**STUDY GUIDE**

**FIRST PROFESSIONAL MBBS**

**Block III**

**Module – CVS - I**

**Pak Red Crescent Medical & Dental College**



48-KM Multan Road, Lahore-Pakistan.

**MODULE 3**

**ANATOMY**

| **ANATOMY Knowledge** | | | |
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| **Theory** | **Learning Objectives** | **Mode of Info Transfer** | **Assessment Tool** |
| Mediastinum | Define mediastinum giving its boundaries and compartments. List the contents of its various compartments. Justify the clinical picture of superior mediastinum syndrome anatomically. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| | Describe the formation, tributaries, and termination of superior vena cava Human Anatomy Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta. Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| | Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins. Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Pericardium | Describe the pericardial cavity mentioning transverse and oblique sinuses. Discuss their clinical significance. Describe the surgical significance of pericardial sinus. Describe the anatomical correlates of pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade. Describe the anatomical basis for pericardiocentesis. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Heart | Describe the external features of heart. List various chambers of heart mentioning their salient features and opening. Describe the arterial supply of heart: coronary | Demonstration | SEQs<br>MCQs |

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| | arteries and their distribution with special emphasis on collaterals established during ischemia. Describe the sites of anastomosis between right and left coronary arteries with the participating vessels. | | OSPE<br>VIVA VOCE |
| Clinical correlates of Heart | Discuss the anatomical correlates of cardiac arterial supply Integrate with cardiology/ Medicine Describe the anatomical basis for cardiac catheterization. Describe the anatomical correlates of electrocardiography, heart block, atrial fibrillation, artificial cardiac pacemaker, cardiac referred pain. Describe the anatomical basis for echocardiography, coronary angiography, angioplasty, and coronary grafts. Describe the features of angina pectoris and myocardial infarction and correlate them anatomically. Describe the features of angina pectoris and myocardial infarction and correlate them anatomically | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Venous and Lymphatic drainage of Heart | Describe the venous drainage of heart. Describe the alternative venous routes to the heart Identify the vessels supplying the heart with their origins/terminations. Discuss the anatomical principles of Varicose Veins Describe the Lymphatics of heart. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Nerve Supply of Heart | Describe the formation, relations, and distribution of cardiac plexus. Describe components and significance of fibrous skeleton of heart | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Fibrous skeleton of heart | Describe components and significance of fibrous skeleton of heart Describe the cardiac valves. Explain the anatomical basis for valvular heart diseases | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| upper respiratory tract | Describe the anatomical features and neurovascular supply of nasal cavity. Describe the anatomical features and neurovascular supply of pharynx. Describe the anatomical features and neurovascular supply of larynx. Describe the anatomical features of the Trachea with its extent, relations, neurovascular supply and lymphatics. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

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| Thoracic Cavity | Give the boundaries of thoracic cavity, superior and inferior thoracic apertures and list the structures contained/ traversing them. Describe the anatomical correlates of Thoracic inlet syndrome & Thoracic outlet syndrome | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Ribs and Articulations | Identify and differentiate the typical from atypical ribs. Describe the anatomical features of ribs and give their attachments. Describe the anatomical correlates of supernumerary cervical rib. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| | Classify the articulations of the ribs. Describe the anatomical features of these articulations. Describe the movements with the muscles producing articulations. Describe the movements with the muscles producing articulations. Describe the anatomical correlates of Flail Chest. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Intercostal space | Describe the anatomical correlates of Thoracotomy. Define the attachments, relations, nerve supply and actions of intercostal muscles. Define an intercostal space and give details of its contents. Describe the anatomical correlates of intercostal incisions | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Thoracic Vertebrae | Describe the anatomical features and attachments on typical & atypical thoracic vertebrae. Differentiate between typical and atypical vertebra. 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 | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Sternum | Describe the bony features and attachments on the sternum. Describe the anatomical correlates of median sternotomy. Describe the anatomical correlates of sternal biopsy. Describe the presentation of sternal fractures and correlate it anatomically. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

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| Connective tissue of thorax | Describe the endo thoracic fascia with its attachment. Describe the supra-pleural membrane with its attachments. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Joints of thorax | Classify the joints of the thorax mentioning their articulations, movements with the muscle producing them. Describe the mechanism of thorax: pump handle and bucket handle movements | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| vascular supply of thorax | Describe the origin, course, relations and distribution of intercostal vessels. Describe the course and relations of Internal thoracic vessels. Describe the alternate routes of venous drainage in blockage of superior/ inferior vena cava | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Cutaneous nerve supply of thorax | Describe the origin, course, relations and distribution of intercostal nerves. Classify the joints of the thorax mentioning their articulations, movements with the muscle producing them. Describe the mechanism of thorax: pump handle and bucket handle movements. Discuss anatomical correlates of intercostal nerve block | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Diaphragm | Name the parts of diaphragm mentioning their attachments and neurovascular supply. Explain the role of diaphragm in respiration Enumerate the diaphragmatic apertures with their vertebral levels, mentioning the structures traversing them. | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Pleural cavity | Describe the pleura giving its parts, layers, neurovascular supply, and lymphatic drainage. Describe the pleural cavity giving its recesses and the lines of pleural reflection. Describe anatomical correlates of pleural pain pleurisy, pneumothorax, pleural effusion | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

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| Lung | Describe the anatomical features, relations of lungs. Describe the neurovascular supply and lymphatic drainage of lungs. Compare and contrast the anatomical features and relations of right and left lung. Describe the root of the lung and pulmonary ligament with arrangement of structures at the hilum. Define Bronchopulmonary segments. Give their vascular supply, lymphatic drainage and clinical significance | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Clinical correlates of lung | Describe the anatomical correlates of chest tube intubation. Describe the anatomical correlates of thoracentesis. Explain the pathophysiology of Atelectasis. Describe the anatomical correlates of bronchoscopy. Describe the anatomical basis for medicolegal significance of lungs in determining the viability of newborn | Demonstration | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| **EMBRYOLOGY**<br><br>Early Development of Heart | Describe the early development of heart and blood vessels. Define parts of primitive heart tube and give its folding. Describe the development of various chambers of heart with emphasis on their partitioning. Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life. Describe the embryological basis of dextrocardia and ectopia cordis. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Late Development of Heart | Describe the partitioning of primordial heart: atrioventricular canal and atrium. Describe the development of sinus venosus. List clinically significant types of atrial septal defects along with their embryological basis and features. Describe probe patent foramen ovale. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| | Describe the partitioning of truncus arteriosus and bulbus cordis. Describe the formation of ventricles and interventricular septum. Describe the clinical features and embryological basis of ventricular septal defects. Describe the development of cardiac valves and conducting system. Describe the development of lymphatic system | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| | 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 aort | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

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| Development of Arteries | Describe the formation and fate of pharyngeal arch arteries. Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Development of Veins | Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate. 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 cava, inferior vena cava and portal vein | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Fetal Vessels and circulation | List the derivatives of fetal vessels and structures: Umbilical vein, ductus venosus, umbilical artery, foramen ovale, ductus arteriosus. Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with its clinical implication | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Congenital Heart defects | List clinically significant types of atrial septal defects along with their embryological basis and features. Describe patent foramen ovale. 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. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Diaphragm | Describe the embryological basis of congenital anomalies of the diaphragm: diaphragmatic hernias, eventuation of diaphragm, epigastric hernia, hiatal hernia, retrosternal hernia | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Upper respiratory tract | Describe the development of upper respiratory tract: larynx and trachea. Describe congenital anomalies of larynx and trachea: laryngeal web, laryngeal atresia, tracheal stenosis and atresia. List the types of tracheo-esophageal fistulas. Describe their embryological basis and clinical presentation | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

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| Lungs | List the phases of lung development with their time periods. Describe the events taking place in each phase. Describe the embryological basis and clinical presentation of respiratory distress syndrome/Hyaline membrane disease. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| **Histology**<br><br>Blood Vessels Organization<br><br>Arteries | Describe general histological organization of blood vessels: Tunica intima, media and adventitia. Identify, draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoid. Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Veins | Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids. Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, Capillaries, and sinusoids | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Thrombus/ Embolus formation<br>Arteriosclerosis atherosclerosis | Describe the histopathological basis of thrombus and embolus formation. Explain the histological basis of arteriosclerosis and atherosclerosis. Describe role of arterioles in hypertension | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Organization of respiratory system<br><br>Respiratory epithelium | Give the general histological organization of respiratory system. Describe the microscopic and ultramicroscopic structure of respiratory epithelium. Describe the histology of blood-air barrier. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Epiglottis & larynx | Describe the histological features of epiglottis and larynx | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

| Psychomotor Domain ANATOMY | | | |
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| **Practical** | **Learning Objective** | **Mode of information transfer** | **Assessment tool** |
| Histological features of Blood Vessels | Draw and label histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids | SGD | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Histology of Epiglottis& larynx | Draw and label the histologic sections of epiglottis and larynx | SGD | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Histology of Trachea | Draw and label the histological sections of trachea | SGD | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Histology of bronchi, bronchioles, alveoli, Lung | Draw and label the histological sections of bronchi, bronchioles, alveoli, Lung. | SGD | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |
| Trachea and lungs | Describe the histological features of trachea and lung. Explain the histological basis of: Coughing Atelectasis Infant respiratory distress syndrome Diffuse alveolar damage Lung carcinoma. | LGIS | SEQs<br>MCQs<br>OSPE<br>VIVA VOCE |

**PHYSIOLOGY MODULE -3**

| **Heart Physiology** **Knowledge** | | | |
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| **Topics** | **Learning Objectives** | **Mode of Info Transfer** | **Assessment Tool** |
| 1.PHYSIOLOGY OF HEART | Explain the Physiologic anatomy of the Heart<br>Describe Physiologic anatomy of the cardiac muscle.<br>Explain the functional importance of intercalated discs.<br>Explain Excitation contraction coupling | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 2. Properties Of Cardiac Muscle | Enlist properties of cardiac muscle.<br>Ectopic focus.<br>Define & give duration of absolute and relative refractory period in cardiac muscle<br>Differentiate between Absolute & Relative Refractory period of cardiac muscle<br>Define Chronotropism, Dromotropism, Bathmotropism, Inotropism.<br>Extrasystole & Compensatory pause | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 3. Ventricular Action potential<br>SA node Action potential<br>self excitation/ Autorhythmicity | Describe and draw the phases of action potential in ventricles<br>Describe and draw the phases of action potential of SA node along with explanation of mechanism of self excitation/ Autorhythmicity of SA node<br>Compare the action potential of each part of heart<br>Describe the effect of ANS on prepotential | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |

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| 4. The Cardiac Cycle | Describe the Events occurring during a cardiac cycle ( electrical & mechanical )<br>Define Systole , Diastole<br>Name Phases & sub-phases Of The Cardiac Cycle with durations<br>Describe Left ventricular pressure changes<br>Describe Aortic pressure changes<br>Describe Heart valves and their function | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 5. The Cardiac Cycle | Describe Pressure changes in right ventricle.<br>Enlist Difference in left & right ventricular pressure curves.<br>Describe Pressure changes in pulmonary artery.<br>Describe Volume changes in ventricles. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 6. The Cardiac Cycle | Explain & draw relationship of ECG with cardiac cycle.<br>Explain & draw relationship of heart sounds with cardiac cycle<br>Enlist draw & explain the physiologic basis of Atrial pressure waves in relation to cardiac cycle<br>Describe the Wave pattern of JVP along with reason of generation of each wave &Clinical importance of JVP.<br>Define and give the normal values of cardiac output, stroke volume, end diastolic volume, end systolic volume & ejection fraction. | Integrated lecture Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 7. Regulation Of Heart Pumping | Describe Regulation Of Heart Pumping.<br>Intrinsic mechanism<br>Extrinsic mechanism<br>Interpret the Ventricular function curves<br>Explain the Effect of $K^+$ ,$Ca^{++}$ Ions & temperance on heart function. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 8. Specialized Excitatory &Conductive System of the Heart | Draw & explain the conducting system of the heart.<br>Describe the physiologic basis & significance of A- V nodal delay. Causes of A- V nodal delay<br>Effect of ANS stimulation on prepotential. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 9. Control of excitation of the heart | Describe normal rate of action potential discharge in auto -rhythmic tissues of the heart.<br>Give the role of Purkinje system in causing synchronous contraction of the ventricular muscle. | Integrated lecture | MCQs, SEQs, Viva Voce |

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| | Discuss the effect of autonomic stimulation on the heart.<br>Enlist the factors affecting heart rate<br>Explain the Ectopic pacemaker. | Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | |
| 10. **The Normal Electrocardiogram (ECG).** | Describe Characteristics Of Normal ECG.<br>Enlist, draw & explain the physiologic basis of normal ECG.<br>Give duration of waves, Segments & Intervals of normal ECG.<br>Explain the physiological basis of upright T wave in normal ECG.<br>Describe location & significance of J point | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 11. Methods Of Recording ECG | Describe the standard limb leads, Augmented limb leads & precordial leads.)<br>Describe the way the electrocardiogram (ECG) is recorded, the waves of the ECG, and the relationship of the ECG to the electrical axis of the heart.<br>Define Einthoven's law & Einthoven's triangle. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 12. Cardiac Vector, Vector Cardiogram<br>Abnormal Ventricular Conditions That Cause Axis Deviation | Define Vector, Mean QRS Vector, Instantaneous Mean Vector<br>Define Axis, Lead<br>Describe Hexagonal & Trigonal reference systems.<br>Enlist the physiological and pathological causes of right axis deviation of heart<br>Enlist the physiological and pathological causes of left axis deviation of heart | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 13. Ischemic heart Disease & ECG | Explain the physiological basis of current of injury<br>Explain the effect of a current of injury on the electrocardiogram.<br>Describe the location and significance of J point on ECG.<br>**Enlist the ECG changes in angina pectoris**<br>**Enlist the ECG changes in myocardial infarction**<br>**Describe the abnormalities of T wave and their causes.** | Integrated lecture<br>Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 14. Cardiac Arrhythmias | Enlist the causes of Cardiac Arrhythmias<br>**Define bradycardia and enlist its causes**<br>**Define tachycardia and enlist its causes**<br>Classify Arrhythmias | Integrated lecture | MCQs, SEQs, Viva Voce |

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| | Explain the physiologic basis of sinus arrhythmia<br>Explain the physiologic basis of reflex bradycardia in athletes<br>Explain the carotid sinus syndrome | Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | |
| 15. Cardiac Arrhythmias & Their Electrocardiographic Interpretation: I | **Enlist the causes of atrioventricular block**<br>**Explain the types of atrioventricular blocks.**<br>**Explain the ECG changes in 1st, 2nd & 3rd degree heart block.**<br>Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome/ventricular escape<br>Explain the physiologic basis of pulse deficit | Integrated lecture Physiology /Medicine/ / tutorial/TBL / SGD/ PBL Cardiology | MCQs, SEQs, Viva Voce |
| 16. Cardiac Arrhythmias & Their Electrocardiographic Interpretation: II | **Enlist the causes of premature contractions. Explain the causes and ECG changes of premature atrial contractions**<br>**Explain the causes and ECG changes in PVC**<br>**Enlist the causes and ECG findings in Long QT syndrome** | Integrated lecture Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 17. Cardiac Arrhythmias & Their Electrocardiographic Interpretation: III | **Explain the causes, physiological basis, features, ECG changes & management of ventricular fibrillation** | Integrated lecture Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 18 .Cardiac Arrhythmias & Their Electrocardiographic Interpretation IV | **Explain the causes, physiologic basis, features, and ECG changes atrial fibrillation**<br>Explain the causes, physiologic basis, features, and ECG changes atrial flutter<br>Compare flutter and fibrillation | Integrated lecture Physiology /Medicine/ Cardiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 19. Effect of electrolyte on ECG | **Describe the effect of hypokalemia and hypokalemia on ECG Describe the effect of hypocalcaemia and hypocalcaemia on ECG** | Integrated lecture Physiology /Biochemistry/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
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| **Physiology of Circulation** | **Knowledge** | | |
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| **Topics** | **Learning Objectives** | **Mode of Info Transfer** | **Assessment Tool** |
| 1.. Organization of Circulation | Explain functional parts of circulation: Arteries, Arterioles, capillaries, veins, venules<br>Explain the functional classification of blood vessels.<br>Explain pressures in systemic & pulmonary circulation. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 2.. Types of blood flow | Explain the types of blood flow & significance of Reynold's number.<br>Explain the resistance to blood flow.<br>Differentiate Total Peripheral Vascular Resistance and Total Pulmonary Vascular Resistance | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 3. Vascular resistance | Explain the Effect of Blood Hematocrit and Blood Viscosity on Vascular Resistance and Blood Flow<br>Explain the effects of vessel wall tension and shear stress on blood vessels. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 4. Vascular Distensibility | Explain the Vascular Distensibility & its units.<br>Explain the Difference in Distensibility of the Arteries and the Veins<br>Differentiate Arterial Pressure Pulsations & Pulse Pressure.<br>Explain the effects of vessel wall tension and shear stress on blood vessels. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 5. Functions of veins | Discuss: venous pressures—right atrial pressure (central venous pressure) and peripheral venous pressures | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |

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| | Explain Venous Resistance and Peripheral Venous Pressure<br>Describe Effects of gravity on arterial and venous pressure. | | |
| 6. The Microcirculation and Lymphatic System: Capillary Fluid Exchange, Interstitial Fluid, and Lymph Flow | Identify vessels constituting The Microcirculation<br>Explain the Structure of the capillary wall.<br>Explain the Special Types of "Pores" Occurring in the Capillaries of Certain Organs<br>Define Vasomotion, describe regulation of vasomotion.<br>Explain Interstitium and Interstitial Fluid | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 7. Fluid Filtration Across Capillaries | Enumerate hydrostatic and osmotic factors that underlie Starling's hypothesis for capillary function. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 8. Local and Humoral Control of Tissue Blood Flow | Discuss the acute local control of local blood flow.<br>Discuss the Basic theories for regulation of local blood flow:<br>Discuss the special examples of acute "metabolic" control of local blood flow | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 9. Autoregulation of Blood Flow | Name the organs in which autoregulation of blood flow occurs during changes in arterial pressure.<br>Explain metabolic & myogenic mechanisms | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 10. Long-Term Blood Flow Regulation | Explain the long-term control of local blood flow | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 11. Humoral Control of the Circulation | Discuss the humoral control of local blood flow.<br>Discuss the Vascular Control by Ions and Other Chemical Factors | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 12. Nervous Regulation of the circulation and rapid control of arterial pressure | Explain the role of autonomic nervous system for regulating the circulation.<br>Explain vasomotor center<br>Explain the control of vasomotor center by higher nervous centers | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 13. Role of the Nervous System in Rapid Control of Arterial Pressure | Explain emotional fainting-vasovagal syncope<br>Explain the role of nervous system in rapid control of arterial blood pressure.<br>Explain the regulation of arterial blood pressure during exercise. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |

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| | Enlist different mechanisms for short term regulation of arterial blood pressure. | | |
| 14. Baroreceptor Arterial Pressure Control System-<br>Baroreceptor Reflexes | Explain the role of baroreceptors in regulation of arterial blood pressure | Interactive lecture/<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 15. Rapid Control of Arterial Pressure<br>Chemoreceptor Reflex<br>Atrial and Pulmonary Artery Reflexes<br>Bainbridge Reflex | Explain the role of chemo receptors in control of arterial blood pressure.<br>Make a flow chart to discuss the role of atrial volume reflexes in control of blood pressure.)<br>Make a flow chart to discuss the role of Bainbridge reflex in control of blood pressure.<br>Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch. | Interactive lecture/<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 16. CNS Ischemic Response<br>Cushing Reflex<br>Abdominal Compression Reflex<br>Special Features of Nervous Control of Arterial Pressure | Describe the role of CNS- Ischemic response in regulation of blood pressure.<br>Explain the Cushing Reflex<br>Explain the role of abdominal compression reflex to increase the arterial blood pressure.<br>Discuss Special Features of Nervous Control of Arterial Pressure. | Interactive lecture/<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 17. Role of the Kidneys in Long-Term Control of Arterial Pressure and in Hypertension: The Integrated System for Arterial Pressure Regulation | Make a flow chart to discuss the role of Renin Angiotensin system for long term control of blood pressure<br>Make a flow chart to show the regulation of blood pressure in response to increased ECF volume | Interactive lecture<br>/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 18.Regulation of blood pressure in response to salt intake | Make a flow chart to show the regulation of blood in response to increased salt intake<br>Summary of the Integrated, Multifaceted System for Arterial Pressure Regulation | Interactive lecture/<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 19. Cardiac output | **Define cardiac output, cardiac index & venous return with their normal values**<br>**Explain the pathological causes of high & low cardiac output.** | Integrated lecture<br>Physiology /Medicine/<br>Cardiology | MCQs, SEQs,<br>Viva Voce |
| 20. Cardiac output | **Discuss the factors regulating cardiac output**<br>Discuss factors regulating venous return | Integrated lecture | MCQs, SEQs, |

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| | Enlist Functions of Veins | Physiology /Medicine/ Cardiology | Viva Voce |
| 21. Circulatory Shock and Its Treatment | Define and enlist different types of shock<br>Explain the causes, features and pathophysiology of hypovolumic/ hemorrhagic shock.<br>Explain the different stages of shock | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 22. Circulatory Shock | Discuss different types of "positive feedback" that can lead to progression of shock.<br>Explain Hypovolumic Shock Caused by Plasma Loss<br>**Discuss the treatment of different types of shock.** | Integrated lecture Physiology /Medicine/ Cardiology | MCQs, SEQs, Viva Voce |
| 23. types of shock | **Low-Output Cardiac Failure - Cardiogenic Shock/ cardiac shock:**<br>**Neurogenic Shock - Increased Vascular Capacity**<br>**Anaphylactic Shock and Histamine Shock**<br>**Septic Shock: "blood poisoning"** | Integrated lecture Physiology / Pathology | MCQs, SEQs, Viva Voce |
| 24. CORONARYCIRCULATION | Explain the physiological anatomy of coronary circulation.<br>Explain the regulation of corontudyary blood flow | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 25. CORONARYCIRCULATION | Explain the physiologic basis of angina, myocardial and subendocardial infarction. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 26. Blood flow regulation in skeletal muscle at rest and during exercise | Explain the Blood flow regulation in skeletal muscle at rest and during exercise | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| 27. Heart Sounds | Name the Heart Sounds, characteristic features of each heart sound.<br>Enlist the causes of 3$^{rd}$ & 4$^{th}$ heart sounds)<br>Define Murmur, Bruit, Thrill, able to differentiate between them.<br>Explain the causes & physiologic basis of murmurs caused by valvular lesions)<br>**Enumerate abnormal heart sounds & explain the physiological basis of each** | Integrated lecture Physiology /Medicine/ Cardiology | MCQs, SEQs, Viva Voce |

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| 28. Heart Failure | Classify different types of heart failure<br>Discuss the signs and symptoms of Heart failure<br>Discuss the management of Heart failure. | Interactive lecture<br>Medicine/ Cardiology | MCQs, SEQs,<br>Viva Voce |
| 29. Arrhythmias | Discuss the signs and symptoms of: Arrhythmias.<br>Discuss the management of Arrhythmias. | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 30. Ischemic Heart Disease (IHD) | Enlist various categories of ischemic heart diseases.<br>Discuss the signs and symptoms of ischemic heart diseases | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 31. Ischemic Heart Disease (IHD) | Discuss the management of ischemic heart diseases | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **32.** Hypertension | Discuss the signs and symptoms of: Hypertension<br>Discuss the management of Hypertension | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **33.** Valvular Heart Diseases | Enlist various valvular heart diseases Valvular Heart Diseases Identify presentations and signs and symptoms of valvular heart diseases | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **34.** Valvular Heart Diseases | Outline management strategies of valvular heart diseases | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **35.** Pericardial Diseases | Identify various pericardial diseases<br>Identify presentations and signs and symptoms | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **36.** Pericardial Diseases | Outline management strategies in various pericardial diseases | Interactive lecture/<br>tutorial/TBL / SGD/ PBL<br>Medicine/ Cardiology | MCQs, SEQs,<br>Viva Voce |
| **37.** Endocardial and myocardial diseases | Identify various endocardial and myocardial diseases<br>Identify presentations and signs and symptoms<br>Outline management strategies | Interactive lecture<br>Medicine/ Cardiology /<br>tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |

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| **38.** Peripheral Arterial Diseases (PAD) | Define Peripheral arterial diseases Peripheral Arterial Diseases (PAD)<br>Identify symptoms and signs of PAD<br>Outline management strategies | Interactive lecture<br>Medicine / tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **39.** Venous thromboembolism | Enlist various sites of venous thromboembolism<br>Identify various symptoms and signs of DVT | Integrated lecture<br>General Medicine, Surgery/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| 40. Venous thromboembolism | Identify various symptoms and signs of pulmonary embolism Outline management strategies | Integrated lecture<br>General Medicine, Surgery/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **41.** Imaging in CVS disorders | Identify the salient features of heart and great vessels on CT/ MRI.<br>Discuss the principles of cardiac catheterization | Interactive lecture<br>Radiology/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **42.** Superior mediastinum Syndrome | Justify the clinical picture of superior mediastinum syndrome anatomically | Interactive lecture<br>Surgery/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **43.** Fetal circulation at Birth | Describe Fetal and neonatal circulation mentioning transitional neonatal circulation with it clinical implication | Integrated lecture<br>Pediatrics, Obgyn/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |
| **44.** Emotional fainting | Psychological basis of emotional fainting and its impact | Behavioral Sciences/ tutorial/TBL / SGD/ PBL | MCQs, SEQs,<br>Viva Voce |

| CVS Physiology PSYCHOMOTOR DOMAINS | | | |
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| **Topic** | **Learning Objective** | **Mode of information transfer** | **Assessment tool** |
| ECG | Record an electrocardiogram by correct lead placement and connections. | Demonstration/performance/ | OSPE/ viva voce |
| Heart Sounds | Perform auscultation of chest to recognize normal heart sounds. | Demonstration/performance/ | OSPE/ viva voce |
| JVP | Examine neck veins to determine Jugular Venous Pulse. | Demonstration/performance/ | OSPE/ viva voce |
| Arterial Pulse | Examine arterial pulse to recognize normal characteristics of pulse. | Demonstration/performance/ | OSPE/ viva voce |
| Blood Pressure | Record the blood pressure of the subject. Calculate the pulse pressure & mean arterial pressure | Demonstration/performance/ | OSPE/ viva voce |
| Blood Pressure | Record the blood pressure of the subject. Determine the effect of posture on blood pressure | Demonstration/performance/ | OSPE/ viva voce |
| Blood Pressure | Record the blood pressure of the subject. Determine the effect of exercise on blood pressure | Demonstration/performance/ | OSPE/ viva voce |

| **Respiration** | **Knowledge** | | |
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| **Topics** | **Learning Objectives** | **Mode of Info Transfer** | **Assessment Tool** |
| **1. Pulmonary ventilation** | Enlist the muscles of inspiration and expiration in labored breathing<br>Discuss the mechanics of pulmonary ventilation | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations<br><br>Integrate with Anatomy | MCQs<br>SEQs<br>Viva Voce<br>Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| 2. Apnea | Explain periodic breathing<br>Explain the causes and pathophysiology of sleep apnea | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| 3. | Enlist the components of surfactant<br>Describe the role of surfactant in lung compliance | Interactive Lectures. Tutorials. | MCQs<br>SEQs |

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| Lung Compliance | | Clinical Integration. Seminars<br><br>Assignments<br>Presentations | Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| 4. Lung volumes and Capacities | Define the different lung volumes and capacities and their clinical significance<br>Discuss FEV1/ FVC ratio and its clinical significance<br>Enlist the lung volumes and capacities that cannot be measured by spirometer.<br>Define dead space & explain its types<br>Discuss FEV1/FVC ratio in relation to Bronchial Asthma. | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| | Discuss FEV1/FVC ratio in relation to pulmonary embolism | Integrate with medicine | |
| Alveolar ventilation | Define minute respiratory volume<br>Define Alveolar ventilation<br><br>Discuss the factors affecting diffusion of gases across the respiratory membrane<br>Explain the diffusion capacity of respiratory membrane for oxygen and carbon dioxide<br>Define alveolar, pleural and transpulmonary pressure. | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |

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| | Explain differences in the partial pressures of atmospheric, humidified, alveolar air and explain physiological basis of change in each pressure | | |
| Transport of oxygen in the blood | Explain the different forms of transport of oxygen in the blood<br>Draw and explain oxy-hemoglobin dissociation curve<br>Enlist the factors that cause rightward shift of oxy-hemoglobin dissociation curve.<br>Enlist the factors that cause leftward shift of oxy-hemoglobin dissociation curve<br>Explain the Bohr's effect<br>Define; enlist the types, and causes of cyanosis | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| Transport of CO2 in blood | Enlist different forms in which CO2 is transported in the blood.<br>Explain the Carboxyhemoglobin dissociation curve.<br>Explain the Haldane effect.<br>Explain the chloride shift/Hamburger phenomenon.<br>Define the respiratory exchange ratio (RER) | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| VA/Q (Ventilation Perfusion Ratio) | Explain the alveolar oxygen and carbon dioxide pressure when VA/Q = infinity, zero and normal | Interactive Lectures. Tutorials. | MCQs<br>SEQs |

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| | Explain the concept of physiological shunt when VA/Q ratio is less than normal<br>Explain the concept of physiological dead space when VA/Q ratio is above normal | Clinical Integration. Seminars<br><br>Assignments<br>Presentations | Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| Protective Reflexes | Enlist the respiratory & non-respiratory functions of lungs.<br>Explain the nervous control of bronchiolar musculature<br>Trace the reflex arc of cough reflex and sneeze reflex | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| Aviation and Space | Explain the principal means by which acclimatization occurs<br>Explain the events that occur during acute mountain sickness<br>Enlist the features of chronic mountain sickness<br>Explain the pathophysiology, features, prevention and treatment of decompression sickness. | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| CO poisoning | Draw and explain the effect of CO poisoning on oxy-hemoglobin dissociation curve | Integrate with medicine | |

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| | Explain the pathophysiology, features, and treatment of CO poisoning | | |
| Nervous regulation of respiration | Enumerate the components of respiratory centers and explain their functions.<br>Explain the inspiratory RAMP signal<br>Explain the Herring Breuer reflex/lung inflation reflex and its clinical significance | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| Chemical control of respiration | | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination<br>Internal evaluation carries 20% weightage in summative examination.<br>Continuous monitoring of attendance and academics in tutorials |
| Exercise and respiration | Explain the regulation of Respiration during Exercise | | |
| Hypoxia | Enlist the effects of acute hypoxia<br>Explain the hypoxia inducible factor a master switch for body response to hypoxia<br>Define and explain different types of hypoxias | Interactive Lectures. Tutorials.<br><br>Clinical Integration. Seminars<br><br>Assignments<br>Presentations | MCQs<br>SEQs<br>Viva Voce Assignments<br>Presentations<br>Open Book Examination |

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| | | | Internal evaluation carries 20% weightage in summative examination. Continuous monitoring of attendance and academics in tutorials |
| Tuberculosis | Explain the pathophysiology of Tuberculosis. | Integrate with pathology | |
| Pneumonia | Describe the pathophysiology of Pneumonia | Integrate with pathology | |
| Dyspnea | Define Dyspnea<br>Enlist different causes of dyspnea<br>Differentiate between cardiac and respiratory dyspnea<br>Outline management strategies for dyspnea | Integrate with Medicine | |
| Pneumothorax | Enlist the causes of Pneumothorax<br><br>Describe the signs and symptoms of Pneumothorax . | Surgery | |
| Pleuritis | | | |
| Bronchitis | Enlist the causes of Bronchitis<br><br>Discuss the signs and symptoms of Bronchitis<br>Discuss the management of Bronchitis | General Medicine | |
| Pneumonia | Classify different types of Pneumonia<br>Discuss the sign symptoms of pneumonia<br>Discuss the management of pneumonia | General Medicine | |
| Asthma | Classify different types of asthma<br>Discuss the signs and symptoms of asthma | General Medicine | |

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| | Discuss the management of asthma | | |
| Tuberculosis | Classify different types of Tuberculosis<br>Discuss the signs and symptoms of tuberculosis<br>Discuss the management of Tuberculosis | General Medicine | |
| Acute respiratory distress syndrome | Discuss the signs and symptoms of acute respiratory distress syndrome<br>Discuss the management of acute respiratory distress syndrome | General Medicine | |
| Respiratory Failure | Describe various types of respiratory failure<br>Enlist various causes of respiratory failure<br>Outline management strategies of respiratory failure | General Medicine | |
| First Aid in Surgical Patients | Describe ABC in a trauma patient | Surgery | |

| Psychomotor Domain | | | |
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| **Topic** | **Learning Objective** | **Mode of information transfer** | **Assessment tool** |
| Clinical Examination of Chest | Perform the clinical examination of chest for the respiratory system (inspection, palpation, percussion, Auscultation) | Demonstration<br><br>Performance | Performance<br><br>OSPE<br><br>Viva voce |
| Peak Expiratory Flow rate measurement | Determine Peak Expiratory Flow rate with Peak Flow Meter | | |
| Oxygen Saturation | Determine Blood Oxygen Saturation with finger Pulse Oximeter | | |

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| Spirometry | Determine Respiratory Volumes & Capacities with Spirometer/ Spiro lab. (FEV1/FVC ratio) | | |
| Chest movements | Student should be able to Record the movements of chest by stethograph | | |
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**(BIOCHEMISTRY)**

| **Knowledge** | | | |
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| **Topics**<br><br>**Block –III (cardiovascular module)**<br><br>(Total Hours = 30) | **Learning Objectives** | **Mode of Info Transfer** | **Assessment Tool** |
| CV-B001. Classification of lipids | Classify lipids | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B002 Biochemistry Functions of lipids & Properties of lipids | Discuss the biomedical functions & properties of lipids. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B003 Classification of fatty acids. | Classify fatty acids. Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

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| | lipid profile. Biochemistry. Discuss lipid peroxidation and its significance acids | | |
| CV-B004 Eicosanoids | Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin) | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B005 Circulation Lipoproteins. | Describe the types, structure, biomedical importance of Lipoproteins<br><br>Discuss the synthesis, transport and fate of Lipoproteins | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B006 Hyperlipidemias | Interpret the disorders associated with impairment of lipoprotein metabolism especially atherosclerosis and LDL oxidized | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B007 Cholesterol | Explain the sources, properties, and biomedical role of cholesterol Describe the reactions of cholesterol biosynthesis, and its regulation & fate. Discuss Genetic basis of the Hypercholesterolemia | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B008 Hypercholesterolemia | Describe enzymes with reference to: Active sites Specificity Catalytic efficiency Cofactor Coenzyme Holoenzyme Apoenzyme Prosthetic group Zymogens Location | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B009 Enzymes | Classify enzymes according to the reaction they catalyze. Biochemistry Enzymes Explain the mechanism of enzyme action from reactants to products (catalysis). a) Illustrate enzyme kinetics in relation to MM Equation & Lineweaver-Burke plot. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

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| | Discuss the effect of various factors (with special reference to Km/V max) on enzymatic activity. Substrate concentration Temperature PH Enzyme concentration.<br><br>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: Competitive inhibition Uncompetitive inhibition c) Interpret the effect of organophosphorus poisoning on enzyme activity on basis of given data<br><br>Explain the application of enzyme in clinical diagnosis and therapeutic use. | | |
| CV-B010 Type I to V hyperlipidemias | Discuss the signs and symptoms of hyperlipidemia | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| **Block –III (respiratory module)**<br><br>**(Total hours= 15)** | | | |
| Re-B001 Genetic defects | Explain and interpret the pedigree of single gene defect i.e., Emphysema and cystic fibrosis (autosomal recessive) | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Re-B002 Phospholipids | Explain the biochemical significance of phospholipids<br><br>Interpret Respiratory Distress syndrome on the basis of given data Integrate with Physiology | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Re-B003 Elastin | Describe the structure, synthesis, degradation and functions of Elastin<br><br>Discuss the pathophysiology of Emphysema. Integrate with Pathology | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

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| Re-B004 Acid base balance | Discuss the concept of acid base balance<br><br>Interpret metabolic and respiratory disorders of acid base balance on the basis of sign, symptoms and ABG findings<br>Describe the Clinical interpretation of acid base balance<br>Integrate with Medicine | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

| **Biochemistry Psychomotor Domain** | | | |
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| **Topic**<br><br>**Block –III**<br><br>**(cardiovascular module)** | **Learning Objective** | **Mode of information transfer** | **Assessment tool** |
| **Block-III**<br><br>**(Total hours=8)** | | | |
| CV-B011 Cholesterol Estimation | Perform estimation of Cholesterol by kit method | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B012 HDL, LDL Estimation | Perform estimation of HDL, LDL | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B013 Cardiac Marker Estimation | Estimation of cardiac markers | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| CV-B014 Interpretation of Lab report | Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

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| **Block-III (respiratory module)**<br><br>**Total hours= 10** | | | |
| Re-B005 Determination of pH | Determine the pH of the solution by pH meter<br>Medical Biochemistry | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

# Pathology

| **BLOCK III (CARDIOVASCULAR RESPIRATORY)** | | | |
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| **5. Hemodynamics and CVS** | • Classify types of thrombosis, embolism, and infarction | Power point, interactive lectures | MCQs |
| **6. Atherosclerosis** | • Discuss the pathophysiology of thrombosis, embolism, and infarction | Power point, interactive lectures | MCQs |
| **7. Hypertension** | • Identify the types and causes of hypertension | Power point, interactive lectures | MCQs |
| **8. Shock** | • Discuss the pathophysiology of atherosclerosis, hypertension, and shock | Power point, interactive lectures | MCQs |
| **9. Cardiac Failure** | • Discuss the clinical consequences of hypertension and atherosclerosis<br>• Classify the types of heart failure<br>• Identify the causes leading to heart failure<br>• Identify the types of ischemic heart disease | Power point, interactive lectures | MCQs |

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| **10. Ischemic Heart Disease** | • Discuss the pathophysiology of different types of ischemic heart disease | Power point, interactive lectures | MCQs |
| **11. Acute Respiratory Distress Syndrome** | • Describe the pathophysiology of acute respiratory distress syndrome | Power point, interactive lectures | MCQs |
| **12. Obstructive lung Disease** | • Describe the pathophysiology of obstructive lung disease | Power point, interactive lectures | MCQs |
| **13. Restrictive Lung Disease** | • Describe the pathophysiology of Restrictive Lung Disease | Power point, interactive lectures | MCQs |
| **14. Age induced lung fibrosis** | • Discuss the effect of age on decreased lung compliance | Power point, interactive lectures | MCQs |
| **15. Increased vulnerability to infection & neoplasia** | • Discuss the role of age on respiratory clearance leading to recurrent inflammatory processes at the ciliated respiratory epithelium | Power point, interactive lectures | MCQs |

## Pharmacology

| **Block – III** | | | |
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| **Cardiovascular 1** | | | |
| Antihypertensive drugs | Outline the pharmacological concepts of drugs used in hypertension. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Antianginal drugs | Outline the pharmacological concepts of drugs used in angina. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Antiarrhythmics drugs | Outline the pharmacological concepts of drugs used in arrythmias. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Drugs for cardiac failure | Outline the pharmacological concepts of drugs used in cardiac failure. | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

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| Drugs for peripheral vascular diseases | Outline the pharmacological concepts of drugs used in peripheral vascular diseases | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| **Respiratory 1** | | | |
| Cough Suppressants | Identify the drugs for cough suppression & expectoration | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| | Explain the mechanism of action and adverse effects of cough suppressants | | |
| Anti histamines | Explain the mechanism of action and adverse effects of anti-histamines | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |
| Anti asthmatics | Explain the mechanism of action and adverse effects of anti-asthmatics | Power point, interactive lectures | Seq, Mcq, Ospe, Viva |

# Community Medicine

| | Block 3 Modules | | | |
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| | **DISEASE PREVENTION & IMPACT** | | | |
| CV-CM001 | Disease Prevention Models | ▪ Describe the various strategies and models to prevent diseases. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| CV-CM002 | Primordial Prevention | ▪ Describe primordial prevention and its application to preventing CVS diseases.<br>▪ Depict the concept of primary prevention in context to CVS and able to apply on CVS diseases. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| CV-CM003 | Health Promotion | ▪ Discuss the basic concept of health promotion and its application to CVS | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| CV-CM004 | Behavioral Change Intervention | ▪ iscuss the basic concept of health promotion and its application to CVS | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| CV-CM005 | Secondary & Tertiary Prevention | ▪ To apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension) | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |

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| CV-CM006 | Noncommunicable disease | ▪ Describe the concept of cardiovascular diseases as non-communicable diseases | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |
| CV-CM007 | Risk factor assessment of CVS diseases | ▪ Identify the risk factors in the community for CVS diseases<br>▪ Learn and apply interventions to prevent the risk factors in community. | Interactive lecture/ tutorial/TBL / SGD/ PBL | MCQs, SEQs, Viva Voce |