

INDEPENDENT MEDICAL COLLEGE, FSD

BLOCK - 3

CARDIOVASCULAR - MODULE 4
CURRICULUM 2K23
(Study Guide)

MODULAR INTEGRATED
UNDERGRADUATE CURRICULUM

TABLE OF CONTENTS

| TOPICS | PAGE NO. |
|---------------------------------|----------|
| List of abbreviation | 01 |
| Curriculum frame work | 02 |
| Introduction to the study guide | 03 |
| Introduction to the module | 04 |
| Module committee | 05 |
| Time Table | 06 |
| Distribution of teaching hours | 07 |
| Module outcomes | 08 |
| Learning objectives | 09-19 |
| Assessment | 20 |
| Date Sheet | 21 |
| Assessment Tools | 22 |
| Marks Distribution | 23 |
| Introduction to the Module | 25 |
| Module committee | 26 |
| Time Table | 27 |
| Distribution of teaching Hours | 28 |
| Module Outcomes | 29 |
| Learning Objectives | 30 – 37 |
| Assessment Tools | 38 |
| Books | 39 |

LIST OF ABBREVIATION

| ABBREVIATION | SUBJECTS |
|--------------|--|
| A | Anatomy |
| Ag | Aging |
| B | Biochemistry |
| BhS | Behavioral Sciences |
| C | Civics |
| CM | Community Medicine |
| C-FRC | Clinical-Foundation Rotation Clerkship |
| CV | Cardiovascular |
| ENT | Ear Nose Throat |
| F | Foundation |
| FM | Forensic Medicine |
| GO | Gynecology and Obstetrics |
| HL | Hematopoietic & Lymphatic |
| M | Medicine |
| MS | Musculoskeletal |
| O | Ophthalmology |
| P | Physiology |
| PA | Pathology |
| PE | Pediatrics |
| PERLs | Pediatrics |
| Ph | Pharmacology |
| Psy | Psychiatry |
| QI | Quran and Islamiyat |
| R | Radiology |
| Re | Respiratory |
| S | Surgery |
| SGD | Small Group Discussion |

CURRICULUM FRAME WORK

The framework of Curriculum 2K23 has 44 modules spanning 05 years. The horizontal integration is evident in the modular configuration where different basic disciplines approach the themes simultaneously. Modules have been structured where all the basic disciplines are represented based on their respective weightage of content. All module objectives are preceded by the recommended themes and clinical relevance. Spiral placement of the modules within the framework ensures a revisit of the basic sciences. Clinical Skills follow a spiral which is entirely skills dominant. This spiral is the core of psychomotor training. Affective training has been formally inculcated in the curricular framework. The model of PERLs has been introduced so that the yield of doctors has a strong, resilient, ethically driven character. PERLs stands for Professionalism, Ethics, Research and Leadership skills.

INTRODUCTION TO THE STUDY GUIDE

The purpose of the study guide is to organize lecture notes and text book material so that students can increase their comprehension and memory of large amount of information. It will provide a teaching aid to assist the students in developing reading skills.

INTRODUCTION TO MODULE

The 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 ageing on cardiovascular system will be discussed.

MODULE COMMITTEE

| | |
|------------------------------|---|
| Prof. Dr. Irfan Ahmad Mughal | Anatomy (Coordinator Integrated Curriculum) |
| Dr. Taimur-ul-Hassan | Medical Education (Module Coordinator) |
| Prof. Dr. Razia Rizwan | Physiology |
| Dr. Rizwan Ahmad | Biochemistry |
| Dr. Awais Shuja | Surgery |
| Dr. Baddar Bashir | Medicine |
| Dr. Sirda Mushtaq | Pharmacology |
| Dr. Shahbaz Ahmad | Community Medicine |
| Dr. Salma Naz | Pathology |
| Dr. Aslam Lodhi | Psychiatry |

INDEPENDENT MEDICAL COLLEGE, FAISALABAD
1ST YEAR MBBS CLASS

TIME TABLE

3RD BLOCK – 4TH MODULE (CARDIOVASCULAR -1)

07 Weeks

| Time | 08:00 - 09:00 | 09:00 - 10:00 | 10:00 - 11:00 | 11:00 - 11:30 | 11:30 - 01:15 | 01:15 - 02:00 | 02:00 - 02:30 |
|------------|-------------------------------------|--------------------------|------------------------|-------------------------------|-------------------------------------|--------------------------|-------------------------------------|
| Mon | Biochemistry | Anatomy | Physiology | BREAK | Physiology | Pharmacology / Pathology | Self Directed Learning (SDL) |
| Tue | Biochemistry | Anatomy | Physiology | | Physiology | Pathology | |
| Wed | Biochemistry | Anatomy | Physiology | | Physiology | Islamiyat / Pak Studies | |
| Thu | Clinical Physiology | Anatomy | Physiology | | Physiology | Community Medicine | |
| Fri | Behavioral Sciences 8:00 - 08:45 | Anatomy 08:45 - 10:15 | | PERL 10:15 - 11:00 | Community Medicine 11:00 - 12:00 | | |
| Sat | Biochemistry 08:00 - 10:00 | | Aging 10:00 - 11:00 | BREAK 11:00 - 11:30 | Physiology 11:30 - 01:15 | CFRC 01:15 - 02:00 | SDL 02:00 - 02:30 |

DISTRIBUTION OF TEACHING HOURS

| | |
|---------------------------|--------|
| Modules weeks | 07 |
| Recommended Minimum Hours | 188 hr |
| Anatomy | 35 hr |
| Physiology | 90 hr |
| Biochemistry | 38 hr |
| Pathology | 05 hr |
| Community Medicine | 13 hr |
| Pharmacology | 05 hr |
| Behavioral Sciences | 02 hr |
| CFRC | 07 hr |
| PERL | 07 hr |

MODULE OUTCOMES

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

LEARNING OBJECTS

BLOCK 3 – CARDIOVASCULAR MODULE -1

| ANATOMY | |
|---|----------------------------|
| COURSE OBJECTIVES | TEACHING STRATEGIES |
| Theory | |
| SPECIFIC LEARNING OUTCOMES | |
| GROSS ANATOMY | |
| Define mediastinum giving its boundaries and compartments. List the contents of its various compartments. | SGD |
| Describe the formation, tributaries, and termination of superior vena cava | SGD |
| Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta. | SGD |
| Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches | SGD |
| Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins. | SGD |
| Describe the course, relations, and distribution of vagus and thoracic splanchnic nerves in relation to nerve supply of heart. | SGD |
| Describe Pericardium and its parts with emphasis on their neurovascular supply and lymphatic drainage | SGD |
| Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance | SGD |
| Describe the anatomical correlates of pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade. | SGD |
| Describe the anatomical basis for pericardiocentesis. | SGD |
| Describe the external features of heart. | SGD |
| List various chambers of heart mentioning their salient features and openings. | SGD |
| Describe the arterial supply of heart: coronary arteries and their distribution with special emphasis on collaterals established during ischemia. | SGD |
| Describe the sites of anastomosis between right and left coronary arteries with the participating vessels. | SGD |
| Discuss the anatomical correlates of cardiac arterial supply | SGD |
| Describe the anatomical correlates of electrocardiography, cardiac referred pain. | SGD |
| Describe the anatomical basis for angioplasty, and coronary grafts. | SGD |
| Describe the features of angina pectoris and myocardial infarction and correlate them anatomically | SGD |
| Describe the venous drainage of heart. | SGD |
| Describe the alternative venous routes to the heart | SGD |

| | |
|--|----------------------|
| Identify the vessels supplying the heart with their origins/terminations. | SGD |
| Describe the formation, relations, and distribution of cardiac plexus. | SGD |
| Describe components and significance of fibrous skeleton of heart | SGD |
| Describe the cardiac valves | SGD |
| Explain the anatomical basis for valvular heart diseases | SGD |
| Perform surface marking of various anatomical landmarks of heart and great vessels | SGD |
| Perform percussion and auscultation of heart | SGD |
| Identify the salient features of heart and great vessels on Computed tomography/ Magnetic Resonance Imaging CT/ MRI | SGD |
| SPECIFIC LEARNING OBJECTIVES | |
| EMBRYOLOGY & POST-NATAL DEVELOPMENT | |
| Describe the early development of heart and blood vessels | Interactive Lectures |
| Describe the development of pericardial cavity | Interactive Lectures |
| Define parts of primitive heart tube and give its folding | Interactive Lectures |
| Describe the development of various chambers of heart with emphasis on their partitioning | Interactive Lectures |
| Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life (Models and specimens) | Interactive Lectures |
| Describe the embryological basis of dextrocardia and ectopia cordis | Interactive Lectures |
| Describe the partitioning of primordial heart: atrioventricular canal and atrium | Interactive Lectures |
| Describe the development of sinus venosus | Interactive Lectures |
| List clinically significant types of atrial septal defects along with their embryological basis and features. Describe probe patent foramen ovale | Interactive Lectures |
| Describe the partitioning of truncus arteriosus and bulbus cordis | Interactive Lectures |
| Describe the formation of ventricles and interventricular septum | Interactive Lectures |
| Describe the clinical features and embryological basis of ventricular septal defects | Interactive Lectures |
| Describe the development of cardiac valves and conducting system. | Interactive Lectures |
| Describe the development of lymphatic system | Interactive Lectures |
| 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 | Interactive Lectures |
| Describe the formation and fate of pharyngeal arch arteries | Interactive Lectures |
| Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries | Interactive Lectures |
| Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate | Interactive Lectures |
| Describe the formation of superior & inferior vena cava and portal vein with their congenital anomalies With the help of diagrams illustrate the development of superior vena | Interactive Lectures |

| | |
|---|----------------------|
| cava, inferior vena cava and portal vein | |
| List the derivatives of fetal vessels and structures: Umbilical vein, ductus venosus, umbilical artery, foramen ovale, ductus arteriosus | Interactive Lectures |
| Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with its clinical implication | Interactive Lectures |
| List clinically significant types of atrial septal defects along with their embryological basis and features. Describe patent foramen ovale. | Interactive Lectures |
| 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 | Interactive Lectures |
| SPECIFIC LEARNING OBJECTIVES | |
| MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY) | |
| Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on T-tubules, sarcoplasmic reticulum and intercalated discs. | Interactive Lectures |
| Identify, draw and label histological structure of cardiac muscle | Interactive Lectures |
| Describe general histological organization of blood vessels: Tunica intima, media and adventitia. | Interactive Lectures |
| Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids | Interactive Lectures |
| Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles | Interactive Lectures |
| Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids | Interactive Lectures |
| Compare and contrast the light microscopic structure of arteries and veins | Interactive Lectures |
| Describe the histopathological basis of thrombus and embolus formation. | Interactive Lectures |
| Explain the histological basis of arteriosclerosis and atherosclerosis | Interactive Lectures |
| Describe role of arterioles in hypertension | Interactive Lectures |
| PRACTICAL | |
| SPECIFIC LEARNING OBJECTIVES | |
| Histology | |
| Identify, draw and label histological structure of cardiac muscle | Practical |
| Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids | Practical |

| PHYSIOLOGY | | |
|-------------------|--|-------------------------------------|
| LEC. NO | LEARNING OBJECTIVES | TEACHING STRATEGIES |
| 1 | Explain the physiological anatomy of cardiac muscle. | Interactive Lectures |
| 2 | Explain the functional importance of intercalated discs. | Interactive Lectures, SGD |
| 3 | Discuss the properties of cardiac muscles. | Interactive Lectures, SGD |
| 4 | Describe and draw the phases of action potential of ventricle. | Interactive Lectures, SGD |
| 5 | 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. | Interactive Lectures, SGD, Tutorial |

| | | |
|----|---|--------------------------------|
| 6 | Define and give the duration of the Absolute and Relative refractory period in cardiac muscle. | Interactive Lectures |
| 7 | Draw & explain pressure & volume changes of left Ventricle during cardiac cycle. | Interactive Lectures, SGD |
| 8 | Explain & draw relationship of ECG with cardiac cycle. | Interactive Lectures, SGD |
| 9 | Explain& draw the relationship of heart sounds with Cardiac cycle. | Interactive Lectures, SGD |
| 10 | Enlist, draw, and explain the physiological basis of Atrial pressure waves in relation to cardiac cycle. | Interactive Lectures, SGD |
| 11 | Define & give the normal values of the cardiac output, stroke volume, end diastolic volume & end systolic volume | Interactive Lectures, Tutorial |
| 12 | Describe the Frank starling mechanism. | Interactive Lectures, SGD |
| 13 | Describe the autonomic regulation of heart pumping. | Interactive Lectures, SGD |
| 14 | Describe the effect of potassium, calcium ions & Temperature on heart function. | Interactive Lectures, SGD |
| 15 | Define chronotropic effect-positive and negative. | Interactive Lectures, SGD |
| 16 | Define the inotropic effect: positive and negative. | Interactive Lectures, SGD |
| 17 | Defined romotropic effect: positive and negative | Interactive Lectures, SGD |
| 18 | Describe the location of adrenergic & cholinergic receptors in heart. | Interactive Lectures, SGD |
| 19 | Name the receptors present in coronary arterioles. | Interactive Lectures, SGD |
| 20 | Explain sympathetic & parasympathetic effects on heart rate & conduction velocity | Interactive Lectures, SGD |
| 21 | Draw and explain the conducting system of heart | Interactive Lectures, SGD |
| 22 | Describe the physiological basis and significance of AV nodal delay. | Interactive Lectures, SGD |
| 23 | Describe and draw the phases of action potential of SA node alongwith explanation of the mechanism of self - excitation/ Auto rhythmicity of SA node. | Interactive Lectures, SGD |
| 24 | Define and give the duration of the Absolute and Relative refractory periodin cardiac muscle. | Interactive Lectures, SGD |
| 25 | Draw & explain pressure & volume changes of left Ventricle during cardiac cycle. | Interactive Lectures, SGD |
| 26 | Explain & draw relationship of ECG with cardiac cycle. | Interactive Lectures, SGD |
| 27 | Explain & draw the relationship of heart sounds with Cardiac cycle. | Interactive Lectures, SGD |
| 28 | Enlist, draw, and explain the physiological basis of atrial pressure waves in relation to cardiac cycle. | Interactive Lectures, SGD |
| 29 | Define & give the normal values of the cardiac output, stroke volume, end diastolic volume & end systolic volume | Interactive Lectures, SGD |
| 30 | Describe the Frank starling mechanism. | Interactive Lectures, SGD |

| | | |
|----|---|--------------------------------|
| 31 | Describe the autonomic regulation of heart pumping. | Interactive Lectures, SGD |
| 32 | Describe the effect of potassium, calcium ions & Temperature on heart function. | Interactive Lectures, SGD |
| 33 | Define chronotropic effect-positive and negative. | Interactive Lectures, SGD |
| 34 | Define the inotropic effect: positive and negative. | Interactive Lectures, SGD |
| 35 | Define dromotropic effect: positive and negative | Interactive Lectures, SGD |
| 36 | Describe the location of adrenergic & cholinergic Receptors in heart. | Interactive Lectures, SGD |
| 37 | Name the receptors present in coronary arterioles. | Interactive Lectures, SGD |
| 38 | Explain sympathetic & parasympathetic effects on heart rate & conduction velocity | Interactive Lectures, SGD |
| 39 | Draw and explain the conducting system of heart | Interactive Lectures, SGD |
| 40 | Describe the physiological basis and significance of AV nodal delay. | Interactive Lectures, Tutorial |
| 41 | Explain the ectopic pacemaker. | Interactive Lectures, Tutorial |
| 42 | Enlist, draw, and explain the physiological basis & give durations of waves, intervals, and segments of normal ECG. | Interactive Lectures, Tutorial |
| 43 | Describe the standard limb leads, Augmented limb Leads & precordial leads. | Interactive Lectures, Tutorial |
| 44 | Define Einthoven's Triangle & Einthoven's law. | Interactive Lectures, SGD |
| 45 | Explain the physiological basis of upright T wave in Normal ECG. | Interactive Lectures, SGD |
| 46 | Describe the location and significance of J point in ECG. | Interactive Lectures, SGD |
| 47 | Explain the physiological basis of current of injury. | Interactive Lectures, SGD |
| 48 | Enlist the ECG changes in angina pectoris. | Interactive Lectures, SGD |
| 49 | Enlist the ECG changes in myocardial infarction. | Interactive Lectures, SGD |
| 50 | Plot the mean cardiac axis. | Interactive Lectures, SGD |
| 51 | Enlist the physiological & pathological causes of right Axis deviation of heart. | Interactive Lectures, SGD |
| 52 | Enlist the physiological & pathological causes of left Axis deviation of heart | Interactive Lectures, SGD |
| 53 | Describe the abnormalities of T wave and their causes. | Interactive Lectures, SGD |
| 54 | Describe the effect of hypokalemia and hyperkalemia on ECG | Interactive Lectures, SGD |
| 55 | Describe the effect of hypocalcemia and Hypercalcemia on ECG. | Interactive Lectures, SGD |
| 56 | Define tachycardia and enlist its causes. | Interactive Lectures, SGD |
| 57 | Define bradycardia and enlist its causes. | Interactive Lectures, SGD |

| | | |
|----|--|---------------------------|
| 58 | Classify arrhythmias | Interactive Lectures, SGD |
| 59 | Explain the physiological basis of sinus arrhythmia. | Interactive Lectures, SGD |
| 60 | Explain the physiological basis of reflex bradycardia in Athletes. | Interactive Lectures, SGD |
| 61 | Explain the carotid sinus syndrome. | Interactive Lectures, SGD |
| 62 | Enlist the causes of atrioventricular block. | Interactive Lectures, SGD |
| 63 | Explain the types of atrioventricular blocks. | Interactive Lectures, SGD |
| 64 | Explain the ECG changes in 1 st , 2 nd & 3 rd degree Heart block. | Interactive Lectures, SGD |
| 65 | Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome / ventricular escape. | Interactive Lectures, SGD |
| 66 | Enlist the causes of premature contractions. | Interactive Lectures, SGD |
| 67 | Explain the causes and ECG changes of premature atrial contractions. | Interactive Lectures, SGD |
| 68 | Explain the physiological basis of pulses deficit. | Interactive Lectures, SGD |
| 69 | Explain the causes and ECG changes in PVC. | Interactive Lectures, SGD |
| 70 | Enlist the causes and ECG findings in Long QT syndrome. | Interactive Lectures, SGD |
| 71 | Explain the causes, physiological basis, features, ECG changes & management of ventricular fibrillation. | Interactive Lectures, SGD |
| 72 | Explain the causes, physiological basis, features & ECG changes of atrial fibrillation. | Interactive Lectures, SGD |
| 73 | Explain the physiological basis, features & ECG Changes of atrial flutter. | Interactive Lectures, SGD |
| 74 | Compare Flutter and Fibrillations | Interactive Lectures, SGD |
| 75 | Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules). | Interactive Lectures, SGD |
| 76 | Explain the pressures in systemic & pulmonary circulation. | Interactive Lectures, SGD |
| 77 | Explain the types of Blood flow and significance of Reynolds number. | Interactive Lectures, SGD |
| 78 | Discuss acute local control of local blood flow. | Interactive Lectures, SGD |
| 79 | Discuss acute humoral control of local blood flow. | Interactive Lectures, SGD |
| 80 | Explain longer control of local blood flow. | Interactive Lectures, SGD |
| 81 | Name the organs in which autoregulation of blood Flow occurs during changes in arterial pressure (metabolic & myogenic mechanisms). | Interactive Lectures, SGD |
| 82 | Explain the role of autonomic nervous system for Regulating the circulation. | Interactive Lectures, SGD |
| 83 | Explain the vasomotor center. | Interactive Lectures, SGD |
| 84 | Explain the control of vasomotor center by higher nervous centers. | Interactive Lectures, SGD |
| 85 | Explain emotional fainting/vasovagal syncope. | Interactive Lectures, SGD |
| 86 | Identify vessels constituting micro-capillaries. Enumerate hydrostatic and osmotic factors that underlie Starling's Hypothesis for capillary function. | Interactive Lectures, SGD |
| 87 | Explain the role of nervous system in rapid control of | Interactive Lectures, SGD |

| | | |
|-----|--|---------------------------|
| | Arterial blood pressure. | |
| 88 | Explain the regulation of arterial blood pressure During exercise. | Interactive Lectures, SGD |
| 89 | Enlist different mechanisms for short term regulation of arterial blood pressure. | Interactive Lectures, SGD |
| 90 | Make a flow chart to discuss the role of Atrial volume reflexes / Bainbridge reflex in control of blood pressure. | Interactive Lectures, SGD |
| 91 | Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch. | Interactive Lectures, SGD |
| 92 | Describe the role of CNS is chemic response in Regulation of the blood pressure. | Interactive Lectures, SGD |
| 93 | Explain the Cushing reflex | Interactive Lectures, SGD |
| 94 | Explain the role of abdominal compression reflex to Increase the arterial blood pressure. | Interactive Lectures, SGD |
| 95 | Make a flow chart to discuss the role of rennin Angiotensin system for long term control of blood pressure. | Interactive Lectures, SGD |
| 96 | Make a flow chart to show the regulation of blood Pressure in response to increase in ECF volume. | Interactive Lectures, SGD |
| 97 | Make a flow chart to show the regulation of blood Pressure in response to increase in salt intake. | Interactive Lectures, SGD |
| 98 | Define cardiac output, cardiac index & venous return With their normal values. | Interactive Lectures, SGD |
| 99 | Explain the pathological causes of high & low cardiac output. | Interactive Lectures, SGD |
| 100 | Discuss the factors regulating cardiac output | Interactive Lectures, SGD |
| 101 | Discuss factors regulating venous return | Interactive Lectures, SGD |
| 102 | Explain the regulation of skeletal muscle blood flow at rest & during exercise. | Interactive Lectures, SGD |
| 103 | Explain the physiological anatomy of coronary circulation. | Interactive Lectures, SGD |
| 104 | Explain the regulation of coronary blood flow. | Interactive Lectures, SGD |
| 105 | Explain the physiological basis of angina, myocardial & subendocardial infarction | Interactive Lectures, SGD |
| 106 | Define & enlist different types of shock. | Interactive Lectures, SGD |
| 107 | Explain the causes, features, and pathophysiology of Hypovolemic/hemorrhagic shock. | Interactive Lectures, SGD |
| 108 | Explain the causes, features, and pathophysiology of Septic shock. | Interactive Lectures, SGD |
| 109 | Explain the causes, features, and pathophysiology of Neurogenic shock. | Interactive Lectures, SGD |
| 110 | Explain the causes, features, and pathophysiology of anaphylactic shock. | Interactive Lectures, SGD |
| 111 | Discuss the treatment of different types of shock. | Interactive Lectures, SGD |
| 112 | Explain the different stages of shock. | Interactive Lectures, SGD |
| 113 | Explain the mechanisms that maintain the cardiac output & | Interactive Lectures, SGD |

| | | |
|-----|---|---------------------------|
| | arterial blood pressure in non-progressive shock. | |
| 114 | Enlist different types of positive feedback Mechanisms that can lead to the progression of shock. | Interactive Lectures, SGD |
| 115 | Enlist the different types of heart sounds and explain the physiological basis of each. | Interactive Lectures, SGD |
| 116 | Enlist the causes of 3 rd and 4 th heart sounds. | Interactive Lectures, SGD |
| 117 | Explain the causes & physiological basis of murmurs Caused by valvular lesions. | Interactive Lectures, SGD |
| 118 | Enumerate abnormal heart sounds and describe the physiological basis of each. | Interactive Lectures, SGD |
| 119 | Classify different types of heart failure | Interactive Lectures, SGD |
| 120 | Discuss the signs and symptoms of Heart failure. | Interactive Lectures, SGD |
| 121 | Discuss the management of Heart failure. | Interactive Lectures, SGD |
| 122 | Discuss the signs and symptoms of Arrhythmias. | Interactive Lectures, SGD |
| 123 | Discuss the management of Arrhythmias. | Interactive Lectures, SGD |
| 124 | Enlist various categories of ischemic heart diseases | Interactive Lectures, SGD |
| 125 | Discuss the signs and symptoms of ischemic heart diseases | Interactive Lectures, SGD |
| 126 | Discuss the management of ischemic heart diseases. | Interactive Lectures, SGD |
| 127 | Discuss the signs and symptoms of Hypertension. | Interactive Lectures, SGD |
| 128 | Discuss the management of Hypertension. | Interactive Lectures, SGD |
| 129 | Enlist various valvular heart diseases | Interactive Lectures, SGD |
| 130 | Identify presentations and signs and symptoms of Valvular heart diseases | Interactive Lectures, SGD |
| 131 | Outline management strategies | Interactive Lectures, SGD |
| 132 | Identify various pericardial diseases | Interactive Lectures, SGD |
| 133 | Identify presentations and signs and symptoms | Interactive Lectures, SGD |
| 134 | Outline management strategies | Interactive Lectures, SGD |
| 135 | Identify various endocardial and myocardial diseases | Interactive Lectures, SGD |
| 136 | Identify presentations and signs and symptoms | Interactive Lectures, SGD |
| 137 | Outline management strategies | Interactive Lectures, SGD |
| 138 | Define Peripheral arterial diseases | Interactive Lectures, SGD |
| 139 | Identify symptoms and signs of PAD | Interactive Lectures, SGD |
| 140 | Outline management strategies | Interactive Lectures, SGD |
| 141 | Identify the salient features of heart and great Vessels on CT/MRI | Interactive Lectures, SGD |
| 142 | Discuss the principles of cardiac catheterization | Interactive Lectures, SGD |
| 143 | Justify the clinical picture superior mediastinum syndrome anatomically | Interactive Lectures, SGD |
| 144 | Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with it clinical implication | Interactive Lectures, SGD |
| 145 | Psychological basis of emotional fainting and its Impact | Interactive Lectures, SGD |

| BIOCHEMISTRY | | |
|---------------------|----------------------------|----------------------------|
| LEC. NO | LEARNING OBJECTIVES | TEACHING STRATEGIES |

| | | |
|----|---|-------------------------------------|
| 1 | Classify lipids. | Interactive Lectures, SGD |
| 2 | Discuss the biomedical functions & properties of lipids. | Interactive Lectures, SGD |
| 3 | Classify fatty acids. Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on lipid profile. | Interactive Lectures, SGD |
| 4 | Discuss lipid peroxidation and its significance | Interactive Lectures, SGD |
| 5 | Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin) | Interactive Lectures, SGD, Tutorial |
| 6 | Describe the types, structure, biomedical importance of Lipoproteins | Interactive Lectures, SGD |
| 7 | Discuss the synthesis, transport and fate of Lipoproteins | Interactive Lectures, SGD |
| 8 | Interpret the disorders associated with impairment of lipoprotein metabolism especially atherosclerosis and LDL oxidized | Interactive Lectures, SGD |
| 9 | Explain the sources, properties, and biomedical role of cholesterol | Interactive Lectures, SGD |
| 10 | Describe the reactions of cholesterol biosynthesis and its regulation & fate. | Interactive Lectures, SGD |
| 11 | Discuss Genetic basis of the Hypercholesterolemia | Interactive Lectures, SGD |
| 12 | Describe enzymes with reference to: <ul style="list-style-type: none"> • Active sites • Catalytic efficiency • Coenzyme • Apoenzyme • Zymogens • Specificity • Cofactor • Holoenzyme • Prosthetic group • Location | Interactive Lectures, SGD |
| 13 | Classify enzymes according to the reaction they catalyze. | Interactive Lectures, SGD |
| 14 | Explain the mechanism of enzyme action from reactants to products (catalysis). a) Illustrate enzyme kinetics in relation to MM Equation & Lineweaver- Burke plo | Interactive Lectures, SGD |
| 15 | Discuss the effect of various factors (with special reference to Km/V max) on enzymatic activity. <ul style="list-style-type: none"> • Substrate concentration • Temperature • PH • Enzyme concentration | Interactive Lectures, SGD |
| 16 | Explain the regulation of enzymatic activity. a) Compare allosteric regulation with regulation by covalent modification. b) Discuss the effect of inhibitors on enzymatic activity which includes: <ul style="list-style-type: none"> • Competitive inhibition • Uncompetitive inhibition c) Interpret the effect of organophosphorus poisoning on | Interactive Lectures, SGD |

| | | |
|----|---|---------------------------|
| | enzyme activity on basis of given data | |
| 17 | Explain the application of enzyme in clinical diagnosis and therapeutic use | Interactive Lectures, SGD |
| 18 | Discuss the signs and symptoms of hyperlipidemia | Interactive Lectures, SGD |
| 19 | Interpret data related to hyperlipidemia | Interactive Lectures, SGD |

| PRACTICAL | | Total Hours = 10 + 08 = 18 | |
|-------------------------------------|--|-----------------------------------|------------------------------|
| SPECIFIC LEARNING OBJECTIVES | | DISCIPLINE | TOPIC |
| 1 | Perform estimation of Cholesterol by kit method. | Medical Biochemistry | Cholesterol Estimation |
| 2 | Perform estimation of HDL, LDL | | HDL, LDL Estimation |
| 3 | Estimation of cardiac markers | | Cardiac Marker Estimation |
| 4 | Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias | | Interpretation of Lab report |

| AGING | |
|---|----------------------------|
| THEORY | |
| LEARNING OBJECTIVES | TEACHING STRATEGIES |
| Discuss the effect of age on blood vessels with reference to hypertension | Lectures |
| Discuss the risk of cardiac attack in old age and weather conditions | Lectures |
| Discuss the effect of age on valvular system of the heart. | Lectures |
| Discuss the effect of age on neural conduction of the heart in relation to arrhythmia. | Lectures |
| Discuss the protective role of female hormone against CVS diseases in women of reproductive age group | Lectures |

| PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS | |
|--|----------------------------|
| THEORY | |
| LEARNING OBJECTIVES | TEACHING STRATEGIES |
| Classify types of thrombosis, embolism, and infarction | Lectures |
| Discuss the pathophysiology of thrombosis, embolism, and infarction | Lectures |
| Identify the types and causes of hypertension | Lectures |
| Discuss the pathophysiology of atherosclerosis, hypertension, and shock | Lectures |
| Discuss the clinical consequences of hypertension and atherosclerosis | Lectures |
| Classify the types of heart failure | Lectures |
| Identify the causes leading to heart failure | Lectures |
| Identify the types of ischemic heart disease | Lectures |
| Discuss the pathophysiology of different types of ischemic heart disease | Lectures |
| Outline the pharmacological concepts of drugs used in hypertension. | Lectures |
| Outline the pharmacological concepts of drugs used in angina. | Lectures |
| Outline the pharmacological concepts of drugs used in arrhythmias. | Lectures |

| | |
|---|----------|
| Outline the pharmacological concepts of drugs used in cardiac failure. | Lectures |
| Outline the pharmacological concepts of drugs used in peripheral vascular diseases. | Lectures |

| DISEASE PREVENTION & IMPACT | |
|--|----------------------------|
| THEORY | |
| LEARNING OBJECTIVES | TEACHING STRATEGIES |
| Describe the various strategies and models to prevent diseases. | Lectures |
| Describe primordial prevention and its application to preventing CVS diseases. | Lectures |
| Depict the concept of primary prevention in context to CVS and able to apply on CVS diseases. | Lectures |
| Discuss the basic concept of health promotion and its application to CVS. | Lectures |
| Discuss various methods of behavioral change interventions at community level. | Lectures |
| To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension) | Lectures |
| Describe the concept of cardiovascular diseases as non-communicable diseases | Lectures |
| Identify the risk factors in the community for CVS diseases. | Lectures |
| Learn and apply interventions to prevent the risk factors in community. | Lectures |
| 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. | Lectures |

ASSESSMENT
INTERNAL ASSESSMENT
BLOCK - 3
(Total 70 Marks)

| THEORY | | |
|--------|---|-----------------|
| S. No | Scoring Parameter | Marks out of 35 |
| 1. | Attendance >91% = 2 Marks 85-90% = 1 Mark | 02 Marks |
| 2. | Block Exam 71-onwards = 7 Marks 66-70 = 7 Marks 61-65 = 7 Marks 55-60 = 6 Marks | 27 Marks |
| 3. | Portfolio, Professional Behavior, Leadership Trait | 03 Marks |
| 4. | Continuous Assessment (Formative) – 3 Modules (only Pass) | 03 Marks |

| PRACTICAL AND BEHAVIORAL ASSESSMENT | | |
|-------------------------------------|---|-----------------|
| S. No | Scoring Parameter | Marks out of 35 |
| 1. | Attendance >91% = 2 Marks 85-90% = 1 Mark | 02 Marks |
| 2. | Summative Assessment (Block Exam) OSPE / Practical 71-onwards = 7 Marks 66-70 = 7 Marks 61-65 = 6 Marks 55-60 = 6 Marks | 26 Marks |
| 3. | Practical books / Clinical Logbooks | 07 Marks |

ASSESSMENT TOOLS

MCQS

SEQS

OSPE

OSCE

VIVA

MARKS DISTRIBUTION

MBBS 1ST PROFESSIONAL **BLOCK - 3**

| Theme | Subject | Written Exam | | | Oral/Practical/Clinical Exam | | | |
|--|------------------------------------|-----------------|-------------------------|------------|-------------------------------------|-------------------------------------|-------------------------------------|------------|
| | | MCQ (1 mark) | SEQ (5 mark each) | Marks | OSPE (08 marks each) Observed | OSCE (05 marks each) Observed | OSVE (14 marks each) Observed | Marks |
| Normal Structure | | 17 | 03 | 32 | 03 | - | 01 | 38 |
| Normal Function | Physiology & applied/clinical | 31 | 04 | 51 | 04 | - | 01 | 46 |
| | Biochemistry & applied/clinical | 19 | 02 | 29 | 02 | - | 01 | 30 |
| Disease Burden & Prevention | Community Medicine & Public Health | 06 | - | 06 | - | - | - | - |
| | Behavioral Sciences | 02 | - | 02 | - | - | - | - |
| Pathophysiology and Pharmacotherapeutics | Pathology | 10 | 01 | 15 | - | - | - | 08 |
| | Pharmacology | 05 | - | 05 | - | - | - | 08 |
| CFRC | CFRC 1-3 | - | - | - | - | 01 | - | 05 |
| PERLs | PERLs 1-3 | - | - | - | - | 01 | - | 05 |
| Total | | 90 | 10 x 5 = 35 | 140 | 11 Stations x 08 = 88 | 2 Stations x 05 = 10 | 3 Stations x 14 = 42 | 140 |

INDEPENDENT MEDICAL COLLEGE, FSD

BLOCK - 3

RESPIRATORY -1 (MODULE - 5)
CURRICULUM 2K23

Modular Integrated
Undergraduate Curriculum

INTRODUCTION TO THE MODULE

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.

MODULE COMMITTEE

| | |
|------------------------------|---|
| Prof. Dr. Irfan Ahmad Mughal | Anatomy (Coordinator Integrated Curriculum) |
| Prof. Dr. Razia Rizwan | Physiology (Module Coordinator) |
| Dr. Rizwan Ahmad | Biochemistry |
| Dr. Awais Shuja | Surgery |
| Dr. Baddar Bashir | Medicine |
| Dr. Sirda Mushtaq | Pharmacology |
| Dr. Shahbaz Ahmad | Community Medicine |
| Dr. Salma Naz | Pathology |
| Dr. Aslam Lodhi | Psychiatry |
| Dr. Taimur-ul-Hassan | Medical Education |

INDEPENDENT MEDICAL COLLEGE, FAISALABAD

1ST YEAR MBBS

TIME TABLE

3RD BLOCK – 5TH MODULE (REPIRATORY -1)

04 Weeks

| Time | 08:00 - 10:00 | 10:00 - 11:00 | 11:00 - 11:15 | 11:15 - 01:15 | 01:15 - 02:15 | 02:15 - 02:45 |
|-------------|---|--------------------------------------|--------------------------------------|--------------------------------------|---|---|
| Mon | Anatomy | Physiology | BREAK | Physiology | Pharmacology | Self Directed Learning (SDL) |
| Tue | Anatomy | Physiology | | Physiology | Pathology / Aging | |
| Wed | Anatomy | Physiology | | Physiology | Community Medicine / Behavioral Sciences | |
| Thu | Anatomy | Physiology | | Physiology | Physiology / Medicine | |
| Fri | Community Medicine / Behavioral Sciences 8:00 - 09:30 | | PERL 09:30 - 10:30 | Biochemistry 10:30 - 11:30 | Pathology / Aging 11:30 - 01:00 | |
| Sat | Anatomy 08:00 - 10:00 | Biochemistry 10:00 - 11:00 | BREAK 11:00 - 11:15 | Biochemistry 11:15 - 01:15 | CFRC 01:15 - 02:15 | SDL 02:15 - 02:45 |

DISTRIBUTION OF TEACHING HOURS

| | |
|---------------------------|--------|
| Modules weeks | 04 |
| Recommended Minimum Hours | 136 hr |
| Anatomy | 45 hr |
| Physiology | 53 hr |
| Biochemistry | 17 hr |
| Pathology | 06 hr |
| Community Medicine | 06 hr |
| Pharmacology | 05 hr |
| Behavioral Sciences | 04 hr |
| CFRC | 04 hr |
| PERL | 04 hr |

MODULE OUTCOMES

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

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

LEARNING OBJECTS

BLOCK 3 – RESPIRATORY -1 (MODULE – 5TH)

| ANATOMY | |
|--|----------------------------|
| COURSE OBJECTIVES | TEACHING STRATEGIES |
| GROSS ANATOMY | |
| Describe the anatomical features and neurovascular supply of nasal cavity | SGD |
| Describe the anatomical features and neurovascular supply of pharynx | SGD |
| Describe the anatomical features and neurovascular supply of larynx | SGD |
| Describe the anatomical features of the Trachea with its extent, relations, neurovascular supply and lymphatics. | SGD |
| Give the boundaries of thoracic cavity, superior and inferior thoracic apertures and list the structures contained/ traversing them. | SGD |
| Describe the anatomical correlates of Thoracic inlet syndrome & Thoracic outlet syndrome | SGD |
| Identify and differentiate the typical from atypical ribs. | SGD |
| Describe the anatomical features of ribs and give their attachments. | SGD |
| Describe the anatomical correlates of supernumerary cervical rib. | SGD |
| Classify the articulations of the ribs. | SGD |
| Describe the anatomical features of these articulations. | SGD |
| Describe the movements with the muscles producing articulations. | SGD |
| Describe the effects of fracture to the neck of rib and give its anatomical justification | SGD |
| Describe the anatomical correlates of Flail Chest. | SGD |
| Describe the anatomical correlates of Thoracotomy | SGD |
| Define the attachments, relations, nerve supply and actions of intercostal muscles | SGD |
| Define an intercostal space and give details of its contents | SGD |
| Describe the anatomical correlates of intercostal incisions | SGD |
| Describe the anatomical features and attachments on typical & atypical thoracic vertebrae. | SGD |
| Differentiate between typical and atypical vertebrae | SGD |
| Explain the thoracic part of vertebral column (normal curvature, intervertebral joints, muscles & fascia of the back, blood supply, lymphatic drainage, nerve supply of back) Associated Clinical conditions -Kyphosis, Scoliosis | SGD |
| Describe the bony features and attachments on the sternum | SGD |
| Describe the anatomical correlates of median sternotomy. | SGD |
| Describe the anatomical correlates of sternal biopsy. | SGD |
| Describe the presentation of sternal fractures and correlate it anatomically | SGD |
| Describe the endo thoracic fascia with its attachments. | SGD |
| Describe the supra-pleural membrane with its attachments. | SGD |
| Classify the joints of the thorax mentioning their articulations, movements | SGD |

| | |
|---|----------------------|
| with the muscle producing them. | |
| Describe the mechanism of thorax: pump handle and bucket handle movements. | SGD |
| Describe the origin, course, relations and distribution of intercostal nerves and vessels | SGD |
| Describe the course and relations of Internal thoracic vessels. | SGD |
| Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava | SGD |
| Describe the cutaneous nerve supply and dermatomes of thorax. | SGD |
| Give anatomical justification of the manifestations of herpes zoster infection on thoracic wall. | SGD |
| Discuss anatomical correlates of intercostal nerve block | SGD |
| Name the parts of diaphragm mentioning their attachments and neurovascular supply | SGD |
| Explain the role of diaphragm in respiration | SGD |
| Enumerate the diaphragmatic apertures with their vertebral levels, mentioning the structures traversing them. | SGD |
| Describe the pleura giving its parts, layers, neurovascular supply, and lymphatic drainage | SGD |
| Describe the pleural cavity giving its recesses and the lines of pleural reflection | SGD |
| Describe the anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion | SGD |
| Describe the anatomical features, relations of lungs | SGD |
| Describe the neurovascular supply and lymphatic drainage of lungs. | SGD |
| Compare and contrast the anatomical features and relations of right and left lung | SGD |
| Describe the root of the lung and pulmonary ligament with arrangement of structures at the hilum | SGD |
| Define Bronchopulmonary segments. Give their vascular supply, lymphatic drainage and clinical significance | SGD |
| Describe the anatomical correlates of chest tube intubation | SGD |
| Describe the anatomical correlates of thoracentesis | SGD |
| Explain the pathophysiology of Atelectasis. | SGD |
| Describe the anatomical correlates of bronchoscopy | SGD |
| Describe the anatomical basis for medico-legal significance of lungs in determining the viability of newborn | SGD |
| Identify various anatomical landmarks on chest X-Rays, CT and MRI | SGD |
| EMBRYOLOGY & POST-NATAL DEVELOPMENT | |
| Describe the development of ribs, sternum, and thoracic vertebrae. Give the associated congenital malformations | Interactive Lectures |
| List the factors contributing to the development of Axial skeletal system | Interactive Lectures |
| Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies | Interactive Lectures |
| Describe the developmental process of Vertebral Column | Interactive Lectures |

| | |
|---|----------------------|
| List the embryological sources of the diaphragm. Describe the events taking place in the development and descent of the diaphragm | Interactive Lectures |
| Describe the development of Thoracic cavities (Pleural and Pericardial cavities) | Interactive Lectures |
| Describe the development of upper respiratory tract: larynx and trachea | Interactive Lectures |
| Describe congenital anomalies of Trachea- Tracheoesophageal fistulas of different types | Interactive Lectures |
| List the phases of lung development with their time periods. Describe the events taking place in each phase | Interactive Lectures |
| Describe the embryological basis of respiratory distress syndrome/Hyaline membrane disease, Ectopic Lung lobes, Congenital cysts of Lung | Interactive Lectures |
| MICROSCOPIC STRUCTURE | |
| Give the general histological organization of respiratory system. | Interactive Lectures |
| Describe the microscopic features of respiratory epithelium & Olfactory epithelium | Interactive Lectures |
| Describe histology of Nasopharynx | Interactive Lectures |
| Describe the histological features of epiglottis and larynx | Interactive Lectures |
| Describe the histological features of trachea and lungs Describe histology of blood-air barrier | Interactive Lectures |
| Explain the histological basis of: 1. Laryngitis 2. Singer's nodules 3. Emphysema 4. Pneumonia 5. Atelectasis 6. Infant respiratory distress syndrome | Interactive Lectures |
| PRACTICAL | |
| SPECIFIC LEARNING OBJECTIVES - HISTOLOGY | |
| Identify, draw and label the histologic sections of epiglottis and larynx. | Practical |
| Describe the histological features of bronchial tree: trachea, bronchi, bronchioles, alveoli | Practical |
| Identify, draw and label the histological sections of bronchial tree: trachea, bronchi, bronchioles, alveoli, Lung | Practical |
| Describe the mucosal changes encountered in the trachea-bronchial tree | Practical |
| Compare and contrast the histological features of various components of bronchial tree: trachea, bronchi, bronchioles, alveoli. | Practical |
| Describe, compare and contrast the light and electron microscopic features of type I and type II pneumocytes | Practical |

| PHYSIOLOGY | | |
|-------------------|---|----------------------------|
| LEC. NO | COURSE OBJECTIVES | TEACHING STRATEGIES |
| 1 | Enlist the muscles of inspiration and expiration in quiet breathing | Interactive Lectures |
| 2 | Enlist the muscles of inspiration and expiration in Labored | Interactive Lectures, SGD |

| | | |
|----|--|-------------------------------------|
| | breathing | |
| 3 | Explain the components of the work of breathing | Interactive Lectures, SGD |
| 4 | Discuss the mechanics of pulmonary ventilation | Interactive Lectures, SGD |
| 5 | Explain periodic breathing | Interactive Lectures, SGD, Tutorial |
| 6 | Explain the causes and pathophysiology of sleep Apnea | Interactive Lectures, |
| 7 | Define lung compliance | Interactive Lectures, SGD |
| 8 | Enlist the factors that affect lung compliance | Interactive Lectures, SGD |
| 9 | Draw the compliance diagram of air filled and Saline filled lungs | Interactive Lectures, SGD |
| 10 | Enlist the components of surfactant | Interactive Lectures, SGD |
| 11 | Describe the role of surfactant in lung compliance | Interactive Lectures, Tutorial |
| 12 | Explain the role of surfactant in premature babies | Interactive Lectures, SGD |
| 13 | Define the different lung volumes and capacities And their clinical significance | Interactive Lectures, SGD |
| 14 | Discuss fev1/FVC ratio and its clinical significance | Interactive Lectures, SGD |
| 15 | Enlist the lung volumes and capacities that cannot Be measured by spirometer. | Interactive Lectures, SGD |
| 16 | Define dead space & explain its types | Interactive Lectures, SGD |
| 17 | Discuss FEV1/FVC ratio in relation to Bronchial Asthma. | Interactive Lectures, SGD |
| 18 | Discuss FEV1/FVC ratio in relation to Chronic Obstructive Pulmonary disease/restrictive lung diseases | Interactive Lectures, SGD |
| 19 | Discuss FEV1/FVC ratio in relation to pulmonary Embolism | Interactive Lectures, SGD |
| 20 | Define alveolar ventilation. | Interactive Lectures, SGD |
| 21 | Define minute respiratory volume | Interactive Lectures, SGD |
| 22 | Explain the ultra-structure of respiratory membrane | Interactive Lectures, SGD |
| 23 | Discuss the factors affecting diffusion of gases Across the respiratory membrane | Interactive Lectures, SGD |
| 24 | Explain the diffusion capacity of respiratory Membrane for oxygen and carbon dioxide | Interactive Lectures, SGD |
| 25 | Define alveolar, pleural and trans pulmonary pressure. | Interactive Lectures, SGD |
| 26 | Explain differences in the partial pressures of atmospheric, humidified, alveolar air and explain physiological basis of change in each pressure | Interactive Lectures, SGD |
| 27 | Explain the different forms of transport of oxygen In the blood | Interactive Lectures, SGD |
| 28 | Draw and explain ox hemoglobin dissociation Curve | Interactive Lectures, SGD |
| 29 | Enlist the factors that cause right ward shift of Oxyhemoglobin dissociation curve. | Interactive Lectures, SGD |
| 30 | Enlist the factors that cause left ward shift of Oxyhemoglobin dissociation curve | Interactive Lectures, SGD |
| 31 | Explain the Bohr's effect | Interactive Lectures, SGD |
| 32 | Define; enlist the types, and causes of cyanosis | Interactive Lectures, SGD |
| 33 | Enlist different forms in which CO ₂ is transported in the blood. | Interactive Lectures, SGD |

| | | |
|----|--|--------------------------------|
| 34 | Explain the Carboxyhemoglobin dissociation curve. | Interactive Lectures, SGD |
| 35 | Explain the Haldane effect. | Interactive Lectures, SGD |
| 36 | Explain the chloride shift / Hamburger phenomenon. | Interactive Lectures, SGD |
| 37 | Define the respiratory exchange ratio (RER) | Interactive Lectures, SGD |
| 38 | Explain the alveolar oxygen and carbondioxide Pressure when VA/Q = infinity, zero and normal | Interactive Lectures, SGD |
| 39 | Explain the concept to physiological shunt when VA / Q ratio is less than normal | Interactive Lectures, SGD |
| 40 | Explain the concept to physiological dead space When VA/Q ratio is above normal | Interactive Lectures, Tutorial |
| 41 | Enlist the respiratory & non-respiratory functions of lungs. | Interactive Lectures, Tutorial |
| 42 | Explain the nervous control of bronchiolar Musculature | Interactive Lectures, Tutorial |
| 43 | Trace the reflex are of cough reflex and sneeze Reflex | Interactive Lectures, Tutorial |
| 44 | Explain the principal means by which Acclimatization occurs | Interactive Lectures, SGD |
| 45 | Explain the events that occur during acute Mountain sickness | Interactive Lectures, SGD |
| 46 | Enlist the features of chronic mountain sickness | Interactive Lectures, SGD |
| 47 | Draw and explain oxyhemoglobin dissociation Curve | Interactive Lectures, SGD |
| 48 | Enlist the factors that cause right ward shift of Oxyhemoglobin dissociation curve. | Interactive Lectures, SGD |
| 49 | Enlist the factors that cause left ward shift of Oxyhemoglobin dissociation curve | Interactive Lectures, SGD |
| 50 | Explain the Bohr's effect | Interactive Lectures, SGD |
| 51 | Define; enlist the types, and causes of cyanosis | Interactive Lectures, SGD |
| 52 | Enlist different forms in which CO ₂ is transported in the blood. | Interactive Lectures, SGD |
| 53 | Explain the Carboxyhemoglobin dissociation curve. | Interactive Lectures, SGD |
| 54 | Explain the Haldane effect. | Interactive Lectures, SGD |
| 55 | Explain the chloride shift / Hamburger phenomenon. | Interactive Lectures, SGD |
| 56 | Define the respiratory exchange ratio (RER) | Interactive Lectures, SGD |
| 57 | Explain the alveolar oxygen and carbondioxide Pressure when VA/Q = infinity, zero and normal | Interactive Lectures, SGD |
| 58 | Explain the concept of physiological shunt when VA/Q ratio is less than normal | Interactive Lectures, SGD |
| 59 | Explain the concept of physiological dead space when VA/Q ratio is above normal | Interactive Lectures, SGD |
| 60 | Enlist the respiratory & non-respiratory functions of lungs. | Interactive Lectures, SGD |
| 61 | Explain the nervous control of bronchiolar musculature | Interactive Lectures, SGD |
| 62 | Trace the reflex arc of cough reflex and sneeze Reflex | Interactive Lectures, SGD |
| 63 | Explain the principal means by which Acclimatization occurs | Interactive Lectures, SGD |
| 64 | Explain the events that occur during acute Mountain sickness | Interactive Lectures, SGD |
| 65 | Enlist the features of chronic mountain sickness | Interactive Lectures, SGD |
| 66 | Explain the pathophysiology, features, prevention And treatment of decompression sickness. | Interactive Lectures, SGD |

| | | |
|-----|---|---------------------------|
| 67 | Draw and explain the effect of CO poisoning on Oxyhemoglobin dissociation curve | Interactive Lectures, SGD |
| 68 | Explain the pathophysiology, features, and Treatment of CO poisoning. | Interactive Lectures, SGD |
| 69 | Enumerate the components of respiratory centers and explain their functions. | Interactive Lectures, SGD |
| 70 | Explain the inspiratory RAMP signal | Interactive Lectures, SGD |
| 71 | Explain the Herring Breuer reflex / lung inflation Reflex and its clinical significance | Interactive Lectures, SGD |
| 72 | Explain the location of chemo sensitive area (central chemoreceptors) and peripheral Chemoreceptors | Interactive Lectures, SGD |
| 73 | Explain the effect of hydrogenions & carbon Dioxide on the chemo-sensitive area | Interactive Lectures, SGD |
| 74 | Explain the role of oxygen in the control of respiration / peripheral chemoreceptors | Interactive Lectures, SGD |
| 75 | Explain the regulation of Respiration during Exercise | Interactive Lectures, SGD |
| 76 | Enlist the effects of acute hypoxia | Interactive Lectures, SGD |
| 77 | Explain the hypoxia inducible factor a master Switch for body response to hypoxia | Interactive Lectures, SGD |
| 78 | Define and explain different types of hypoxias | Interactive Lectures, SGD |
| 79 | Explain the pathophysiology of Tuberculosis. | Interactive Lectures, SGD |
| 80 | Describe the pathophysiology of Pneumonia | Interactive Lectures, SGD |
| 81 | Define Dyspnea | Interactive Lectures, SGD |
| 82 | Enlist different causes of dyspnea | Interactive Lectures, SGD |
| 83 | Differentiate between cardiac and respiratory dyspnea Outline management strategies for dyspnea | Interactive Lectures, SGD |
| 84 | Enlist the causes of Pneumothorax | Interactive Lectures, SGD |
| 85 | Describe the signs and symptoms of Pneumothorax | Interactive Lectures, SGD |
| 86 | Enlist the causes of Pleuritis | Interactive Lectures, SGD |
| 87 | Describe the signs and symptoms of Pleuritis Discuss the management of Pleuritis | Interactive Lectures, SGD |
| 88 | Enlist the causes of Bronchitis | Interactive Lectures, SGD |
| 89 | Discuss the signs and symptoms of Bronchitis | Interactive Lectures, SGD |
| 90 | Discuss the management of Bronchitis | Interactive Lectures, SGD |
| 91 | Classify different types of pneumonia | Interactive Lectures, SGD |
| 92 | Discuss the sign symptoms of pneumonia | Interactive Lectures, SGD |
| 93 | Discuss the management of pneumonia | Interactive Lectures, SGD |
| 94 | Classify different types of asthma | Interactive Lectures, SGD |
| 95 | Discuss the signs and symptoms of asthma | Interactive Lectures, SGD |
| 96 | Discuss the management of asthma | Interactive Lectures, SGD |
| 97 | Classify different types of Tuberculosis | Interactive Lectures, SGD |
| 98 | Discuss the signs and symptoms of tuberculosis | Interactive Lectures, SGD |
| 99 | Discuss the management of Tuberculosis | Interactive Lectures, SGD |
| 100 | Classify different types of acute respiratory distress syndrome | Interactive Lectures, SGD |

| | | |
|-----|---|---------------------------|
| 101 | Discuss the signs and symptoms of acute respiratory distress syndrome | Interactive Lectures, SGD |
| 102 | Discuss the management of acute respiratory distress syndrome | Interactive Lectures, SGD |
| 103 | Define respiratory failure | Interactive Lectures, SGD |
| 104 | Describe various types of respiratory failure | Interactive Lectures, SGD |
| 105 | Enlist various causes of respiratory failure | Interactive Lectures, SGD |
| 106 | Outline management strategies of respiratory failure | Interactive Lectures, SGD |
| 107 | Describe ABC in a trauma patient | Interactive Lectures, SGD |

| PRACTICAL | | Total Hours = 6 + 6 = 12 | |
|------------------|--|---------------------------------|----------------------------|
| | SPECIFIC LEARNING OBJECTIVES | DISCIPLINE | TOPIC |
| 1 | Interpret the Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter | Medical Physiology | Blood Cells |
| 2 | Interpret the Total Leucocyte Count, Differential Leucocyte Count Platelet Count by Automated Cell Counter. | | |
| 3 | Determine Bleeding Time. | | Bleeding/ Clotting time |
| 4 | Determine Clotting Time. | | |

| BIOCHEMISTRY | | |
|---------------------|--|-------------------------------------|
| LEC. NO | COURSE OBJECTIVES | TEACHING STRATEGIES |
| 1 | Explain and interpret the pedigree of single gene defect i.e., Emphysema and cystic fibrosis (autosomal recessive) | Interactive Lectures, SGD |
| 2 | Explain the biochemical significance of phospholipids | Interactive Lectures, SGD |
| 3 | Interpret Respiratory Distress syndrome on the basis of given data | Interactive Lectures, SGD |
| 4 | Describe the structure, synthesis, degradation and functions of Elastin | Interactive Lectures, SGD |
| 5 | Discuss the pathophysiology of Emphysema. | Interactive Lectures, SGD, Tutorial |
| 6 | Discuss the concept of acid base balance | Interactive Lectures, SGD |
| 7 | Interpret metabolic and respiratory disorders of acid base balance on the basis of sign, symptoms and ABG findings | Interactive Lectures, SGD |
| 8 | Describe the Clinical interpretation of acid base balance | Interactive Lectures, SGD |

| CODE | PRACTICAL | Total Hours = 6+6=12 | |
|-------------|-------------------------------------|-----------------------------|--------------|
| | SPECIFIC LEARNING OBJECTIVES | DISCIPLINE | TOPIC |

| | | | |
|---|--|-------------------------|--|
| 1 | Determine the pH of the solution by pH meter | Medical Biochemistry | Determination of pH Prevention of acute respiratory infections (ARI) |
| 2 | Explain the role of vitamins in the respiratory tract infections | | |

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

| COURSE OBJECTIVES | TEACHING STRATEGIES |
|---|---------------------|
| Identify the drugs for cough suppression & expectoration | Lectures |
| Explain the mechanism of action and adverse effects of cough suppressants | Lectures |
| Explain the mechanism of action and adverse effects of anti-histamines | Lectures |
| Explain the mechanism of action and adverse effects of anti-asthmatics | Lectures |
| Describe the pathophysiology of acute respiratory distress syndrome | Lectures |
| Describe the pathophysiology of obstructive lung disease | Lectures |
| Describe the pathophysiology of Restrictive Lung Disease | Lectures |

AGING

| COURSE OBJECTIVES | TEACHING STRATEGIES |
|---|---------------------|
| Discuss the effect of age on decreased lung compliance | Lectures |
| Discuss the role of age on respiratory clearance leading to recurrent inflammatory processes at the ciliated respiratory epithelium | Lectures |

DISEASE PREVENTION & IMPACT

| THEORY | |
|---|---------------------|
| COURSE OBJECTIVES | TEACHING STRATEGIES |
| Identify the common risk factors of acute respiratory infections with emphasis on smoking | Lectures |
| Discuss preventive strategies of different problems related to respiratory system | Lectures |
| Enlist the common vaccines used for the prevention of ARI | Lectures |
| Explain the role of vitamins in the respiratory tract infections | Lectures |
| Explain the effect of air pollutants on the respiratory system | Lectures |
| Describe the burden of respiratory diseases | Lectures |
| Enlist the common respiratory diseases related to occupation | Lectures |
| Identify the psychosocial factors leading to dyspnea. | Lectures |
| Identify the psychosocial factors leading to psychogenic cough. | Lectures |
| 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. | Lectures |

RESOURCE BOOKS

Anatomy

- Langman's Medical Embryology
- Snell's Clinical Anatomy
- Snell's Clinical Neuroanatomy. Walter Kluwer
- Laiq H.S. Medical Histology. Paramount Books.
- Laiq H.S. General Anatomy. Paramount Books.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Saunders & Co., Philadelphia.
- Essentials of Medical Physiology by Mushtaq Ahmad

Biochemistry

- Harper's Biochemistry by Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. McGraw-Hill latest ed.
- Lippincott's Illustrated Reviews Biochemistry Champe, P.C. & Harvey, E.A latest ed. Published by Lippincott Williams and Wilkins.
- ABC of clinical genetics by H. M. Kingston

Pathology

- Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.
- Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology. Churchill Livingstone.

Pharmacology

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioral Sciences

- Handbook of Behavioural Sciences by Prof. Mowadat H. Rana, 3rd Edition.
- Medical and Psychosocial Aspects of Chronic Illness and Disability SIXTH EDITION Donna R. Falvo, PhD Beverley E. Holland, PhD, RN,

Community medicine

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor).
- Public Health and Community Medicine Ilyas, Ansari (Editors)

Surgery

- Bailey & Love' Short practice of Surgery

Medicine

- Davidson's Principles and Practice of Medicine

Islamiyat

- Standard Islamiyat (compulsory) for B.A, BSc, MA, MSc, MBBS by Prof. M. Sharif Islahi.
- Ilmi Islamiyat (compulsory) for BA, BSc, & equivalent.