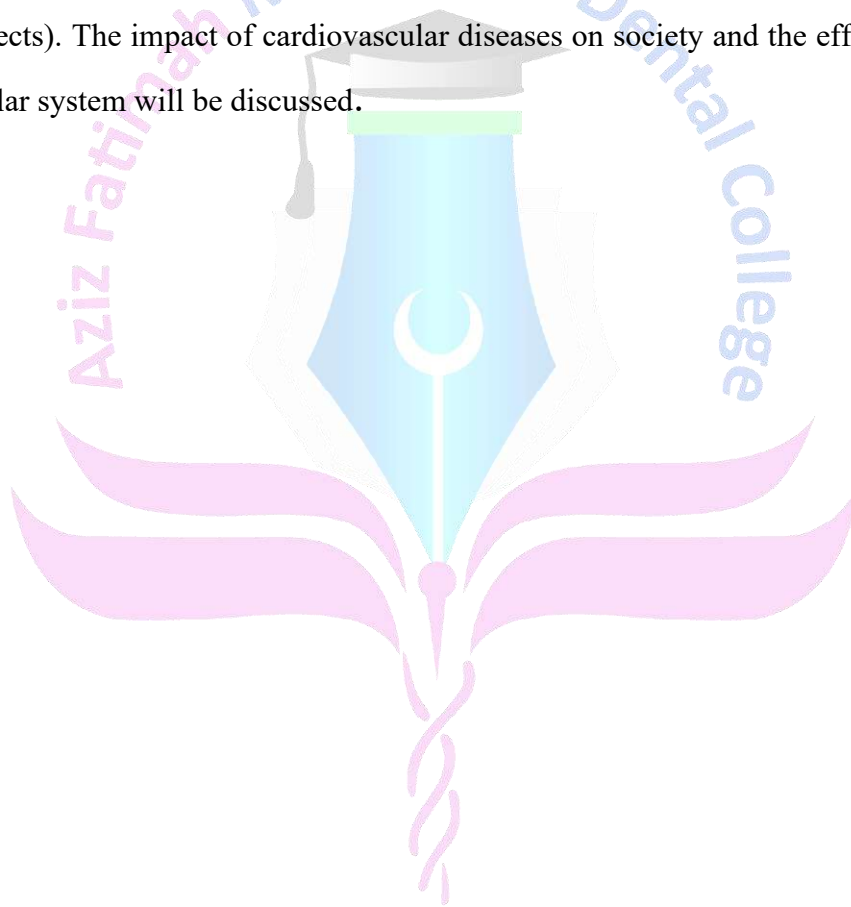
Throughout this module, we will delve into the anatomy and physiology of the heart, blood vessels, and blood, laying the foundation for a comprehensive understanding of how the cardiovascular system functions. We will explore the various diseases and disorders that can affect this system, ranging from common conditions like hypertension and atherosclerosis to more complex issues such as congenital heart defects and arrhythmias.

Moreover, we will discuss diagnostic tools and imaging techniques used to assess cardiovascular health, as well as therapeutic approaches, including lifestyle modifications, medications, and surgical interventions. By the end of this module, you will have a solid grasp of the cardiovascular system's intricacies, enabling you to recognize, evaluate, and manage cardiovascular conditions effectively.

Whether you are a medical student, healthcare practitioner, or simply someone passionate about health and well-being, this Cardiovascular Module aims to equip you with the knowledge and skills necessary to make informed decisions and contribute to the promotion of cardiovascular health. So, let's embark on this educational journey together, as we unravel the mysteries of the human heart and its circulatory network.

## 5.1. Module Rationale

Cardiovascular system comprises the study of the heart & circulatory system. The initial learning activities will help in understanding the normal structure & development of the organs of the system. Understanding of anatomical details of each component of CVS will be accompanied by study of normal physiological mechanisms. This will help in better understanding the possible pathological conditions of the system, including some of the most prevalent conditions in society like ischemic heart disease, hypertension, shock, heart block, heart failure. This will be followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of cardiovascular diseases on society and the effect of aging on cardiovascular system will be discussed.



## 5.2. Module Outcomes

At the end of this module the students will be able to:

- Describe the normal structure of heart including development, topographical anatomy, neurovascular supply, and histology.
- Review the arrangement of circulatory system (arteries, veins, lymphatics).
- Define the congenital anomalies of cardiovascular system with reference to normal development and early circulation.
- Define functions of cardiac muscle along with its properties
- Interpret pressure changes during cardiac cycle along with regulation of cardiac pumping.
- Interpret normal & abnormal ECG, ST-T changes, and its abnormalities.
- Identify the risk factors and role of lipids in coronary blockage and atherosclerosis (hyperlipidemia/ dyslipidemia).
- Define cardiac output and its modulating/controlling factors.
- Differentiate left and right sided heart failure and correlate it with the importance of pressure differences.
- Enumerate different types of arrhythmias and describe the electrical events that produce them.
- Discuss the psychosocial impact of cardiovascular diseases in society

## 5.3. Learning Objectives

### 5.3.1. Knowledge

#### ➤ Anatomy

Topic	Sub Topic	Learning objectives
Gross Anatomy	Mediastinum	<ul style="list-style-type: none"> <li>Define mediastinum giving its boundaries and Compartments. List the contents of its various Compartments</li> <li>Describe the formation, tributaries, and termination of superior vena cava</li> <li>Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta</li> <li>Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches</li> <li>Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins.</li> <li>Describe the course, relations, and distribution of vagus and thoracic splanchnic nerves in relation to nerve supply of heart.</li> </ul>
	Pericardium	<ul style="list-style-type: none"> <li>Describe Pericardium and its parts with emphasis on their nerve supply</li> <li>Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance</li> <li>Describe the anatomical correlates of various pericardial conditions like pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade.</li> <li>Describe the anatomical basis for Paracentesis pericardiocentesis.</li> </ul>
	Heart	<ul style="list-style-type: none"> <li>Describe the external features of heart.</li> <li>List various chambers of heart mentioning their salient features and openings.</li> <li>Describe the arterial supply of heart: coronary arteries and their distribution with special emphasis on collaterals established during ischemia.</li> <li>Describe the sites of anastomosis between right and left coronary arteries with the participating vessels.</li> <li>Discuss the anatomical correlates of cardiac arterial supply</li> <li>Describe the anatomical correlates of</li> </ul>

		<p>electrocardiography, cardiac referred pain</p> <ul style="list-style-type: none"> <li>• Describe the anatomical basis for echocardiography, coronary angiography, angioplasty, and coronary grafts</li> <li>• Describe the features of angina pectoris and myocardial infarction and correlate them anatomically</li> <li>• Describe the venous drainage of heart.</li> <li>• Describe the alternative venous routes to the heart</li> <li>• Identify the vessels supplying the heart with their origins/terminations</li> <li>• Describe the formation, relations, and distribution of cardiac plexus.</li> <li>• Describe components and significance of fibrous skeleton of heart</li> <li>• Describe the cardiac valves</li> <li>• Explain the anatomical basis for valvular heart diseases</li> <li>• Perform surface marking of various anatomical landmarks of heart and great vessels</li> <li>• Perform percussion and auscultation of heart</li> <li>• Identify the salient features of heart and great vessels on CT/ MRI</li> </ul>
<b>Embryology &amp; Post-Natal Development</b>	Introduction	<ul style="list-style-type: none"> <li>• Describe the early development of heart and blood vessels</li> <li>• Describe the development of pericardial cavity</li> </ul>
	Development of Heart	<ul style="list-style-type: none"> <li>• Define parts of primitive heart tube and give its Folding</li> <li>• Describe the development of various chambers of heart with emphasis on their partitioning</li> <li>• Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life (Models and specimens)</li> </ul>
	Development of Heart and Development of Lymphatic System	<ul style="list-style-type: none"> <li>• Describe the embryological basis of dextrocardia and ectopia cordis</li> <li>• Describe the partitioning of primordial heart: atrioventricular canal and atrium</li> <li>• Describe the development of sinus venosus</li> <li>• List clinically significant types of atrial septal defects along with their embryological basis and features. Describe probe patent foramen ovale</li> <li>• Describe the partitioning of truncus arteriosus and bulbus cordis</li> </ul>

		<ul style="list-style-type: none"> <li>• Describe the formation of ventricles and interventricular septum</li> <li>• Describe the clinical features and embryological basis of ventricular septal defects</li> <li>• Describe the development of cardiac valves and conducting system.</li> <li>• Describe the development of lymphatic system</li> </ul>
	Development of Arteries	<ul style="list-style-type: none"> <li>• Describe the embryological correlates and clinical presentation of developmental defects of heart: Tetralogy of Fallot, Patent ductus arteriosus, Unequal division of arterial trunks, Transposition of great vessels and Valvular stenosis, Coarctation of aorta</li> <li>• Describe the formation and fate of pharyngeal arch arteries</li> <li>• Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries</li> </ul>
	Development of Veins	<ul style="list-style-type: none"> <li>• Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate</li> <li>• Describe the formation of superior &amp; inferior vena cava and portal vein with their congenital anomalies</li> <li>• With the help of diagrams illustrate the development of superior vena cava, inferior vena cava and portal vein</li> </ul>
	Fetal Vessels & Circulation	<ul style="list-style-type: none"> <li>• List the derivatives of fetal vessels and structures: Umbilical vein, ductus venosus, umbilical artery, foramen ovale, ductus arteriosus</li> <li>• Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with its clinical implication</li> </ul>
	Congenital Heart defects	<ul style="list-style-type: none"> <li>• List clinically significant types of atrial septal defects along with their embryological basis and features. Describe patent foramen ovale</li> <li>• Describe the embryological correlates and clinical presentation of developmental defects of heart: Tetralogy of Fallot, Persistent ductus arteriosus, Unequal division of arterial trunks, Transposition of great vessels and Valvular stenosis</li> </ul>
		<ul style="list-style-type: none"> <li>• Describe microscopic structure of Heart wall (Endocardium, Myocardium, Epicardium)</li> </ul>

<b>Microscopic Anatomy (Histology &amp; Pathology)</b>	Heart & Cardiac Muscle	<p>Describe histology of Cardiac skeleton, SA (sinoatrial) node, AV (atrioventricular) node, Purkinje fibers.</p> <ul style="list-style-type: none"> <li>Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on Tubules, sarcoplasmic reticulum and intercalated discs.</li> <li>Identify, draw and label histological structure of cardiac muscle</li> </ul>
	Blood Vessels Organization	<ul style="list-style-type: none"> <li>Describe general histological organization of blood vessels: Tunica intima, media and adventitia</li> <li>Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids</li> </ul>
	Arteries	<ul style="list-style-type: none"> <li>Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles</li> </ul>
	Veins	<ul style="list-style-type: none"> <li>Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids</li> <li>Compare and contrast the light microscopic structure of arteries and veins</li> </ul>
	Thrombus/ Embolus formation	<ul style="list-style-type: none"> <li>Describe the histopathological basis of thrombus and embolus formation.</li> </ul>
	Arteriosclerosis Atherosclerosis & Hypertension	<ul style="list-style-type: none"> <li>Explain the histological basis of arteriosclerosis and atherosclerosis</li> <li>Describe role of arterioles in hypertension</li> </ul>
	Lymph vascular system	<ul style="list-style-type: none"> <li>Describe histological features of Lymph vascular system (Lymph capillaries, Lymph vessels &amp; Lymphatic duct</li> </ul>

➤ **Physiology**

Topic	Sub Topic	Learning objectives
		<ul style="list-style-type: none"> <li>Explain the physiological anatomy of cardiac muscle.</li> <li>Explain the functional importance of intercalated discs.</li> <li>Discuss the properties of cardiac muscles.</li> <li>Describe and draw the phases of action potential of ventricle.</li> <li>Describe and draw the phases of action potential of SA node along with explanation of the mechanism of self-excitation/ Auto rhythmicity of SA node.</li> </ul>

<b>Medical Physiology</b>	Cardiac Muscle	<ul style="list-style-type: none"> <li>• Define and give the duration of the Absolute and relative refractory period in cardiac muscle.</li> <li>• Describe the mechanism of excitation-contraction coupling and relaxation in cardiac muscle.</li> <li>• Draw &amp; explain pressure &amp; volume changes of left ventricle during cardiac cycle</li> <li>• Explain &amp; draw relationship of ECG with cardiac cycle.</li> <li>• Explain &amp; draw the relationship of heart sounds with cardiac cycle.</li> <li>• Enlist, draw, and explain the physiological basis of atrial pressure waves in relation to cardiac cycle.</li> <li>• Define &amp; give the normal values of the cardiac output, stroke volume, end diastolic volume &amp; end systolic volume</li> </ul>
	Regulation of heart pumping	<ul style="list-style-type: none"> <li>• Describe the Frank Starling mechanism.</li> <li>• Describe the autonomic regulation of heart pumping.</li> <li>• Describe the effect of potassium, calcium ions &amp; temperature on heart function.</li> <li>• Define chronotropic effect- positive and negative.</li> <li>• Define the inotropic effect: positive and negative.</li> <li>• Define dromotropic effect: positive and negative</li> <li>• Describe the location of adrenergic &amp; cholinergic receptors in heart.</li> <li>• Name the receptors present in coronary arterioles.</li> <li>• Explain sympathetic &amp; parasympathetic effects on heart rate &amp; conduction velocity</li> </ul>
	Conducting system of heart	<ul style="list-style-type: none"> <li>• Draw and explain the conducting system of heart</li> <li>• Describe the physiological basis and significance of AV nodal delay.</li> <li>• Explain the ectopic pacemaker.</li> </ul>
		<ul style="list-style-type: none"> <li>• Enlist, draw, and explain the physiological basis &amp; give durations of waves, intervals, and segments of normal ECG.</li> <li>• Describe the standard limb leads, augmented limb leads &amp; precordial leads.</li> <li>• Define Einthoven's Triangle &amp; Einthoven's law.</li> <li>• Explain the physiological basis of upright T</li> </ul>

	Fundamentals of ECG	<p>wave in normal ECG.</p> <ul style="list-style-type: none"> <li>• Describe the location and significance of J point in ECG.</li> <li>• Explain the physiological basis of current of injury.</li> <li>• Enlist the ECG changes in angina pectoris. Enlist the ECG changes in myocardial infarction.</li> <li>• Plot the mean cardiac axis.</li> <li>• Enlist the physiological &amp; pathological causes of right axis deviation of heart.</li> <li>• Enlist the physiological &amp; pathological causes of left axis deviation of heart</li> <li>• Describe the abnormalities of T wave and their causes</li> </ul>
	Effect of electrolyte on ECG	<ul style="list-style-type: none"> <li>• Describe the effect of hypokalemia and hyperkalemia on ECG</li> <li>• Describe the effect of hypocalcemia and hypercalcemia on ECG</li> </ul>
	Cardiac arrhythmia	<ul style="list-style-type: none"> <li>• Define tachycardia and enlist its causes.</li> <li>• Define bradycardia and enlist its causes.</li> <li>• Classify arrhythmias</li> <li>• Explain the physiological basis of sinus arrhythmia</li> <li>• Explain the physiological basis of reflex bradycardia in Athletes.</li> <li>• Explain the carotid sinus syndrome.</li> <li>• Enlist the causes of atrioventricular block.</li> <li>• Explain the types of atrioventricular blocks.</li> <li>• Explain the ECG changes in 1st, 2nd &amp; 3rd degree heart block.</li> <li>• Explain the cause, physiological basis &amp; ECG changes in Stokes Adam syndrome/ventricular escape.</li> <li>• Enlist the causes of premature contractions.</li> <li>• Explain the causes and ECG changes of premature atrial contractions.</li> <li>• Explain the physiological basis of pulses deficit.</li> <li>• Explain the causes and ECG changes in Premature Ventricular Contraction PVC.</li> <li>• Enlist the causes and ECG findings in Long QT Syndrome</li> <li>• Explain the causes, physiological basis, features, ECG changes &amp; management of premature heartbeat.</li> <li>• Explain the causes, physiological basis, features &amp; ECG changes and management of</li> </ul>

		<p>atrial fibrillation.</p> <ul style="list-style-type: none"> <li>• Explain the causes, physiological basis, features &amp; ECG changes of ventricular fibrillation.</li> <li>• Explain the physiological basis, features &amp; ECG changes of atrial flutter.</li> <li>• Compare Flutter and Fibrillations</li> </ul>
	Organization of Circulation	<ul style="list-style-type: none"> <li>• Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules).</li> </ul>
	Blood flow	<ul style="list-style-type: none"> <li>• Explain the pressures in systemic &amp; pulmonary circulation.</li> <li>• Explain the types of Blood flow and significance of Reynolds number.</li> </ul>
	Local & Humoral Control of Blood flow	<ul style="list-style-type: none"> <li>• Describe local control of blood flow according to tissue needs</li> <li>• Discuss humoral control of local blood flow.</li> <li>• Explain long term control of local blood flow.</li> <li>• Describe vascular control by ions and other chemical factors.</li> <li>• Name the organs in which auto regulation of blood flow occurs during changes in arterial pressure (metabolic &amp; myogenic mechanisms)</li> </ul>
	Nervous Regulation of circulation	<ul style="list-style-type: none"> <li>• Explain the role of autonomic nervous system for regulating the circulation.</li> <li>• Explain the vasomotor center.</li> <li>• Explain the control of vasomotor center by higher nervous centers.</li> <li>• Explain emotional fainting/vasovagal syncope.</li> <li>• Identify vessels constituting micro-capillaries. Enumerate hydrostatic and osmotic factors that underlie Starling's Hypothesis for capillary function.</li> </ul>
	Rapid control of arterial blood pressure	<ul style="list-style-type: none"> <li>• Explain the role of nervous system in rapid control of arterial blood pressure.</li> <li>• Explain the regulation of arterial blood pressure during exercise.</li> <li>• Enlist different mechanisms for short term regulation of arterial blood pressure.</li> <li>• Explain the role of baroreceptors in regulation of arterial blood pressure.</li> <li>• Explain the role of chemoreceptors in regulation of arterial blood pressure.</li> <li>• Make a flow chart to discuss the role of atrial volume reflexes/ Bainbridge reflex in control</li> </ul>

		<p>of blood pressure.</p> <ul style="list-style-type: none"> <li>• Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch.</li> <li>• Describe the role of CNS ischemic response in regulation of the blood pressure.</li> <li>• Explain the Cushing reflex</li> <li>• Explain the role of abdominal compression reflex to increase the arterial blood pressure.</li> </ul>
	Role of kidneys in long term Regulation of Arterial Blood Pressure	<ul style="list-style-type: none"> <li>• Make a flow chart to discuss the role of renin angiotensin system for long term control of blood pressure.</li> <li>• Make a flow chart to show the regulation of blood pressure in response to increase in ECF volume.</li> <li>• Make a flow chart to show the regulation of blood pressure in response to increase in salt intake.</li> </ul>
	Cardiac output	<ul style="list-style-type: none"> <li>• Define cardiac output, cardiac index &amp; venous return with their normal values.</li> <li>• Explain the pathological causes of high &amp; low cardiac output.</li> <li>• Discuss the factors regulating cardiac output</li> <li>• Discuss factors regulating venous return</li> </ul>
	Skeletal muscle circulation	<ul style="list-style-type: none"> <li>• Explain the regulation of skeletal muscle blood flow at rest &amp; during exercise.</li> </ul>
	Coronary circulation	<ul style="list-style-type: none"> <li>• Explain the physiological anatomy of coronary circulation.</li> <li>• Explain the regulation of coronary blood flow.</li> <li>• Explain the physiological basis of angina, myocardial &amp; subendocardial infarction</li> </ul>
	Circulatory shock	<ul style="list-style-type: none"> <li>• Define &amp; enlist different types of shock</li> <li>• Explain the causes, features, and pathophysiology of hypovolemic/hemorrhagic shock.</li> <li>• Explain the causes, features, and pathophysiology of septic shock.</li> <li>• Explain the causes, features, and pathophysiology of neurogenic shock.</li> <li>• Explain the causes, features, and pathophysiology of anaphylactic shock.</li> <li>• Discuss the treatment of different types of shock.</li> <li>• Explain the different stages of shock.</li> <li>• Explain the mechanisms that maintain the cardiac output &amp; arterial blood pressure in non-progressive shock</li> </ul>

		<ul style="list-style-type: none"> <li>• Enlist different types of positive feedback mechanisms that can lead to the progression of shock.</li> </ul>
	Heart Sounds	<ul style="list-style-type: none"> <li>• Enlist the different types of heart sounds and explain the physiological basis of each.</li> <li>• Enlist the causes of 3rd and 4th heart sounds.</li> <li>• Explain the causes &amp; physiological basis of murmurs caused by valvular lesions.</li> <li>• Enumerate abnormal heart sounds and describe the physiological basis of each.</li> </ul>

➤ **Medical Biochemistry**

Topic	Sub Topic	Learning objectives
<b>Medical Biochemistry</b>	Classification of lipids	<ul style="list-style-type: none"> <li>• Classify lipids.</li> </ul>
	Functions of lipids & Properties of lipids	<ul style="list-style-type: none"> <li>• Discuss the biomedical functions &amp; properties of lipids.</li> </ul>
	Classification of fatty acids	<ul style="list-style-type: none"> <li>• Classify fatty acids. Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on lipid profile.</li> </ul>
	Eicosanoids	<ul style="list-style-type: none"> <li>• Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin)</li> </ul>
	Lipoprotein metabolism	<ul style="list-style-type: none"> <li>• Discuss Lipoprotein metabolism</li> <li>• Discuss role of oxidized LDL in atherosclerosis</li> </ul>
	Type I to V hyperlipidemias	<ul style="list-style-type: none"> <li>• Discuss the signs and symptoms of hyperlipidemia</li> <li>• Interpret data related to hyperlipidemia</li> </ul>
	Fat soluble vitamins	<ul style="list-style-type: none"> <li>• Discuss the sources, biomedical importance, active states, deficiency and excess of fat-soluble vitamins: Vitamins A,D, E and K</li> </ul>
	Water soluble vitamins	<ul style="list-style-type: none"> <li>• Discuss the sources, biomedical importance, active states, deficiency and excess of water-soluble vitamins: Vitamins B group</li> </ul>
	Minerals and trace elements	<ul style="list-style-type: none"> <li>• Discuss the sources, biomedical importance, active states, deficiency and excess of minerals and trace elements especially zinc, Mg, Na, K, I, Ca, P, Se, S, Cu</li> </ul>

➤ **Pathophysiology and Pharmacotherapeutics**

Topic	Sub Topic	Learning objectives
Pathophysiology and Pharmacotherapeutics	Inflammation	<ul style="list-style-type: none"> <li>• Define Inflammation</li> <li>• Enumerate cardinal signs of inflammation</li> <li>• Enlist types of Inflammation</li> <li>• Enumerate causes &amp; outcomes of inflammation</li> <li>• Differentiate cells of acute &amp; chronic inflammation</li> <li>• Describe general concept of vascular &amp; cellular events of inflammation</li> <li>• Enumerate chemical mediators of inflammation along with their principal functions</li> </ul>
	Atherosclerosis	<ul style="list-style-type: none"> <li>• Classify types of thrombosis, embolism, and infarction</li> <li>• Discuss the pathophysiology of thrombosis, embolism, and infarction</li> </ul>
	Hypertension	<ul style="list-style-type: none"> <li>• Identify the types and causes of hypertension</li> <li>• Discuss the clinical consequences of hypertension and atherosclerosis</li> </ul>
	Shock	<ul style="list-style-type: none"> <li>• Discuss the pathophysiology of shock</li> </ul>
	Cardiac Failure	<ul style="list-style-type: none"> <li>• Classify the types of heart failure</li> <li>• Identify the causes leading to heart failure</li> </ul>
	Cardiac Output	<ul style="list-style-type: none"> <li>• Explain the pathological causes of high &amp; low cardiac output.</li> </ul>
	Ischemic Heart Disease	<ul style="list-style-type: none"> <li>• Identify the types of ischemic heart disease</li> <li>• Discuss the pathophysiology of different types of ischemic heart disease</li> </ul>
	Antihypertensive drugs	<ul style="list-style-type: none"> <li>• Discuss briefly the therapeutic effect of various antihypertensive drugs</li> </ul>
	Antianginal drugs	<ul style="list-style-type: none"> <li>• Discuss briefly the therapeutic effect of various antianginal drugs</li> </ul>
	Antiarrhythmics drugs	<ul style="list-style-type: none"> <li>• Discuss briefly the therapeutic effect of various antiarrhythmic drugs</li> </ul>
Drugs for cardiac failure	<ul style="list-style-type: none"> <li>• Discuss briefly the therapeutic effect of drugs used in cardiac failure</li> </ul>	

➤ **Aging**

Topic	Sub Topic	Learning objectives
	Hypertension	<ul style="list-style-type: none"> <li>• Discuss the effect of age on blood vessels with reference to hypertension</li> </ul>
	Cardiac Attack	<ul style="list-style-type: none"> <li>• Discuss the risk of cardiac attack in old age and weather conditions</li> </ul>
	Valvular diseases	<ul style="list-style-type: none"> <li>• Discuss the effect of age on valvular system</li> </ul>

<b>Aging</b>		of the heart.
	Arrhythmia	<ul style="list-style-type: none"> <li>• Discuss the effect of age on neural conduction of the heart in relation to arrhythmia</li> </ul>
	Role of female hormone on CVS disease	<ul style="list-style-type: none"> <li>• Discuss the protective role of female hormone against CVS diseases in women of reproductive age group</li> </ul>

### ➤ Disease Prevention & impact

<b>Topic</b>	<b>Sub Topic</b>	<b>Learning objectives</b>
<b>Disease Prevention &amp; impact</b>	Disease Prevention Models	<ul style="list-style-type: none"> <li>• Describe the various strategies and models to prevent diseases.</li> </ul>
	Primordial Prevention	<ul style="list-style-type: none"> <li>• Describe primordial prevention and its application to preventing CVS diseases.</li> <li>• Depict the concept of primary prevention in context to CVS and able to apply on CVS diseases</li> </ul>
	Health Promotion	<ul style="list-style-type: none"> <li>• Discuss the basic concept of health promotion and its application to CVS.</li> </ul>
	Behavioral Change Intervention	<ul style="list-style-type: none"> <li>• Discuss various methods of behavioral change interventions at community level.</li> </ul>
	Secondary & Tertiary Prevention	<ul style="list-style-type: none"> <li>• To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension)</li> </ul>
	Non-communicable disease	<ul style="list-style-type: none"> <li>• Describe the concept of cardiovascular diseases as non-communicable diseases</li> </ul>
	Risk factor assessment of CVS diseases	<ul style="list-style-type: none"> <li>• Identify the risk factors in the community for CVS diseases.</li> <li>• Learn and apply interventions to prevent the risk factors in community.</li> </ul>
	Emotional fainting	<ul style="list-style-type: none"> <li>• Psychological basis of emotional fainting &amp; its impact</li> </ul>
Personal, Psychosocial and vocational issues	<ul style="list-style-type: none"> <li>• Identify and deal with the various psychosocial aspects of Cardiovascular conditions (such as Hypertension, Coronary artery disease, Heart failure, Arrhythmias, and other cardiovascular conditions) on Individual, Family and Society</li> </ul>	

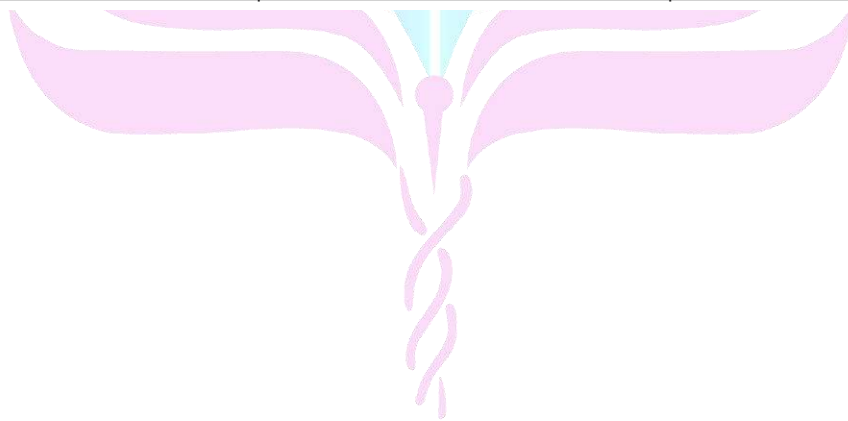
### 5.3.2. SKILLS

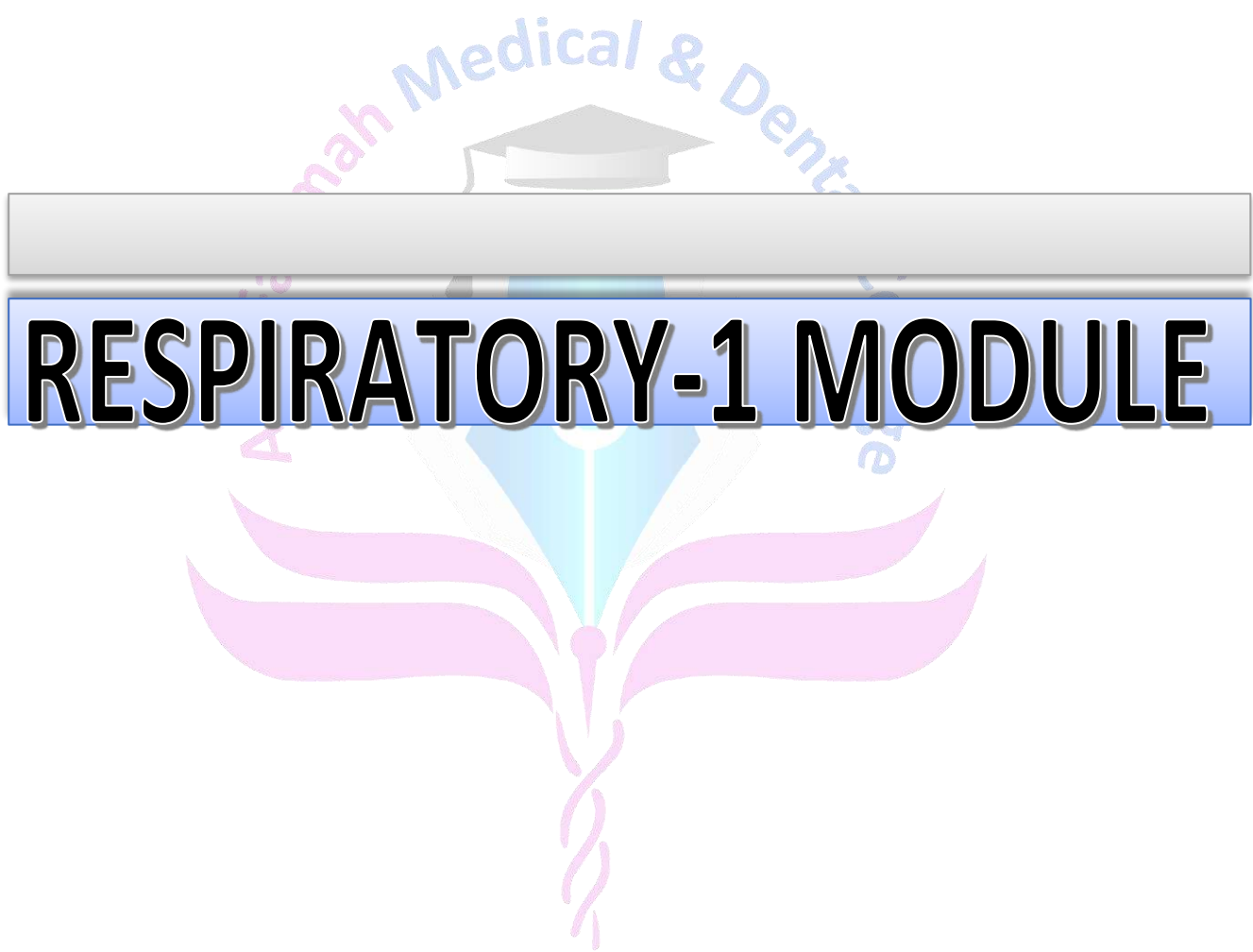
#### ➤ Practical

Topic	Sub Topic	Learning objectives
<b>Histology</b>	Histological features of Cardiac Muscle	<ul style="list-style-type: none"> <li>Identify, draw and label histological structure of cardiac muscle</li> </ul>
	Histological features of Blood Vessels	<ul style="list-style-type: none"> <li>Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids</li> </ul>
<b>Physiology</b>	ECG	<ul style="list-style-type: none"> <li>Record an electrocardiogram by correct lead placement and connections.</li> <li>Perform auscultation of chest to recognize normal heart sounds.</li> </ul>
	Blood Pressure	<ul style="list-style-type: none"> <li>Determine the effect of posture and exercise on blood pressure by auscultatory method.</li> <li>Measure the blood pressure of the subject by palpatory and auscultatory methods.</li> </ul>
	JVP	<ul style="list-style-type: none"> <li>Examine neck veins to determine Jugular Venous Pulse.</li> </ul>
	Arterial Pulse	<ul style="list-style-type: none"> <li>Examine arterial pulse to recognize normal characteristics of pulse.</li> </ul>
<b>Biochemistry</b>	Interpretation of Lab report	<ul style="list-style-type: none"> <li>Perform cardiac markers Creatine Kinase and Lactate Dehydrogenase (CK and LDH)</li> <li>Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias</li> </ul>
<b>Pathology</b>	Hemodynamic	<ul style="list-style-type: none"> <li>Identify the pathological changes of infarction and thrombosis</li> </ul>

### 5.3.3. C-FRC for Cardiovascular-1 Module

<b>CARDIOVASCULAR-1 MODULE</b>		
<b>Objectives</b>	<b>Skill</b>	<b>Miller's Pyramid Level Reflected</b>
Auscultation of heart sounds	Heart sounds	Shows
Detection of ankle swelling/edema – pitting /non-pitting	Edema	Shows
Abdominal jugular reflex	JVP	Shows
Perform detection of pedal and carotid pulses	Pedal and carotid pulse	Shows
Perform cervical and axillary lymph node examination	Lymph node Examination	Shows





# RESPIRATORY-1 MODULE

## **6. Introduction of Respiratory-1 Module**

The study of the respiratory system is a vital component of medical education, as it plays an indispensable role in sustaining human life. This Respiratory System Module has been meticulously designed to provide students with a comprehensive understanding of the intricacies of this crucial physiological system. Through this module, students will embark on a captivating journey into the anatomy, physiology, and pathology of the respiratory system, gaining invaluable insights into the mechanisms that enable us to breathe and exchange oxygen and carbon dioxide efficiently.

In this introductory section, we will provide an overview of the key objectives, learning strategies, and resources that will guide you through this module. We will delve into the importance of respiratory health, the structure and function of the respiratory organs, and the multitude of factors that can influence respiratory well-being. As we progress through the module, we will explore topics ranging from the mechanics of respiration to the diagnosis and management of respiratory diseases, equipping you with the knowledge and skills necessary to excel in this critical area of medicine.

Whether you aspire to become a healthcare professional or simply seek a deeper understanding of the remarkable intricacies of the human respiratory system, this module is designed to meet your educational needs. Get ready to embark on an educational journey that will not only expand your horizons but also empower you with the expertise needed to appreciate the wonders of the respiratory system and its profound impact on human health. Let's take our first breath into the world of respiratory medicine and embark on this enlightening voyage together.

## 6.1. Module Rationale

The diseases related to the respiratory system are on the rise not only in developing countries but also in developed countries. The infant mortality rate in Pakistan is highest in Southeast Asia and one of the important reasons is common respiratory infections in children. With the world suffering from COVID-19 not only physically but also mentally, it is very important for medical students to study in detail the structures, functions, prevention, epidemiology, genetic basis of diseases and their management. The respiratory system is responsible for bringing oxygen into the body and removing carbon dioxide. It is made up of several organs and structures, including the nose, pharynx, larynx, trachea, bronchi, lungs and diaphragm.



## 6.2. Module Outcomes

At the end of this module the students will be able to:

- Apply basic sciences knowledge to understand the causes of common respiratory problems.
- Explain the pathogenesis of respiratory diseases.
- Enlist the main investigations relevant to respiratory disorders.
- Recognize risk factors and preventive measures of main respiratory diseases.



### 6.3. Learning Objectives

#### 6.3.1. Knowledge

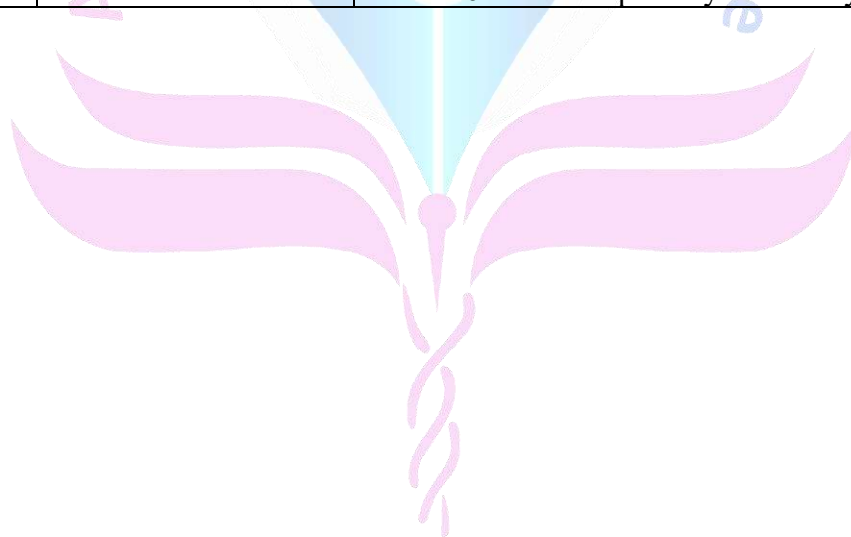
##### ➤ Thorax

Topic	Sub Topic	Learning objectives
<b>Gross Anatomy</b>	Upper respiratory tract	<ul style="list-style-type: none"> <li>Describe the anatomical features and neurovascular supply of nasal cavity</li> <li>Describe the anatomical features and neurovascular supply of pharynx</li> <li>Describe the anatomical features and neurovascular supply of larynx</li> </ul>
	Trachea	<ul style="list-style-type: none"> <li>Describe the anatomical features of the Trachea with its extent, relations, neurovascular supply and lymphatics.</li> </ul>
	Thoracic cavity	<ul style="list-style-type: none"> <li>Give the boundaries of thoracic cavity, superior and inferior thoracic apertures and list the structures contained/ traversing them.</li> <li>Describe the anatomical correlates of Thoracic inlet syndrome &amp; Thoracic outlet syndrome</li> </ul>
	Rib cage	<ul style="list-style-type: none"> <li>Identify and differentiate the typical from a typical ribs.</li> <li>Describe the anatomical features of ribs and give their attachments.</li> <li>Describe the anatomical correlates of supernumerary cervical rib.</li> <li>Classify the articulations of the ribs.</li> <li>Describe the anatomical features of these Articulations</li> <li>Describe the movements with the muscles producing articulations.</li> <li>Describe the effects of fracture to the neck of rib and give its anatomical justification</li> <li>Describe the anatomical correlates of Flail Chest</li> </ul>
	Inter costal spaces	<ul style="list-style-type: none"> <li>Describe the anatomical correlates of Thoracotomy</li> <li>Define the attachments, relations, nerve supply and actions of intercostal muscles</li> <li>Define an intercostal space and give details of its contents</li> <li>Describe the anatomical correlates of intercostal incisions</li> <li>Describe the anatomical features and attachments on typical &amp; atypical thoracic vertebrae.</li> </ul>

		<ul style="list-style-type: none"> <li>• Differentiate between typical and atypical vertebrae</li> </ul>
	Thoracic vertebrae	<ul style="list-style-type: none"> <li>• Explain the thoracic part of vertebral column (normal curvature, intervertebral joints, muscles &amp; fascia of the back, blood supply, lymphatic drainage, nerve supply of back)</li> <li>Associated Clinical conditions -Kyphosis, Scoliosis</li> </ul>
	Sternum	<ul style="list-style-type: none"> <li>• Describe the bony features and attachments on the sternum</li> <li>• Describe the anatomical correlates of median sternotomy.</li> <li>• Describe the anatomical correlates of sternal biopsy.</li> <li>• Describe the presentation of sternal fractures and correlate it anatomically</li> </ul>
	Connective tissues of Thorax	<ul style="list-style-type: none"> <li>• Describe the endo thoracic fascia with its attachments.</li> <li>• Describe the supra-pleural membrane with its attachments.</li> </ul>
	Joints of thorax	<ul style="list-style-type: none"> <li>• Classify the joints of the thorax mentioning their articulations, movements with the muscle producing them</li> <li>• Describe the mechanics of inspiration and expiration</li> </ul>
	Neurovascular supply of thorax	<ul style="list-style-type: none"> <li>• Describe the origin, course, relations and distribution of intercostal nerves and vessels</li> <li>• Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava</li> <li>• Describe the cutaneous nerve supply and dermatomes of thorax.</li> </ul>
	Cutaneous nerve supply of thorax	<ul style="list-style-type: none"> <li>• Describe the cutaneous nerve supply and dermatomes of thorax.</li> <li>• Give anatomical justification of the manifestations of herpes zoster infection on thoracic wall.</li> <li>• Discuss anatomical correlates of intercostal nerve block</li> </ul>
	Diaphragm	<ul style="list-style-type: none"> <li>• Name the parts of diaphragm mentioning their attachments and neurovascular supply</li> <li>• Explain the role of diaphragm in respiration</li> <li>• Enumerate the diaphragmatic apertures with their vertebral levels, mentioning the structures traversing them.</li> </ul>
	Pleural cavity	<ul style="list-style-type: none"> <li>• Describe the pleura giving its parts, layers, neurovascular supply, and lymphatic drainage</li> <li>• Describe the pleural cavity giving its</li> </ul>

		<p>recesses and the lines of pleural reflection</p> <ul style="list-style-type: none"> <li>Describe the anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion</li> </ul>
	Lungs	<ul style="list-style-type: none"> <li>Describe the anatomical features, relations of lungs</li> <li>Describe the neurovascular supply and lymphatic drainage of lungs.</li> <li>Compare and contrast the anatomical features and relations of right and left lung</li> <li>Describe the root of the lung and pulmonary ligament with arrangement of structures at the hilum <ul style="list-style-type: none"> <li>Define Bronchopulmonary segments. Give their vascular supply, lymphatic drainage and clinical significance</li> </ul> </li> <li>Describe the anatomical correlates of chest tube intubation</li> <li>Describe the anatomical correlates of thoracentesis</li> <li>Describe the anatomical correlates of bronchoscopy</li> <li>Describe the anatomical basis for medico legal significance of lungs in determining the viability of newborn</li> <li>Identify various anatomical landmarks on chest X-Rays, CT and MRI</li> </ul>
<b>Embryology &amp; Post-Natal Development</b>	Bony components of thoracic cavity	<ul style="list-style-type: none"> <li>Describe the development of ribs, sternum, and thoracic vertebrae. Give the associated congenital malformations</li> </ul>
	Development of Axial skeleton	<ul style="list-style-type: none"> <li>List the factors contributing to the development of Axial skeletal system</li> <li>Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies</li> <li>Describe the developmental process of Vertebral Column</li> </ul>
	Diaphragm & Thoracic cavity	<ul style="list-style-type: none"> <li>List the embryological sources of the diaphragm. Describe the events taking place in the development and descent of the diaphragm</li> <li>Describe the development of Thoracic cavities (Pleural and Pericardial cavities)</li> </ul>
	Upper respiratory tract	<ul style="list-style-type: none"> <li>Describe the development of upper respiratory tract: larynx and trachea</li> <li>Describe congenital anomalies of Trachea Tracheoesophageal fistulas of different types</li> </ul>
	Lungs	<ul style="list-style-type: none"> <li>List the phases of lung development with</li> </ul>

		<p>their time periods. Describe the events taking place in each phase</p> <ul style="list-style-type: none"> <li>Describe the embryological basis of respiratory distress syndrome/Hyaline membrane disease, Ectopic Lung lobes, Congenital cysts of Lung</li> </ul>
<b>Histology</b>	Organization of respiratory system	<ul style="list-style-type: none"> <li>Give the general histological organization of Respiratory system.</li> </ul>
	Respiratory epithelium	<ul style="list-style-type: none"> <li>Describe the microscopic and ultra-microscopic structure of respiratory epithelium</li> </ul>
	Nasopharynx	<ul style="list-style-type: none"> <li>Describe histology of Nasopharynx</li> </ul>
	Epiglottis & larynx	<ul style="list-style-type: none"> <li>Describe the histological features of epiglottis and larynx</li> </ul>
	trachea and lungs	<ul style="list-style-type: none"> <li>Describe the histological features of trachea and lungs</li> </ul>
	Clinical correlates	<ul style="list-style-type: none"> <li>Explain the histological basis of:               <ol style="list-style-type: none"> <li>Laryngitis</li> <li>Singer's nodules</li> <li>Emphysema</li> <li>Pneumonia</li> <li>Atelectasis</li> <li>Infant respiratory distress syndrom</li> </ol> </li> </ul>



➤ Physiology

Topic	Sub Topic	Learning objectives
Respiratory Physiology	Breathing	<ul style="list-style-type: none"> <li>• Enlist the muscles of inspiration and expiration in quiet breathing</li> <li>• Enlist the muscles of inspiration and expiration in labored breathing</li> <li>• Explain the components of the work of breathing</li> <li>• Discuss the mechanics of pulmonary ventilation</li> <li>• Explain periodic breathing</li> <li>• Explain the causes and pathophysiology of sleep apnea</li> </ul>
	Lung Compliance	<ul style="list-style-type: none"> <li>• Define lung compliance</li> <li>• Enlist the factors that affect lung compliance</li> <li>• Draw the compliance diagram of air filled and saline filled lungs</li> <li>• Enlist the components of surfactant</li> <li>• Describe the role of surfactant in lung compliance</li> <li>• Explain the role of surfactant in premature babies</li> </ul>
	Lung volumes and Capacities	<ul style="list-style-type: none"> <li>• Define the different lung volumes and capacities and their clinical significance</li> <li>• Discuss fev1/ FVC ratio and its clinical significance</li> <li>• Enlist the lung volumes and capacities that cannot be measured by spirometer.</li> <li>• Define dead space &amp; explain its types</li> <li>• Discuss FEV1/FVC ratio in relation to Bronchial Asthma.</li> <li>• Discuss FEV1/FVC ratio in relation to Chronic Obstructive Pulmonary disease/restrictive lung diseases</li> <li>• Discuss FEV1/FVC ratio in relation to pulmonary embolism</li> </ul>
	Pulmonary ventilation	<ul style="list-style-type: none"> <li>• Define alveolar ventilation.</li> <li>• Define minute respiratory volume<sup>2</sup> points</li> <li>• Describe the pressures in the pulmonary system</li> </ul>
	Pulmonary Circulation	<ul style="list-style-type: none"> <li>• Describe the blood volume of the Lungs</li> <li>• Describe the distribution and regulation of blood flow through the lungs.</li> <li>• Describe the mechanics of blood flow in the three blood flow zones of the lung</li> <li>• Describe the effect of heavy exercise on</li> </ul>

		<p>pulmonary arterial pressure.</p> <ul style="list-style-type: none"> <li>Describe the function of pulmonary circulation when left atrial pressure rises as a result of left-sided heart failure.</li> <li>Explain pulmonary capillary dynamics.</li> </ul>
	Pulmonary Edema, and Pleural Fluid	<ul style="list-style-type: none"> <li>Discuss pathophysiology and common causes of pulmonary edema</li> <li>Explain the safety factors that prevent pulmonary edema.</li> <li>Explain the physiological basis of the presence of fluid normally in the pleural cavity.</li> <li>Define pleural effusion and give its causes.</li> </ul>
	Principles of gaseous exchange	<ul style="list-style-type: none"> <li>Explain the ultrastructure of respiratory membrane</li> <li>Discuss the factors affecting diffusion of gases across the respiratory membrane</li> <li>Explain the diffusion capacity of respiratory membrane for oxygen and carbon dioxide</li> <li>Define alveolar, pleural and Tran's pulmonary pressure.</li> <li>Explain differences in the partial pressures of atmospheric, humidified, alveolar air and explain physiological basis of change in each pressure</li> </ul>
	Transport of oxygen in the blood	<ul style="list-style-type: none"> <li>Explain the different forms of transport of oxygen in the blood</li> </ul>
	Oxyhemoglobin dissociation curve	<ul style="list-style-type: none"> <li>Draw and explain oxyhemoglobin dissociation curve</li> <li>Enlist the factors that cause rightward shift of oxyhemoglobin dissociation curve.</li> <li>Enlist the factors that cause leftward shift of oxyhemoglobin dissociation curve</li> </ul>
	Bohr's effect	<ul style="list-style-type: none"> <li>Explain the Bohr's effect</li> </ul>
	Cyanosis	<ul style="list-style-type: none"> <li>Define; enlist the types, and causes of cyanosis</li> </ul>
	Transport of CO <sub>2</sub> in blood	<ul style="list-style-type: none"> <li>Enlist different forms in which CO<sub>2</sub> is transported in the blood.</li> <li>Explain the Carboxy hemoglobin dissociation curve.</li> <li>Explain the Haldane effect.</li> <li>Explain the chloride shift/Hamburger phenomenon.</li> <li>Define the respiratory exchange ratio (RER)</li> </ul>
	VA/Q (Ventilation)	<ul style="list-style-type: none"> <li>Explain the alveolar oxygen and carbon dioxide pressure when VA/Q = infinity, zero and normal</li> </ul>

Perfusion Ratio)	<ul style="list-style-type: none"> <li>• Explain the concept of physiological shunt when VA/Q ratio is less than normal</li> <li>• Explain the concept of physiological dead space when VA/Q ratio is above normal</li> </ul>
Protective Reflexes	<ul style="list-style-type: none"> <li>• Enlist the respiratory &amp; non-respiratory functions of lungs.</li> <li>• Explain the nervous control of bronchiolar musculature</li> <li>• Trace the reflex arc of cough reflex and sneeze reflex</li> </ul>
Aviation and Space	<ul style="list-style-type: none"> <li>• Explain the principal means by which acclimatization occurs</li> <li>• Explain the events that occur during acute mountain sickness</li> <li>• Enlist the features of chronic mountain sickness</li> </ul>
Deep sea diving	<ul style="list-style-type: none"> <li>• Explain the pathophysiology, features, prevention and treatment of decompression sickness.</li> </ul>
CO poisoning	<ul style="list-style-type: none"> <li>• Draw and explain the effect of CO poisoning on oxyhemoglobin dissociation curve</li> <li>• Explain the pathophysiology, features, and treatment of CO poisoning</li> </ul>
Nervous regulation of respiration	<ul style="list-style-type: none"> <li>• Enumerate the components of respiratory centers and explain their functions.</li> <li>• Explain the inspiratory RAMP signal</li> <li>• Explain the Herring Breuer reflex/lung inflation reflex and its clinical significance</li> </ul>
Chemical control of respiration	<ul style="list-style-type: none"> <li>• Explain the location of chemo sensitive area (central chemoreceptors) and peripheral chemoreceptors</li> <li>• Explain the effect of hydrogen ions &amp; carbon dioxide on the chemo- sensitive area</li> <li>• Explain the role of oxygen in the control of respiration/peripheral chemoreceptors</li> </ul>
Exercise and respiration	<ul style="list-style-type: none"> <li>• Explain the regulation of Respiration during Exercise</li> </ul>
Hypoxia	<ul style="list-style-type: none"> <li>• Enlist the effects of acute hypoxia</li> <li>• Explain the hypoxia inducible factor a master switch for body response to hypoxia</li> <li>• Define and explain different types of hypoxias</li> </ul>
Tuberculosis	<ul style="list-style-type: none"> <li>• Explain the pathophysiology of Tuberculosis</li> </ul>
Pneumonia	<ul style="list-style-type: none"> <li>• Describe the pathophysiology of Pneumonia</li> </ul>
Dyspnea	<ul style="list-style-type: none"> <li>• Define Dyspnea</li> <li>• Enlist different causes of dyspnea</li> <li>• Differentiate between cardiac and respiratory dyspnea Outline management strategies for</li> </ul>

		dyspnea
	Pneumothorax	<ul style="list-style-type: none"> <li>• Enlist the causes of Pneumothorax</li> <li>• Describe the signs and symptoms of Pneumothorax</li> </ul>
	Pleuritis	<ul style="list-style-type: none"> <li>• Enlist the causes of Pleuritis</li> <li>• Describe the signs and symptoms of Pleuritis</li> <li>• Discuss the management of Pleuritis</li> </ul>
	Bronchitis	<ul style="list-style-type: none"> <li>• Enlist the causes of Bronchitis</li> <li>• Discuss the signs and symptoms of Bronchitis</li> <li>• Discuss the management of Bronchitis</li> </ul>
	Pneumonia	<ul style="list-style-type: none"> <li>• Classify different types of pneumonia</li> <li>• Discuss the sign symptoms of pneumonia</li> <li>• Discuss the management of pneumonia</li> </ul>
	Asthma	<ul style="list-style-type: none"> <li>• Classify different types of asthma</li> <li>• Discuss the signs and symptoms of asthma</li> <li>• Discuss the management of asthma</li> </ul>
	Tuberculosis	<ul style="list-style-type: none"> <li>• Classify different types of Tuberculosis</li> <li>• Discuss the signs and symptoms of tuberculosis</li> <li>• Discuss the management of Tuberculosis</li> </ul>
	Acute respiratory distress syndrome	<ul style="list-style-type: none"> <li>• Classify different types of acute respiratory distress syndrome</li> <li>• Discuss the signs and symptoms of acute respiratory distress syndrome</li> <li>• Discuss the management of acute respiratory distress syndrome</li> </ul>
	Respiratory Failure	<ul style="list-style-type: none"> <li>• Define respiratory failure</li> <li>• Describe various types of respiratory failure</li> <li>• Enlist various causes of respiratory failure</li> <li>• Outline management strategies of respiratory failure</li> </ul>
	First Aid in Surgical Patients	<ul style="list-style-type: none"> <li>• Describe ABC in a trauma patient</li> </ul>

➤ **Medical Biochemistry**

Topic	Sub Topic	Learning objectives
<b>Medical Biochemistry</b>	Genetic defects	<ul style="list-style-type: none"> <li>• Explain and interpret the pedigree of single gene defect i.e., Emphysema and cystic fibrosis (autosomal recessive)</li> </ul>
	Respiratory diseases	<ul style="list-style-type: none"> <li>• Describe the biochemical basis of emphysema, Chronic obstructive pulmonary disease (COPD) and cystic fibrosis</li> <li>• Interpret Respiratory Distress syndrome on</li> </ul>

		the basis of given data
	Water, pH, Buffers/Ionization of water	<ul style="list-style-type: none"> <li>Describe ionization of water and elaborate its significance. Discuss water and electrolyte balance in health and disease.</li> </ul>
	Water, pH, Buffers/pH and pH scale	<ul style="list-style-type: none"> <li>Define pH and describe the concept of pH scale</li> </ul>
	Water, pH, Buffers/weak acids and their significance	<ul style="list-style-type: none"> <li>Define weak acids and conjugate base.</li> </ul>
	Water, pH, Buffers/Ka And pKa	<ul style="list-style-type: none"> <li>Define Ka and pKa and give their significance.</li> </ul>
	Water, pH, Buffers/HH equation and its applications	<ul style="list-style-type: none"> <li>Describe Henderson-Hasselbach (HH) equation. (no derivation required) along with its application/use.</li> <li>Interpret the titration curve for amino acids (alanine, histidine&amp; acetic acid)</li> </ul>
	Water, pH, Buffers/HH equation and its applications	<ul style="list-style-type: none"> <li>Define buffers.</li> <li>Enumerate the component of a buffers system and describe their mechanism of action.</li> <li>Enlist important buffers present in blood, plasma, ECF (Extra Cellular Fluid), ICF (Intra Cellular Fluid) and renal tubular fluid.</li> <li>Elaborate the working of bicarbonate buffer and phosphate buffer.</li> </ul>
	Acid Base balance and imbalance/ Renal mechanisms for pH regulation	<ul style="list-style-type: none"> <li>Elaborate the role of kidneys in the regulation of acid base balance.</li> </ul>
	Acid Base balance and imbalance/Defense mechanisms against changes in H <sup>+</sup> concentration	<ul style="list-style-type: none"> <li>Elaborate the concept of 1st, 2nd and 3rd line of defence against changes in H<sup>+</sup> ion concentration.</li> </ul>
	Acid base balance	<ul style="list-style-type: none"> <li>Discuss the concept of acid base balance</li> </ul>

➤ **Pathophysiology and Pharmacotherapeutics**

Topic	Sub Topic	Learning objectives
Pharmacotherapeutics	Cough Suppressants	<ul style="list-style-type: none"> <li>Identify the drugs for cough suppression &amp; Expectorant</li> <li>Explain the mechanism of action and adverse effects of cough suppressants</li> </ul>
	Anti-histamines	<ul style="list-style-type: none"> <li>Explain the mechanism of action and adverse effects of anti-histamines</li> </ul>
	Anti-asthmatics	<ul style="list-style-type: none"> <li>Explain the mechanism of action and adverse effects of anti-asthmatics</li> </ul>
Pathology	Acute Respiratory Distress Syndrome	<ul style="list-style-type: none"> <li>Describe the pathophysiology of acute respiratory distress syndrome</li> </ul>
	Obstructive lung Disease	<ul style="list-style-type: none"> <li>Describe the pathophysiology of obstructive lung disease</li> </ul>
	Restrictive Lung Disease	<ul style="list-style-type: none"> <li>Describe the pathophysiology of Restrictive Lung Disease</li> </ul>

➤ **Aging**

Topic	Sub Topic	Learning objectives
Aging	Respiratory infections in old age	<ul style="list-style-type: none"> <li>Discuss the biochemical basis of respiratory infections in old age in cold weather</li> </ul>
	Increased vulnerability to infection & neoplasia	<ul style="list-style-type: none"> <li>Discuss the role of age on respiratory clearance leading to recurrent inflammatory processes at the ciliated respiratory epithelium</li> </ul>
	Respiratory diseases	<ul style="list-style-type: none"> <li>Describe the biochemical basis of emphysema, COPD and cystic fibrosis</li> </ul>

➤ **Disease Prevention & impact**

Topic	Sub Topic	Learning objectives
Community Medicine and Public Health	Prevention of acute respiratory infections (ARI)	<ul style="list-style-type: none"> <li>Identify the common risk factors of acute respiratory infections with emphasis on smoking</li> <li>Discuss preventive strategies of different problems related to respiratory system</li> <li>Enlist the common vaccines used for the prevention of ARI</li> <li>Explain the role of vitamins in the respiratory tract Infections</li> </ul>
	Interaction of environment & Respiratory system	<ul style="list-style-type: none"> <li>Explain the effect of air pollutants on the respiratory system</li> </ul>
	Epidemiology of	<ul style="list-style-type: none"> <li>Describe the burden of respiratory diseases</li> </ul>

	respiratory Diseases	
	Occupational Lung Diseases	<ul style="list-style-type: none"> <li>• Enlist the common respiratory diseases related to occupation</li> </ul>
<b>Behavioral Sciences</b>	Dyspnea	<ul style="list-style-type: none"> <li>• Identify the psychosocial factors leading to dyspnea</li> </ul>
	Psychogenic cough	<ul style="list-style-type: none"> <li>• Identify the psychosocial factors leading to psychogenic cough.</li> </ul>
	Personal, Psychosocial and vocational issues	<ul style="list-style-type: none"> <li>• Identify and deal with the various psychosocial aspects of Respiratory conditions (such as Asthma, COPD, Tuberculosis, Cystic Fibrosis, Sleep Apnea) on Individual, Family and Society</li> </ul>



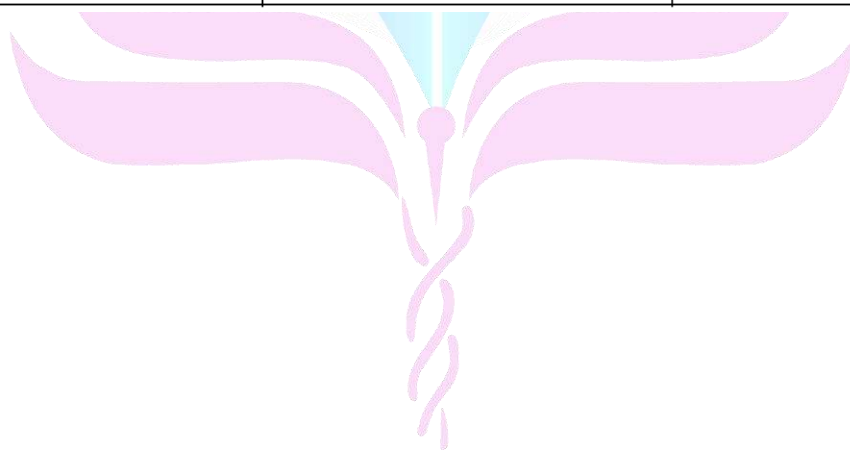
### 2.1.1. SKILLS

#### ➤ Practical's

Topic	Sub Topic	Learning objectives
<b>Histology</b>	Epiglottis & larynx	<ul style="list-style-type: none"> <li>Identify, draw and label the histologic sections of epiglottis and larynx.</li> </ul>
	Trachea & Organization of respiratory system	<ul style="list-style-type: none"> <li>Describe the histological features of bronchial tree: trachea, bronchi, bronchioles, alveoli</li> </ul>
	Bronchial tree & Lung	<ul style="list-style-type: none"> <li>Identify, draw and label the histological sections of bronchial tree: trachea, bronchi, bronchioles, alveoli, Lung</li> <li>Describe the mucosal changes encountered in the trachea-bronchial tree</li> <li>Compare and contrast the histological features of various components of bronchial tree: trachea, bronchi, bronchioles, alveoli.</li> </ul>
	Pneumocytes	<ul style="list-style-type: none"> <li>Describe, compare and contrast the light and electron microscopic features of type I and type II pneumocytes</li> </ul>
<b>Physiology</b>	Clinical Examination of Chest	<ul style="list-style-type: none"> <li>Perform the clinical examination of chest for the respiratory system (inspection, palpation, percussion, Auscultation)</li> </ul>
	Peak Expiratory Flow rate measurement	<ul style="list-style-type: none"> <li>Determine lung volumes and capacities with spiromete</li> </ul>
	Oxygen Saturation	<ul style="list-style-type: none"> <li>Determine Blood Oxygen Saturation with finger Pulse Oximeter</li> </ul>
	CPR	<ul style="list-style-type: none"> <li>Perform Cardio pulmonary Resuscitation (CPR) on adult and infant</li> </ul>
<b>Biochemistry</b>	Determination of pH	<ul style="list-style-type: none"> <li>Determine the pH of the solution by pH meter</li> </ul>
	Acid base Balance Interpretations	<ul style="list-style-type: none"> <li>Interpret metabolic and respiratory disorders of acid base balance on the basis of sign, symptoms and ABG findings.</li> </ul>

### 6.3.2. C-FRC for Respiratory-1 Module

RESPIRATORY-1 MODULE		
Objectives	Skill	Miller's Pyramid Level Reflected
Performance of chest compressions	CPR/Chest compressions	Shows
Detection of clubbing	Clubbing	Shows
Identify main organs of the thorax on CXR	CXR	Shows
Identification of pneumonic patch on chest x ray	Pneumonia CXR	Shows
Administering inhaler to a patient	Inhaler use	Shows



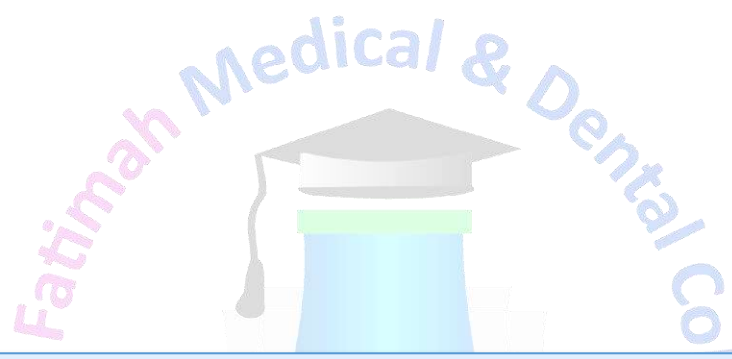
## 7. Attitude

### ➤ PERL's for Block-III

CARDIOVASCULAR-I				
<i>*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block</i>				<b>Total Hours = 09</b>
Code	Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
	<b>Professionalism</b>	Digital Identity	<ul style="list-style-type: none"> <li>Understand the concept of digital identity, focusing on the impact of a healthcare professional's digital footprint and the importance of maintaining professional conduct in online spaces</li> <li>Analyze their current digital footprint, identify areas where they can improve their online presence to reflect professionalism and develop a plan for maintaining appropriate online conduct.</li> </ul>	Submit evidence of your digital footprint.
	<b>Ethics</b>	Justice Resource Allocation in	<ul style="list-style-type: none"> <li>Describe the ethical principle of justice in healthcare, focusing on the fair allocation of limited resources and how healthcare professionals can make ethical decisions to ensure equity in patient care.</li> <li>Analyze a case where healthcare resources e.g. Ventilators are limited in CCU, evaluating how justice and fairness principles were applied in resource allocation and proposing ways to ensure equitable distribution.</li> </ul>	Submit a case analysis discussing the ethical challenges of resource allocation in healthcare, focusing on how justice was applied or compromised. Propose strategies for making fair and equitable decisions in future resource-constrained scenarios.

			<p>leadership skill to foster personal growth, enhance team performance, and improve communication within healthcare settings.</p> <ul style="list-style-type: none"> <li>• Discuss the critical principles of seeking constructive feedback, including openness to criticism, active listening, and using feedback for personal and professional growth.</li> <li>• Practice seeking constructive feedback by asking specific, open-ended questions to peers or mentors about their performance and demonstrating active listening and reflection on the feedback received.</li> </ul>	mentor in the upcoming mentor meeting.
		Role Modelling/ Mentoring Session II	<ul style="list-style-type: none"> <li>• Participate in a mentoring session where they will discuss their strengths and weaknesses with their mentor, receive feedback, and collaboratively create an action plan for personal and professional development</li> </ul>	Submit a summary of your progress from your last mentoring session, including feedback, areas identified for improvement, and the action plan you developed with your mentor to enhance your professional growth.

RESPIRATORY-I				
*Proposed Sequence of Topics Mentioned below. Medical Colleges are at liberty to manage according to their resources. Topics can switch within each Block				<b>Total Hours = 4.5</b>
Code	Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
	<b>Ethics</b>	Digital Ethics	<ul style="list-style-type: none"> <li>The principles of digital ethics, including proper netiquette, maintaining confidentiality in online spaces, and the legal and ethical implications of online harassment and misconduct.</li> <li>Identify examples of ethical and unethical online behaviour, focusing on netiquette, confidentiality, and how to prevent and address online harassment by relevant laws.</li> </ul>	Make a poster for Netiquette in using your Class Social Media Groups.
	<b>Professionalism</b>	Integrity & Honesty	<ul style="list-style-type: none"> <li>Describe the importance of integrity and honesty in academic and clinical environments, focusing on demonstrating ethical behaviour in assignment submissions and during examinations.</li> </ul>	Submit an incident report of a case of cheating in an exam and provide recommendations on how it should have been handled.
			<ul style="list-style-type: none"> <li>Commit to completing and submitting assignments and exams with honesty and integrity, reflecting on the significance of these values in their academic and future professional practice.</li> </ul>	
	<b>Research</b>	Critiquing Scientific Article via Journal Club Meetings	<ul style="list-style-type: none"> <li>Participate in a journal club meeting with a presentation of a scientific article, critique its strengths and weaknesses, and discuss the article's validity and relevance with peers.</li> </ul>	Submit Article Critique report



**ASSESSMENT POLICY AND TOS OF UHS**

## **8. Teaching & Learning Methodologies**

### ➤ **Interactive Lectures**

Interactive lecturing involves an increased interchange between teachers, students and the lecture content. The use of interactive lectures can promote active learning, heighten attention and motivation, give feedback to the teacher and the student, and increase satisfaction for both.

### ➤ **Small group discussions**

Small-group discussion is a student-centered methodology that allows students to actively involve and be partners in the teaching-learning process. Students interact with peers and instructors, discussing, and sharing ideas. They develop the ability to build consensus in a group.

### ➤ **Practical's**

Hands-on performance of skills in laboratory

### ➤ **Clinical Skills Session**

Clinical skills are abilities health care professionals use when assessing, diagnosing and caring for patients. Clinical skills also describe applied medical knowledge, such as assessing bloodwork.

### ➤ **Case based Learning**

Case-based learning is a student-centered learning approach where students read and discuss complex situations and apply their knowledge to each situation. Students typically examine the case together as a team and address the problems within the realistic scenario to develop a reasonable conclusion.

### ➤ **Problem Based Learning**

Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem. This problem is what drives the motivation and the learning.

### ➤ **Self-directed learning**

Self-directed learning is an instructional strategy where the students with guidance from the teacher decide what and how they will learn. It can be done individually or with group, learning, but the overall concept is that students take honor ship of their learning

## **9. Assessment Methodologies**

### **1. Theory**

- **MCQ's**

A multiple-choice question (MCQ) is composed of two parts: a stem that identifies the question or problem, and a set of alternatives or possible answers that contain a key that is the best answer to the question, and a number of distractors that are plausible but incorrect answers to the question.

- **SEQ's**

It is a type of assessment tool in which a question on a topic is given in test or examination requiring a written analysis and explanation usually of a specified length.

### **2. Practical**

- **OSPE**

“Objectively Structured Practical Examination.”, as a tool for the assessment of practical skills of undergraduate Medical Students.

- **OSCE**

OSCE stands for “Objectively Structured Clinical Examination.” OSCEs are very helpful in medical education because they allow a student to practice and demonstrate clinical skills in a standardized medical scenario.

### **3. OSVE**

OSVE stands for “Objectively Structured Viva Examination”. In the viva you have to answer questions and engage with your examiners.

## 10. Assessment Policy (UHS)

### Statutes

1. The first professional MBBS shall be held at the end of first year MBBS whereas, the second Professional MBBS Examination shall be held at the end of the second year.
2. Every candidate shall be required to study contents of Anatomy (including Histology), Physiology, Biochemistry, Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Islamic Studies/Ethics and Pakistan Studies, Clinical skills and Professionalism, Ethics, Research and Leadership. The teaching and assessment shall be done in three modular blocks.
3. There will be three papers in the first professional examination, and four papers in the second professional examination

#### **First Professional Exam:**

- a) Paper 1 will be based on contents of Block 1;
- b) Paper 2 will be based on contents of Block 2;
- c) Paper 3 will be based on contents of Block 3;

#### **Second Professional Exam:**

- a) Paper 1 will be based on contents of Block 4;
  - b) Paper 2 will be based on contents of Block 5;
  - c) Paper 3 will be based on contents of Block 6;
  - d) Paper 4 will be based on contents of Islamic Studies/Civics and Pakistan Studies;
4. Each paper will comprise of two components 'Written' and 'Oral/Practical/Clinical' examinations.
  5. The 'Written' and 'Oral/Practical/Clinical' examinations in each paper will carry 175 marks each, making the total marks of 350 for each paper of papers 1, 2 and 3 (inclusive of internal Assessment).
  6. Total marks for the First and Second Professional Examinations shall be 1050, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination, and determination of position or merit of a candidate. However, the candidates failing in the subject of Islamic Studies/Civics & Pakistan Studies, while passing other subjects of 2nd professional examination, may not be subjected to detention, as the subject has no contribution towards total marks of any professional examination, and determination of position or merit. The

students may rather be allowed to pass the examination in the subject, before appearing in their final professional MBBS examination, and in case of their failure to clear the subject they may not be allowed to take their final professional MBBS examination

7. Major content areas of the first two professional years shall be from:
  - a. Anatomy including applied/clinical/Anatomy
  - b. Physiology including applied/clinical/Physiology
  - c. Biochemistry including applied/clinical/ Biochemistry
8. The Applied/Clinical content for the Anatomy, Physiology and Biochemistry shall be based on clinical correlations.
9. Integrated clinical content areas for the both years include Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Clinical Foundation- 1& II and PERLs- 1 & II.

#### **10. Written Examination**

- d. The written component of Papers 1, 2, and 3 will consist of 'One-best-type' Multiple Choice Questions (MCQ) and Structured Essay Questions (SEQ) in a ratio of 65:35 %.
- e. Each MCQ will have five options (one best response and four distractors) and will carry one (01) mark.
- f. There will be no negative marking.
- g. There will be no sections within an SEQ, and it will be a structures question with five (05) marks each.
- h. SEQ's will only be based on the major content areas of the year.
- i. There will be total of 85 MCQs and 07 SEQs in every written paper in Papers 1, 2 and 3.
- j. The duration of each written paper will be 195 minutes (03 hours & 15 minutes).
- k. The MCQ section will be 95 minutes duration and the SEQ section 100 minutes.

#### **11. Oral/Practical/Clinical Examination**

- a. The Oral/Practical/Clinical examination of each Papers 1, 2, and 3 will consist of a total of twelve (18) OSPE/OSCE/OSVE stations in each Oral/Practical/Clinical examination.

- b. There will be seven (11) Observed OSPE (Objective Structured Practical Examination) stations from major subject areas. Each OSPE station will have the Practical component and an evaluation of the underlying principle relevant to that practical with a component of applied knowledge.
  - c. There will be two (02) Observed OSCE (Objective Structured Clinical Examination) stations, 01 from C-FRC1 and PERLs-1 in each Oral/Practical/Clinical examination.
  - d. There will be three (03) Observed Interactive OSVE (Objective structured Viva Examination) from major subject areas. Each OSVE station will have a structured Viva to assess a practical component along evaluation of the underlying principle relevant to that practical with a component of applied/practical knowledge and related clinical application.
  - e. Each OSPE station will carry eight (08) marks.
  - f. Each OSCE from C-FRC-1 and PERLs-1 will carry eight (05) marks.
  - g. Each OSVE station will carry 14 marks
  - h. The duration of each Oral/Practical/Clinical examination will be 100 minutes.
  - i. Time for each OSPE, OSCE and OSVE station will be eight (06) minutes.
12. Every candidate shall take the examination in the following Blocks (Modules) in First & Second Professional MBBS Examination:

**Year 1**

- |   |     |
|---|-----|
| i. Block 1 (Foundation-I + Hematopoietic & Lymphatic) Marks | 350 |
| ii. Block 2 (Musculoskeletal & Locomotion-1) Marks          | 350 |
| iii. Block 3 (Cardiovascular-1 Respiratory-1) Marks         | 350 |

**Year 2**

- |   |     |
|---|-----|
| a. Block 4 (Gastrointestinal Tract & Nutrition- Renal-1) Marks              | 350 |
| b. Block 5 (Endocrinology & Reproduction Head & Neck, Special Senses) Marks | 350 |
| c. Block 6 (Neurosciences-1+ Inflammation) Marks                            | 350 |
| d. Islamic Studies Civics Pakistan Studies Marks                            | 100 |

**A. Block 1 (Foundation- Hematopoietic and Lymphatic)**

The examination in Block 1 shall be as follows:

- I. One written paper of 140 marks having two parts

- a. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.
  - b. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- II. Oral Practical/Clinical examination shall have 140 marks in total.
- III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

**B. Block 2 (Musculoskeletal & Locomotion-1)**

- IV. One written paper of 140 marks having two parts
- c. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.
  - d. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- V. Oral Practical/Clinical examination shall have 140 marks in total.
- VI. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

**C. Block 3 (Cardiovascular-I + Respiratory-1)**

- VII. One written paper of 140 marks having two parts
- e. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.
  - f. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- VIII. Oral Practical/Clinical examination shall have 140 marks in total.
- IX. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

YEAR-1						
Subject	Theory		Practical			Total
<b>Block 1</b> Modules (Foundation-I + Hematopoietic and Lymphatic)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	011 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Block 2</b> Modules (Musculoskeletal & Locomotion-I)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Block 3</b> Modules (Cardiovascular-I & Respiratory-I)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Total Marks:</b>						<b>1050</b>

13. No grace marks shall be allowed in any examination or practical under any guise or name.

14. At least 25% MCQ & 25% SEQ shall be based on applied/case/clinical scenarios to assess high order thinking in the papers set for the students of First and Second Professional MBBS Examination.

## 11. Exam Regulations by UHS

1. Professional examination shall be open to any student who:
  - a. Has been enrolled/registered and completed one academic year preceding the concerned professional examination in a constituent/affiliated College of the University.
  - b. Has his/her name submitted to the Controller of Examinations, for the purpose of examination, by the Principal of the college in which he/she is enrolled & is eligible as per all pre-requisites of the examination.
  - c. Has his/her marks of internal assessment in all the Blocks sent to the Controller Examinations by the Principal of the college along with the admission forms.
  - d. Produces the following certificates duly verified by the principal of his/ her college:
    - I. of good character;
    - II. of having attended not less than cumulative 85% of the full course of lectures delivered and practical conducted in the academic session, while maintaining 75 % attendance in each block,
    - III. Certificate of having appeared at the Block Examinations conducted by the college of enrolment with at least 55 % cumulative percentage in aggregate of blocks 1,2 and 3 for the 1st Year and 4,5, and 6 for the Second year;
    - IV. Candidates falling short of block/s attendance shall not be admitted to the annual examination unless they take remedial classes to complete the requirement
2. The minimum number of marks required to pass this examination for each paper shall be fifty percent (55%) in Written and fifty percent (55%) in the Oral/Practical/Clinical examinations and fifty percent (50%) in aggregate, independently and concomitantly at one and the same time.
3. Candidates who secure eighty five percent (85%) or above marks in any of the papers shall be declared to have passed “**with distinction**” in that Block subject to having at least 80 % marks in the Written component of that paper, concomitantly. However, no candidate shall be declared to have passed “with distinction” in any paper, who does not pass in all the papers of the First Professional Examination as whole at one and the same time.
4. A candidate failing in one or more paper of the annual examination shall be provisionally allowed to join second professional class till the commencement of supplementary examinations. Under no circumstances, a candidate shall be promoted to the second professional class till he/she has previously passed all the papers in the First Professional MBBS Examination.
5. If a student appears in the supplementary examination for the first time as he/she did not appear in the annual examination because of any reason and fails in any paper in

the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.

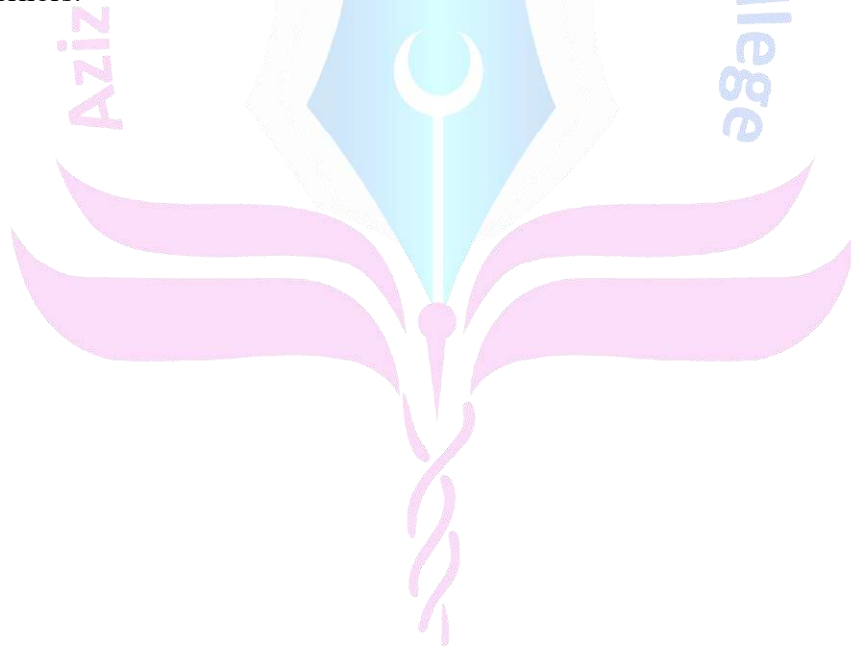
6. The colleges may arrange remedial classes and one re-sit for block examination after approval from the competent authority.
7. The remedial classes and re-sit examination can be conducted during summer vacation/weekends, before or during preparatory leave, for the concerned professional examination, subject to the following conditions:

At the completion of each block, the principals of the colleges shall submit a detailed report to the university, including cases of students with short attendance poor performance/absence in the block examination along with the reasons and evidence for the same, proposed schedule to remedial classes and re-sit examination.

- I. Competent Authority UHS will have the cause and the submitted evidence evaluated and documented, before permitting the colleges to arrange remedial classes and re-sit examination at the concerned block. No college is allowed to conduct remedial classes or re-sit examination without prior approval of the competent authority
- II. The students can appear in re-sit of a block examination, along with the subsequent block, and before or during preparatory leave for the terminal block of the professional year, once the requirement of attendance is met with However conduct of remedial classes shall be permitted only in the cases of students, who shall have attended at least 50% of total attendance of the concerned block in the first instance
- III. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or death of an immediate relative/being afflicted by a natural calamity or disaster However, in special circumstances a student can be allowed to attend the 'remedial classes' for a certain block, with the permission of the Competent Authority, to complete his/her requirement of attendance, even if the block attendance is less than 50%. In such cases, the evidence of reason will be provided by the college after the Principal has endorsed the case.
  - b. The students who have attained a cumulative attendance of 85% directly or with remedial classes, can appear in the 'annual' professional examination.
  - c. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or sickness / death of an immediate relative/being afflicted by a natural/manmade calamity or disaster or detained students (missed the first block of the year) or UHS permitted late admission students
8. The application for admission of each candidate for examination shall be submitted to the Controller of Examination, through the Principal of the College, in a prescribed format, as per notified schedule, accompanied by the prescribed fee.
9. The marks of internal assessment and attendance shall be submitted to Controller of Examinations three times, within two weeks of completion of each block examination
10. At the end of each block, the colleges are required to submit question papers and keys for the block examination, internal assessment marks and attendance record to the

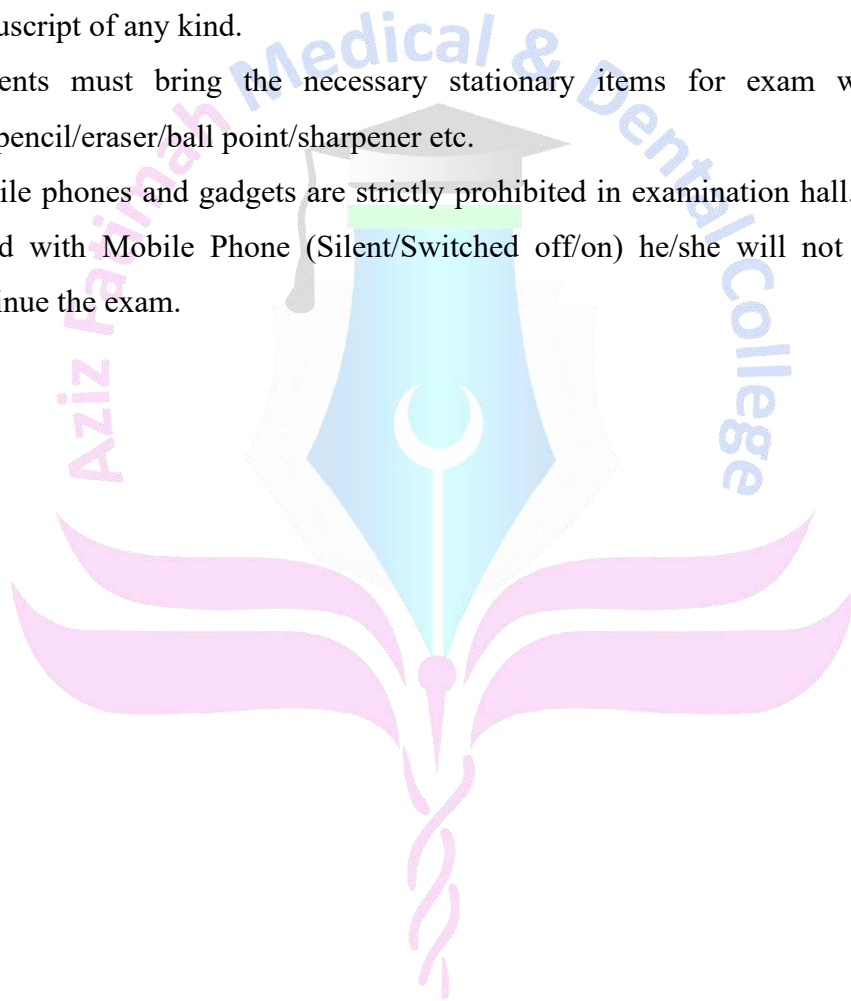
Department of Examinations UHS. Further, parent-teacher meetings shall be arranged by the colleges after every block examination to share feedback on the progress of students with their parents, Minutes of parent teacher meetings shall be submitted to the Department of Medical Education UHS.

11. It is emphasized that fresh internal assessment or a revision of assessment for supplementary examination shall not be permissible. However, a revised internal assessment for the detained students can be submitted. The internal assessment award in a particular year will not be decreased subsequently detrimental to the detainee candidate. A proper record of the continuous internal assessment shall be maintained by the concerned departments in the colleges.
12. The candidates shall pay their fee through the Principals of their respective colleges who shall forward a bank draft / pay order / crossed cheque in favor of Treasure, university of Health Sciences Lahore, along with their Admission Forms.
13. Only one annual and one supplementary of First and Second Professional MBBS Examinations shall be allowed in a particular academic session. In exceptional situations i.e., national calamities, war or loss of solved answer books in case of accident, special examination may be arranged after having observed due process of law. This will require permission of relevant authorities, i.e., Syndicate and Board of Governors.



## 12. Examination Rules AFMDC

- Students must report to examination hall/ venue at least 30 minutes before the exam.
- Exam will start sharp at time.
- Late comers arriving at the examination hall more than 15 minutes after the start of the paper will not be allowed to enter the examination hall.
- All students should wear Lab coats before appearing in the exam.
- Students are not allowed to take into the examination hall textbooks, notes or manuscript of any kind.
- Students must bring the necessary stationary items for exam with them e.g. pen/pencil/eraser/ball point/sharpener etc.
- Mobile phones and gadgets are strictly prohibited in examination hall. If any student found with Mobile Phone (Silent/Switched off/on) he/she will not be allowed to continue the exam.




### 13. Table of Specification (TOS)

#### MBBS 1<sup>st</sup> Professional

#### Block-3

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCO (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	17	03	32	03	-	01	38
	Physiology applied/clinical	31	04	51	04	-	01	46
Normal Function	Biochemistry applied/clinical	19	02	29	02	-	01	30
Disease Burden & Prevention	Community Medicine & Public Health	06	-	06	-	-	-	-
	Behavioral Sciences	02	-	02	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	10	01	15	01	-	-	08
	Pharmacology	05	-	05	01	-	-	08
CFRC	CF-I	-	-	-	-	01	-	05
PERLs	PERLs-I	-	-	-	-	01	-	05
<b>Total</b>		90	10x5=50	140	011 stations x 08 = 88	02 stations x 05 = 10	03 stations x 14=42	140

## 14. Frame work of Block-III Module Timetable 2024-25

 <b>AZIZ FATIMAH MEDICAL &amp; DENTAL COLLEGE FAISALABAD</b> TIME TABLE 1st YEAR MBBS CLASS SESSION 2024-25 Cardiovascular-1 & Respiratory- Module						
DAY	1 08:00 am - 09:00 am	2 09:00 am - 10:30 am	3 10:30 am - 11:30 am	4 11:30 am - 12:30 pm	5 12:30 pm - 13:00 pm	6 13:00 pm - 14:00 pm
Monday	Physiology Lecture Topic: Teacher	Practical Group A: Anatomy Group B: Physiology Group C: Biochemistry	Anatomy Lecture Topic: Teacher:	Biochemistry Lecture Topic: Teacher	Break/Namaz Break	Community Medicine Topic: Teacher:
DAY	1 08:00 am - 09:30 am	2 09:30 am - 10:30 am	3 10:30 am - 11:30 am	4 11:30 am - 12:30 pm	5 12:30 pm - 13:00 pm	6 13:00 pm - 14:00 pm
Tuesday	Practical Group B: Anatomy Group C: Physiology Group A: Biochemistry	Physiology Lecture Topic: Teacher	Dissection Topic: Teacher:		Break/Namaz Break	PERL's Topic: Teacher:
Wednesday	Practical Group C: Anatomy Group A: Physiology Group B: Biochemistry	Physiology Lecture Topic: Teacher	Dissection Topic: Teacher:			Pathology Topic: Teacher:
Thursday	SGD Group A: Anatomy Group B: Biochemistry Group C: Physiology	Physiology Lecture Topic: Teacher	Dissection Topic: Teacher:			Pathology Topic: Teacher:
DAY	1 08:00 am - 09:30 am	2 09:30 am - 10:30 am	3 10:30 am - 11:00 am	4 11:00 am - 12:00 nm	5 12:00 pm - 13:00 pm	6 13:00 pm - 14:00 pm
Friday	SGD Group B: Anatomy Group C: Biochemistry Group A: Physiology	Biochemistry Lecture Topic: Teacher	SDL/Break	Physiology Lecture Topic: Teacher	Anatomy Lecture Topic: Teacher:	Jummah Prayers
DAY	1 08:00 am - 09:30 am	2 09:30 am - 10:30 am	3 10:30 am - 11:30 am	4 11:30 am - 12:30 nm	5 12:30 pm - 13:00 pm	6 13:00 pm - 14:00 pm
Saturday	SGD Group C: Anatomy Group A: Biochemistry Group B: Physiology	Biochemistry Lecture Topic: Teacher	Anatomy Lecture Topic: Teacher:	BS Topic: Teacher:	Break/Namaz Break	IS Topic: Teacher:



## **RESOURCE BOOKS**

## 15. Learning Resources

Anatomy	<ul style="list-style-type: none"> <li>• Snell's Clinical Anatomy 10th ed.</li> <li>• Langman's Medical Embryology 12th ed</li> <li>• Medical Histology by Laiq Hussain Siddiqui 8th ed.</li> <li>• General Anatomy by Laiq Hussain Siddiqui 6th ed.</li> </ul>
Physiology	<ul style="list-style-type: none"> <li>• Guyton AC and Hall JE. Textbook of Medical Physiology, W.B. Saunders &amp; Co. Philadelphia</li> <li>• Essentials of Medical Physiology by Mushtaq Ahmad</li> </ul>
Biochemistry	<ul style="list-style-type: none"> <li>• Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers.</li> <li>• Lippincott illustrated Review 8th edition Kluwer.W.</li> <li>• Essentials of Medical Biochemistry vol 1&amp;2 by Mushtaq Ahmed.</li> </ul>
Community Medicine	<ul style="list-style-type: none"> <li>• Parks TextBook of Preventive and Social Medicine, K. Park(Editor)</li> <li>• Public Health and Community Medicine Ilyas Ansari(Editors)</li> </ul>
Pharmacology	<ul style="list-style-type: none"> <li>• Basic and clinical Pharmacology by Katzung. McGraw-Hill</li> <li>• Pharmacology by Champe and Harvey, Lippincott Williams &amp; Wilkins</li> </ul>
Pathology	<ul style="list-style-type: none"> <li>• Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.</li> <li>• Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and</li> <li>• Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.</li> <li>• Walter and Israel. General Pathology.</li> <li>• Churchill Livingstone.</li> </ul>
Medicine	<ul style="list-style-type: none"> <li>• Davidson's Principles and Practice of Medicine</li> </ul>
Surgery	<ul style="list-style-type: none"> <li>• Bailey &amp; Love Short Practice of Surgery</li> </ul>
Islamiyat	<ul style="list-style-type: none"> <li>• Standard Islamiyat (compulsory) for B.A, B.Sc, MA, Msc, MBBS by Prof. M Sharif Islahi</li> <li>• Ilmi Islamiyat (compulsory) mfor B.A, B.sc &amp; equilent.</li> </ul>
Behavioral Sciences	<ul style="list-style-type: none"> <li>• Handbook of Behaioural Sciences by Prof. Mowadat H. Rana, 3<sup>rd</sup> Edition.</li> <li>• Medical and Psychosocial Aspects of Chronic illness and Disability Sixth Edition Donna R. Falvo, PHD Beverley E. Holland, PHD RN.</li> </ul>