BLOCK C

1st Year MBBS

Contents

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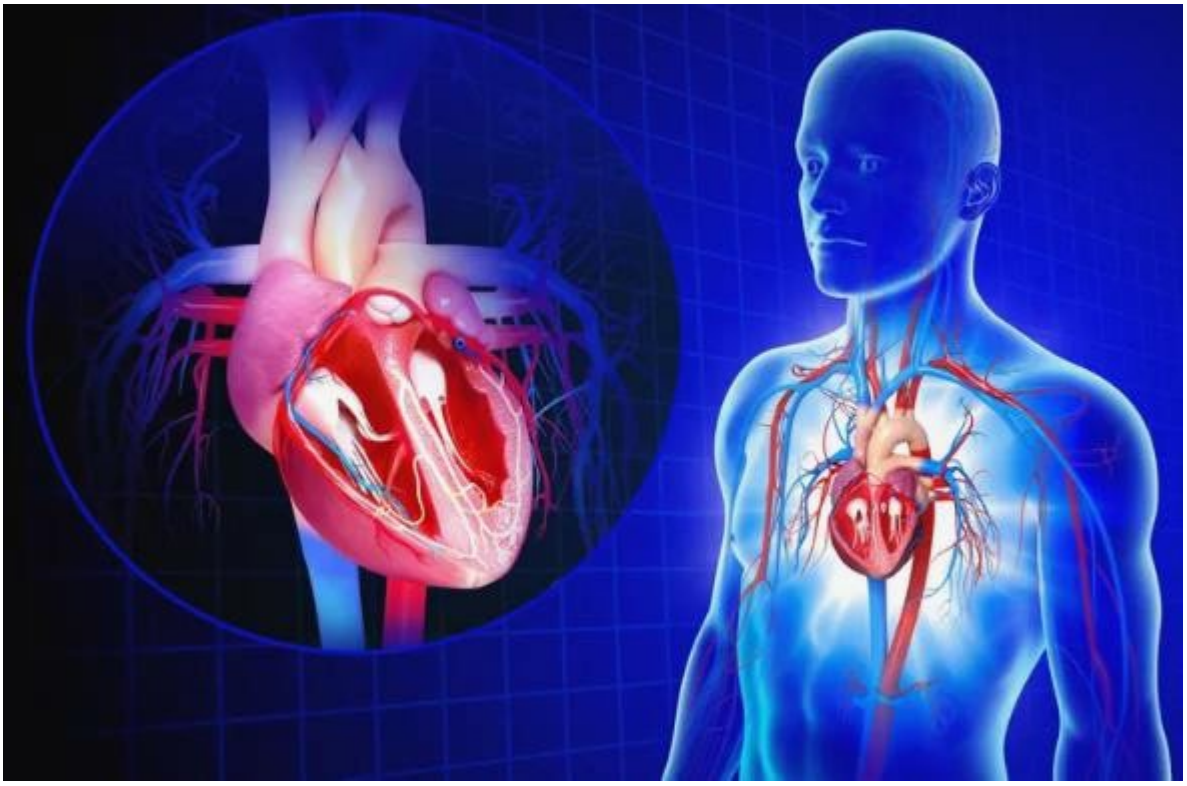
Cardiovascular I Module



Introduction to module

The main role of the cardiovascular system in the body is to transport oxygen to all tissues in the body and for removing, from these same tissues, metabolic waste products. The system itself consists of the blood, the medium for exchanging oxygen, nutrients and waste products throughout the body, the blood vessels, the pipes through which the blood flows and the heart, the pump which forces blood to flow through the blood vessels.

Rationale

Cardiovascular health is important in maintaining overall health and wellness. This module will teach how heart and cardiovascular system work when healthy, and what happens when diseased. We will explore through lectures, CBLs and skill lab normal anatomy, physiology, biochemistry of CVS. This module wills briefly discuss the common CVS diseases & their prevention, therapeutic drug treatment, behavioral aspects, radiological findings.

General Learning Outcomes

By the end of this module the students would be able to;

Knowledge

At the end of this module, the students will be able to;

1. Describe the structure and surface markings of the heart, valves and great vessels.
2. Describe the steps of development of the heart.
3. Describe the steps of development of arterial, venous and lymphatic system.
4. Describe the conduction system of the heart.
5. Describe the anatomy of valves of the heart.
6. Describe the microscopic structure of myocardium, and blood vessels.
7. Describe the cardiac cycle.
8. Discuss cardiac output, and venous return.
9. Discuss blood pressure and its regulation.
10. Discuss coronary circulation and diseases associated with it.
11. Describe the mechanisms and types of circulatory shock and associated compensatory mechanisms.
12. Describe the anatomy and common pericardial diseases.
13. Describe the cardiac enzymes.
14. Discuss the hyperlipidemias and the roles lipoproteins and cholesterol in the development of atherogenesis.
15. Describe the mechanisms of impulse generation, conduction and excitation of myocardium.
16. Discuss normal ECG and common ECG abnormalities.
17. Enlist the drugs used in ischemic heart disease and hyperlipidemias.
18. Describe preventive strategies of cardiovascular diseases.

Skill

1. Explain different waves, segment and intervals of ECG and apply it to the interpretation of ECG
2. Demonstrate effective communication skill strategies while history taking and examining the patients with CVS problems.

Attitude

1. Follow the basic laboratory protocols.
2. Participate in class and practical work efficiently.
3. Maintain discipline of the college.
4. Follow the norms of the college properly.
5. Communicate effectively in a team with colleagues and teachers.
6. Demonstrate professionalism and ethical values in dealing with patients, cadavers, colleagues and teachers.
7. Communicate effectively in a team with colleagues and teachers.
8. Demonstrate the ability to reflect on the performance.

Themes for CVS Module

Sr. NO.	Theme	Duration
1	Chest pain	1 weeks
2	Breathlessness and ankle swelling	2 weeks
3	Blood pressure	1 weeks
4	Palpitations	1 week

Learning objectives in CVS Module

Theme 1chest pain

Sr. No	Subject	Topic	Learning Objectives	Teaching strategy	Duration	Assessment
	Gross Anatomy	Gross External features of Heart	Describe the external features of heart Identify major vessels of heart on model Identify border and surfaces of heart on model	Skill Lab	2 hours	MCQS & Viva
	Gross Anatomy	Internal features of Heart	Describe internal features of atria and ventricles of heart. Explain the role of muscles bundles present in the ventricles in drawing the valvular cusps together during ventricular systole. Explain the role of skeleton of heart in preventing the incompetence of heart valve Describe the different valves present in heart	Skill Lab	2 hour	MCQS, OSPE & Viva
		Development of heart –1	Describe the formation of heart tube. Describe the mechanism of cardiac	Lecture	1 hour	MCQS, & Viva

			looping Describe contribution of bulbs cordis and sinus venosus to the development of heart. Enlist abnormalities of cardiac looping.			
		Development of heart –2	Describe the formation of atria and ventricles with special reference to septum Premium and septum Secundem. Describe atrial septal defects. Describe the formation of ventricles. Describe ventricular septal defects. Describe Fallots tetralogy	Lecture	1 hour	MCQS, & Viva
		Development of aortic arches	Describer the development of aortic arches Enumerate their derivatives Describe development of coarctation of the aorta	Lecture	1 hour	MCQS, & Viva
	Gross Anatomy	Conduction system of the heart	Describe the different components of conduction system. • SA Node • AV Node • Bundle of His • Purkinje Fibers Bundle branches	SGD	2hours	MCQS

			Describe the sympathetic innervation of heart. Describe the parasympathetic innervation of the heart			
	Physiology	Cardiac muscle action potential	Explain phases of cardiac muscle action potential Describe the characteristics of cardiac action potentials and the role of "slow calcium" channels in causing plateau and its significance. Differentiate the refractory period of cardiac muscle with that of skeletal muscle. Describe the significance of prolonged action potential in cardiac muscle	Lecture	1 hour	MCQS, & Viva
	Physiology	Excitation and contraction of cardiac muscles	Describe the excitation–contraction process in cardiac muscle. Describe Chronotropic, Inotropic and Dromotropic Effects Differentiate excitation–contraction process in cardiac and skeletal muscle cells Describe gap junctions and the significance of functional syncytium	Lecture	1 hour	MCQS, & Viva
	physiology	Conductive system of heart	Define Pacemaker and explain why SA node is the normal	Lecture	1 hour	MCQS, & Viva

			pacemaker of the heart Describe the physiological anatomy of the sinus node Define automaticity and rhythmicity and conductivity Describe the specialized excitatory and conductive pathway of the cardiac muscle tissue Define Ectopic Pacemaker and describe its causes Describe the significance of AV nodal Delay Describe the effects of sympathetic and parasympathetic stimulation on the heart rate and conduction of cardiac action potentials			
	Community Medicine	CVD prevention	Identify the major risk factors which contribute to common diseases of the cardiovascular system Enumerate modifiable and non-modifiable risk factors of CV diseases Apply primordial, primary, secondary and tertiary prevention of CV diseases in community	Lecture	1 hour	MCQS, & Viva

	Biochemistry	Classification of lipids	• Define lipids • Classify lipids • Describe general biological functions of lipids	SGD (1)	2 Hours	MCQS
2	Biochemistry	Fatty acids **I**	• Define fatty acids • Describe nomenclature of fatty acids • Classify fatty acids • Describe general biological functions of fatty acids	lecture	1 hour	MCQS
	Biochemistry	Fatty acids **II**	• Describe isomerism in fatty acids • Explain role of saturated and unsaturated fatty acids in health and disease • Define role of trans fatty acids (*trans*-fats) in coronary heart disease • Describe omega-3 and omega-6 fatty acids and the importance of their dietary use	lecture	1 hour	MCQS

	Biochemistry	Clinically significance Fatty acids	• Define role of trans fatty acids (*trans*-fats) in coronary heart disease • Describe omega-3 and omega-6 fatty acids and the importance of their dietary use	Interactive lecture	1 hour	MCQS
	Biochemistry	Nutritionally essential fatty acids	• Enlist essential fatty acids • Describe importance and functions of essential fatty acids	Interactive lecture	1 hour	MCQS
	Biochemistry	Eicosanoids I	• Define eicosanoids • Enlist eicosanoids • Describe biologic functions along with their significance in health and disease	Interactive lecture	1 hour	MCQS
	Biochemistry	Eicosanoids **II**	• Describe biologic functions along with their significance in health and disease	Interactive lecture	1 hour	MCQS
	Biochemistry	Trop-I	• Define principle of ELISA • Enlist types of troponins in striated muscle • Demonstrate the Trop-I test • Discuss the significance and interpretation of Trop-I test in chest pain	Skill lab(1)	2 hours	OSPE

THEME 2 Breathlessness and ankle swelling

	Gross Anatomy	Surface anatomy of heart	Describe the surface marking of the heart Describe the surface marking of the heart valves Illustrate the surface marking of the aorta on models / x-rays Describe the surface marking of the superior vena cava Describe the surface marking of the inferior vena cava	Skill Lab	2hours	OSPE
	Gross Anatomy	Coronary circulation	Describe the coronary arteries Enlist the branches of each main artery Describe the anastomosis of coronaries Identify the area of the heart supplied by a coronary artery and its branches	Skill Lab	2 hours	MCQS, OSPE & Viva
	Gross Anatomy	Venous & Lymphatic drainage of Heart	Describe the venous drainage of the heart Describe the lymphatic drainage of the heart	Skill Lab	2 hours	MCQS, OSPE & Viva

	Gross Anatomy	Pericardium	Define pericardium Describe different reflections of pericardium Identify entry & exit of vessels of heart via pericardium Define the following clinical condition; pericarditis pericardial effusion cardiac Tamponade	Lecture	1 hour	MCQS, OSPE & Viva
	Histology	Histology of heart muscles	Explain the characteristics of cardiac muscle cell Explain the Structure of Intercalated disc Define the junctional specializations making up the intercalated disk Describe identification of different microscopic views of Cardiac muscle and its ultra-structures Differentiate histologically between cardiac and skeletal muscle and smooth muscles Enumerate histological layers of heart wall	Lecture	1 hour	OSPE, MCQS & Viva
	Physiology	Cardiac muscles	• Describe physiologic anatomy of cardiac muscle • Describe the properties of the cardiac muscle	Interactive lecture	1 hour	MCQs
	Physiology	Coronary circulation	Describe the physiologic basis coronary circulation Describe the steps of coronary thrombosis Describe the etiology of coronary thrombosis	Lecture	1 hour	MCQS, & Viva

	Physiology	Cardiac cycle	• Describe various events in cardiac cycle • Relate phases of cardiac cycle with o pressure changes o JVP (atrial pressure changes), ECG o volume changes o valvular changes o heart sounds Describe the concept of systole and diastole Describe the role of atria and ventricles as pumps Describe the regulation of cardiac cycle	Lecture	1 hour	MCQS, & Viva
	Physiology	Heart sounds	• Enumerate various types of normal heart sounds • Explain mechanism for production of heart sounds • Discuss pathophysiology of murmurs	Lecture	1 hour	MCQS, & Viva
	Physiology	Auscultation of heart	• Perform the auscultation of heart. • Indicate the characteristic features of normal heart sounds	Skill Lab	2 hours	MCQS, OSPE & Viva

	Physiology	Functions of heart valves	Describe the functions of mitral, tricuspid, aortic and pulmonic valves Describe the hemodynamics and sequel related to stenosis and regurgitation of heart valves	Lecture	1 hour	MCQS, & Viva
	Physiology	Cardiac output 1	• Describe cardiac output and cardiac index • Discuss control of cardiac output • Discuss venous return • explain the factors affecting venous return • Describe Frank Starling mechanism for intrinsic regulation of heart pumping • Describe the effect of following on Cardiac Performance: o Potassium ions o Calcium ions o Temperature • Describe the methods for measuring of cardiac output • Enlist the causes of abnormally high and abnormally low cardiac output	Lecture	1 hour	MCQS, & Viva

	Physiology	Cardiac output 2	• Describe pressure volume loop (end-systolic volume / end-diastolic volume / ejection fraction / systolic volume / systolic work output)	Lecture	1 hour	MCQS, & Viva
	Physiology	Lymphatic system	Describe the function of lymphatic system in the maintenance of interstitial fluid volume. Describe the effects of Interstitial Fluid Pressure on Lymph Flow. • Describe how changes in capillary hydrostatic pressure, plasma oncotic pressure, capillary permeability, and lymphatic function can lead to tissue edema	Lecture	1 hour	MCQS, & Viva
	Pharmacoloy		Enlist the groups of drugs used in the treatment of CAD (angina and MI) Enlist the groups of lipids lowering drugs	Lecture	1 hour	MCQS, & Viva
	Pathology		Describe the risk factors, and lab. Diagnosis of CAD Define and enlist the stages of atherosclerosis	Lecture	1 hour	MCQS, & Viva
	Forensic medicine	Death	Describe the medicolegal aspects of sudden death due to cardiovascular diseases	Lecture	1 hour	MCQS, & Viva

	Community Medicine	Prevention of CVD	Describe primordial, primary, secondary and tertiary prevention of CV diseases in community	Lecture	1 hour	MCQS, & Viva
	Biochemistry	Triacylglycerols	• Define triacylglycerols Describe Structure and biologic functions & significance	Interactive lecture	1 hour	MCQS
	Biochemistry	Phospholipids, glycolipids	• Define Phospholipids & glycolipids • Describe Structure and biologic functions & significance of Phospholipids & glycolipids	Interactive lecture	1 hour	MCQS
	Biochemistry	Sulfo-lipids and gangliosides	• Define Sulfo-lipids and gangliosides • Describe Structure and biologic functions & significance of Sulfo-lipids & gangliosides	Interactive lecture	1 hour	MCQS
	Biochemistry	Lipid peroxidation	• Explain Lipid peroxidation Describe the significance of Lipid peroxidation	Interactive lecture	1 hour	MCQS
		Fats and lipids in nutrition I	• Enlist Fats as a source of energy, • Describe role of saturated and unsaturated fats in health and disease, Explain effect of dietary intake of trans fats on health, and nutritionally essential fatty acids	SGD (2)	2 Hours	MCQS

		Fats and lipids in nutrition **II**	• Describe effect of dietary intake of trans fats on health, and nutritionally essential fatty acids	Interactive lecture	1 hour	MCQS
	Biochemistry	Calculation of caloric requirement	Discuss the caloric requirement of a person and nutritional requirements in pregnancy, lactation, infancy, and old age	SGD (3)	2 Hours	MCQS
	Biochemistry	Preparation of solutions & Conversion of conventional & SI measuring units	• Define System International (SI) units • Prepare different types of solutions Describe the clinical significance of different propositions of biochemical solutions	Skill lab (2)	2 hours	OSPE
	Biochemistry	Phenomenon of adsorption	• Define adsorption • Demonstrate Phenomenon of adsorption • Describe clinical significance of adsorption	Skill lab (3)	2 hours	OSPE
Theme 3 Blood pressure						
	Embryology	Cardiac developmental anomalies	Enlist the developmental anomalies of heart Describe the congenital anomalies of the heart. ASD VSD PDA Tetralogy of Fallot	Lecture	1 hour	MCQS & Viva

			transposition of the great vessels Hemangiomas and Telangiectasia			
	Physiology	Blood flow	• Discuss the basic principles of circulatory functions • Explain the inter-relationship of pressure, flow, and resistance • Describe the vascular dispensability of the Arteries and the Veins • Describe local control of blood flow in response to tissue needs • Explain mechanics of blood flow control (acute & long term) • Summarize humoral control of circulation • Summarize nervous control of circulation	Lecture	1 hour	MCQS, & Viva
	Physiology	Vascular dispensability and functions of arterial and venous system	• Describe the vascular dispensability of the Arteries and the Veins • Describe vascular compliance and vascular pressure curves of arterial and venous circulation • Describe the effect of Sympathetic	Lecture	1 hour	MCQS, & Viva

			Stimulation or Sympathetic Inhibition on the Volume-Pressure Relations of the Arterial and Venous Systems • Describe the delayed Compliance (Stress relaxation) of Vessels			
	Physiology	Arterial pressure pulsation	• Describe the arterial pressure pulsations • Discuss abnormal Pressure Pulse Contours • Explain the transmission of Pressure Pulses to the Peripheral Arteries	Lecture	1 hour	MCQS, & Viva
	Physiology	Short term regulation of blood pressure	Describe the regulation of blood pressure through sympathetic and parasympathetic nervous system • Describe the role of nervous system in rapid control of arterial pressure in the following situation such as o During muscle exercise o Stress o Maintaining normal arterial pressure by barorecept or reflexes o Lack of	Lecture	1 hour	MCQS, & Viva

			oxygen ○ Diminished brain blood flow • Describe the role of skeletal muscle in increasing the cardiac output and arterial pressure			
	Physiology	Long term regulation of blood pressure	• Describe the role of renal body fluid system in control of arterial pressure. • Describe the role of renin angiotensin system in control of arterial pressure	Lecture	1 hour	MCQS, & Viva
	Physiology	Microcirculation	• Describe microcirculation • Discuss capillary dynamics	Lecture	1 hour	MCQS, & Viva
	Medicine	Heart failure	Define Heart failure Differentiate between right-sided Heart failure and left-sided heart failure	Lecture	1 hour	MCQS, & Viva
	Physiology	Veins and their functions	• Describe Venous Pressures-Right Atrial Pressure (Central Venous Pressure) • Describe the Venous Resistance and Peripheral Venous Pressure • Explain the various factors affecting venous	Lecture	1 hour	MCQS, & Viva

			pressure • Discuss blood Reservoir Function of the Veins • Describe the specific Blood Reservoirs • Discuss pathophysiology of varicose vein			
	Physiology	Fetal circulation, cerebral, cutaneous and splanchnic circulation	• Discuss readjustments in fetal circulation at birth • Enumerate factors regulating cerebral and cutaneous circulations • Elaborate splanchnic circulation	Lecture	1 hour	MCQS, & Viva
	Physiology	CVS changes during exercise	• Describe the cardiovascular changes during exercise	Lecture	1 hour	MCQS, & Viva
	Physiology	Examination of arterial pulse	• Examine the different arterial pulses and characterize the information according to rate, rhythm, volume, and character	Skill Lab	2 hours	MCQS, OSPE & Viva
		Apex beat	• Perform the steps for location of apex beat	Skill Lab	2 hours	MCQS, OSPE & Viva

		Determination of BP and effect of posture and exercise on blood pressure	• Measure the blood pressure by auscultatory and palpatory method • Indicate the effect of posture and exercise on blood pressure	Skill Lab	2 hours	MCQS, OSPE & Viva
	Community medicine	Prevention of hypertension	• Describe the preventive strategies of hypertension	Lecture	1 hour	MCQS, & Viva
	Biochem	Biochemistry of Na, K **(I)**	• Discuss RDA, serum Levels Na, K, • Enlist sources of copper and cobalt • Describe functions of these minerals • Discuss absorption and excretion of Na, K,	Interactiv e lecture	1 hour	MCQS
	Biochemistry	Biochemistry of Na, K **(II)**	• Describe disorders related to increase and decrease in the amount of Na, K, • Describe the role of Na, K, in cardiac muscles contractility and their biochemical abnormalities	Interactiv e lecture	1 hour	MCQS
	Biochemistry	Carbohydrates in human nutrition	• Describe Protein sparing effect of carbohydrates, • Explain dietary carbohydrates and blood glucose along with the details of glycemic index, • Enlist dietary	SGD (4)	2 Hours	MCQS

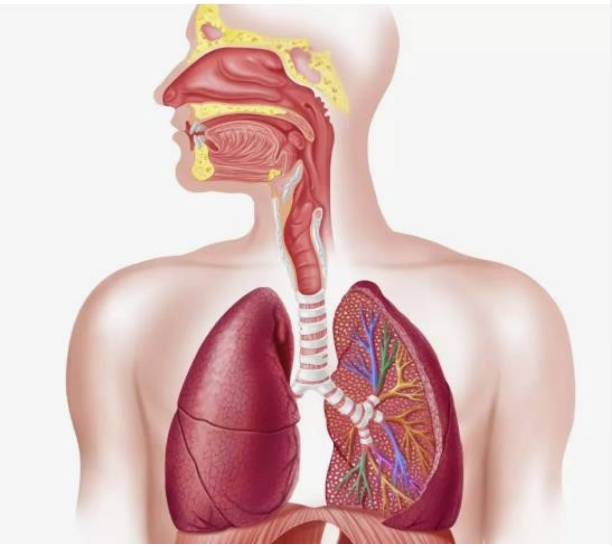
			fibers (types and biomedical importance)			
	Biochemistry	Collection of blood techniques of blood samples	• Enlist the precautions of blood sampling • Define vacutainer • Demonstrate types of vacutainers • Describe the biochemical reagents used in different types of vacutainers along with their principle's biochemical reactions	Skill lab (4)	2 hours	OSPE
Theme 4 palpitations						
	Histology	Histology of blood vessels	Describe the histological composition of vessel Describe the microscopic structure of artery and vein Differentiate histologically between artery and vein under light microscope Describe the histological composition of lymphatic channels	Lecture	1 hour	OSPE, MCQS & Viva

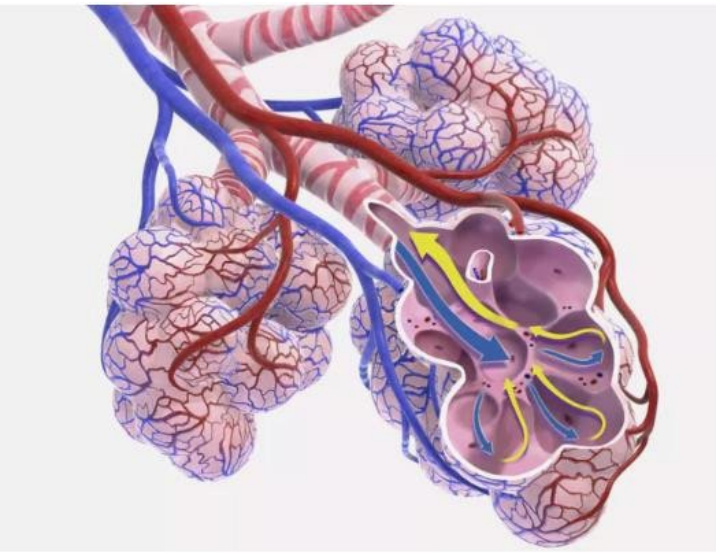
	Embryology	Fetal circulation	Describe fetal circulation Describe the physiological changes in circulation after birth	Lecture	1 hour	MCQS & Viva
	Embryology	Development of arteries	Describe the development of arterial system - Coarctation of Aorta Describe the congenital abnormalities in in the vessels	Lecture	1 hour	MCQS & Viva
	Embryology	Development of veins	Describe the development of venous system Describe the congenital abnormalities in in the vessels.	Lecture	1 hour	MCQS & Viva
	Physiology	ECG	• Draw and label normal ECG • Explain the physiologic basis of waves, segments, and intervals.	Lecture	1 hour	MCQS, & Viva
	Physiology	ECG	• Define bipolar limb leads • Enumerate the organization of bipolar limb leads • Define Einthoven's triangle • Define Einthoven's law • Enumerate chest (precordial) leads • Explain significance of chest leads • Define augmented unipolar limb leads • Describe esophageal leads	Lecture	1 hour	MCQS, & Viva

	Physiology	ECG	• Determination of heart rate in normal ECG • Discuss the conduction of electric current during recording of normal ECG • Discuss vectorial analysis of normal ECG • Describe Current of injury	Lecture	1 hour	MCQS, & Viva
	Physiology	Cardiac arrhythmias	• Discuss cardiac arrhythmias including heart modules • Explain premature contractions, flutter, fibrillations • Describe ectopic beats	Lecture	1 hour	MCQS, & Viva
	Physiology	ECG	• Describe the parts of ECG machine • Perform recording and interpretation of electrocardiogram	Skill Lab	2 hours	MCQS, OSPE & Viva
	Physiology	CPR	• Perform the steps of CPR • Describe the indications of doing CPR	Skill Lab	2 hours	MCQS, OSPE & Viva
	Pharmacology	Drugs used in hypertension	Enlist the drugs used in hypertension	Lecture	1 hour	MCQS, & Viva
	Biochemistry	Cardiac enzymes	Identify the enzymes that increase in myocardial infarction Discuss hyperlipidemia and its types	Interactive lecture	1 hour	MCQS

	Biochemistry	Lipoproteins	• Enlist lipoproteins Identify the enzymes that increase in myocardial infarction	Interactive lecture	1 hour	MCQS
	Biochemistry	Obesity and food additives	• Discuss obesity and food additives Especially artificial sweeteners and flavor enhancers	SGD (5)	2 Hours	MCQS
	Biochemistry	Test for creatinine	• Demonstrate Nitroprusside test • Demonstrate Nitroprusside acetic acid test • Demonstrate Picric acid test • Describe the clinical significance of creatinine in health and disease	Skill lab (5)	2 hours	OSPE

Respiration I module





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Introduction to respiration module

A respiratory system's function is to allow gas exchange. The space between the alveoli and the capillaries, the anatomy or structure of the exchange system, and the precise physiological uses of the exchanged gases vary depending on the organism. In humans the respiratory system includes airways, lungs, and the respiratory muscles. Molecules of oxygen and carbon dioxide are passively exchanged, by diffusion, between the gaseous external environment and the blood. This exchange process occurs in the alveolar region of the lungs.

Rationale

In this present module has been designed to unfold structural organization function congenital anomalies and diseases of respiration. It explains the anatomy, control, gases exchange, reflexes of respiratory system. It also helps to include the radiological examination of the respiratory system.

General learning outcomes

Knowledge

By the end of this module the students will be able to

1. Describe the anatomy and abnormalities of thoracic cage.
2. Describe the development and gross anatomy of the diaphragm.
3. Describe the contents of mediastinum and their relations.
4. Describe the anatomy of pleura and its reflections.
5. Describe the gross and microscopic structure, development, nerve supply and blood supply of trachea, bronchi and lungs.
6. Describe the epithelia and connective tissues lining the respiratory passageways.
7. Describe pulmonary ventilation.
8. Discuss the mechanisms of gaseous exchange between alveoli, and blood and blood and tissues.
9. Elaborate the transport of gases in the blood.
10. Describe the mechanisms of regulation of respiration.
11. Define hypoxia, and cyanosis.

12. Describe the effect of aging on respiratory system
13. Describe the biochemical structure and functions of enzymes.
14. Describe the mechanisms of O2 and CO2 transport in the blood.
15. Classify anti-asthmatic and anti-tuberculous drugs.
16. Describe the types and signs of asphyxia.
17. List the causes and signs of pneumonias, bronchial asthma, tuberculosis, acute respiratory distress syndrome (ARDS), and pulmonary edema.
18. Describe the parameters of Pulmonary Function Tests (PFTs)

Skill

Demonstrate a professional attitude, team-building spirit and good communication skills.

Attitude

1. Follow the basic laboratory protocols.
2. Participate in class and practical work efficiently.
3. Maintain discipline of the college.
4. Follow the norms of the college properly.
5. Communicate effectively in a team with colleagues and teachers.
6. Demonstrate professionalism and ethical values in dealing with patients, cadavers, colleagues, and teachers.
7. Communicate effectively in a team with colleagues and teachers.
8. Demonstrate the ability to reflect on the performance.

Themes for respiration module

Sr. NO.	Theme	Duration
1	Chest wall injury	1 week
2	Cough and hemoptysis	1weeks
3	breathlessness	2 weeks

Learning objectives in Respiration Module

Theme 1 Chest wall injury

Sr. No	Subject	Topic	Learning Objectives	Teaching strategy	Duration	Assessment
	Gross Anatomy	Gross anatomy of thorax	• Describe main features of thoracic wall • Describe the Boundaries of thoracic cavity. • Describe the boundaries of thoracic inlet & outlet	SGD	2 hours	MCQS, OSPE & Viva
	Gross Anatomy	Sternum	• Describe the location and shape of the sternum • Describe the parts of the sternum • • Describe the articulations and muscle • attachments •	Skill Lab	2 hours	MCQS, OSPE & Viva
	Gross Anatomy	Thoracic Vertebra	• Describe the gross features of the thoracic • vertebrae • a. Vertebral body • b. Intervertebral disc • c. Laminae • d. Pedicles • e. Intervertebral foramina	Skill Lab	2 hours	MCQS, OSPE & Viva

	Gross Anatomy	Rib	• Differentiate between typical and atypical ribs. • Describe different joints of thorax • Discuss Intercostal muscles • Discuss the contents of intercostal spaces • Describe the origin of intercostal arteries • Describe the origin, course and distribution of • intercostal nerves • Discuss branches and course of internal thoracic artery	Skill Lab	2 hours	MCQS, OSPE & Viva
	Gross Anatomy	Abnormalities of thoracic wall	• Describe thoracic wall abnormalities and its clinical correlation	Lecture	1 hour	MCQS, OSPE & Viva
	Gross Anatomy	Diaphragm	• Describe the origin and insertion of the • diaphragm • Describe the openings of the diaphragm • Describe the nerve supply of Diaphragm and its clinical significance	SGD	2 hour	MCQS, OSPE & Viva

	Gross Anatomy	Mediastinum	• Describe the contents of the superior • mediastinum • Describe the contents of the Anterior & • Posterior mediastinum • Describe the relations of different contents in • mediastinum • Identify various anatomical landmarks on chest • X-Rays, CT and MRI	Lecture	1 hour	MCQS, OSPE & Viva
	Embryology	Development of Diaphragm	• Describe development of diaphragm • Describe diaphragmatic hernias and clinical significance	Lecture	1 hour	MCQS, OSPE & Viva

	Physiology	Mechanics of pulmonary ventilation	• Enlist the muscle that cause lung expansion, contraction and muscles involved in strenuous exercise
			• Describe role of the following three pressures during respiration
			  • Pleural pressure
			  • Alveolar pressure
			  • Trans pulmonary pressure
			• Describe the effect of Pneumothorax on pulmonary pressures
				Interactive Lecture	1 hour	MCQs

	Physiology	Lung compliance	• Explain production & function of surfactant. • Describe compliance of lungs • Describe the concept of work of breathing. • Discuss respiration distress syndrome& chest wall abnormalities	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Lung volumes and capacities	Describe Lung volumes and capacities	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Spirometry-Measurement of pulmonary volumes and capacities	Perform the steps for determination of various volumes and capacities with the recording spirometer	Skill Lab	2 hours	MCQS, OSPE & Viva
	Physiology	Determination of peak expiratory flow rate	Perform the peak expiratory flow rate	Skill Lab	2 hours	MCQS, OSPE & Viva
	Surgery		Describe pneumothorax Define Hydro pneumothorax	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Biochemistry	Introduction, Classification and nomenclature of enzymes	• Define enzymes and • Define activation energy • Define Gibbs Free energy • Describe IU of enzyme activity Describe Enzyme Commission Classification of enzymes along with main subclasses	SGD	2 Hours	MCQS
	Biochemistry	Properties of enzymes	Explain the Chemical nature, active site, catalytic efficiency, specificity, proenzymes, and kinetic properties of enzymes	Interactive lecture	1 hour	MCQS

	Biochemistry	Coenzymes and cofactors	• Describe Coenzymes and cofactors • Enlist Coenzymes derived from various vitamins along with the examples of enzymes requiring these coenzymes; and metal cofactors	Interactive lecture	1 hour	MCQS
	Biochemistry	Isozymes	• Define isozymes • Enlist isozymes Describe the clinical significance	Interactive lecture	1 hour	MCQS
	Biochemistry	Allosteric enzymes	• Define allosteric Describe the clinical significance of allosteric enzymes	Interactive lecture	1 hour	MCQS
	Biochemistry	Demonstration of buffer action	• Prepare the buffers • Demonstrate the buffer actions Describe biochemical significances of different types of body buffers in health and disease	Skill lab (1)	2 hours	OSPE
Theme 2 Cough and hemoptysis						
	Gross Anatomy	Pleura	• Describe the gross features of pleura • Describe the pleural cavity and the pleural • reflections • Describe the surface anatomy relatedto pleural • reflections	Skill Lab	2 hours	MCQS, OSPE & Viva

	Gross Anatomy	Trachea & bronchi	• Describe trachea and bronchi with relations • plus subdivisions • Describe the neurovascular supply of trachea • and bronchi • Describe the surfaces anatomy of trachea and bronchi	Skill Lab	2 hours	MCQS , OSPE & Viva
	Gross Anatomy	Gross anatomy of Lung	• Describe the lungs with their lobes and fissures, • relations with surroundings and surfaces and • compare between right and left lungs. • Describe Broncho-pulmonary segments and their clinical importance • Describe innervations, blood supply and lymphatic drainage of the lungs.	Skill Lab	2 hours	MCQS , OSPE & Viva
	Embryology	Development of body cavities	• Recognize the cephalo-caudal and transverse folding of embryonic disc • Describe the extent of intra embryonic coelom after folding and its divisions into three serous cavities • State the derivatives of visceral and parietal layers of mesoderm • State the peri cardio-peritoneal canals and their final fate	Lecture	1 hour	MCQS & Viva

	Embryology	Development of Lungs	• Describe development of trachea, bronchial tree, pleura, lungs • Discuss the formation of Lung Bud • Discuss the different phases of lung development • Discuss the abnormalities related to lung development	Lecture	2 hours	MCQS & Viva
	Histology	Respiratory epithelium and Trachea	• Classify the types of epithelia lining the various • parts of respiratory system • Differentiate between the histological • differences among various parts of respiratory • system • Describe the structure of trachea and Its layer	Lecture	1 hours	MCQS, OSPE & Viva
	Histology	Histology of Lung	Discuss the microscopic picture of respiratory bronchiole, alveolar ducts, alveolar sacs and alveoli. Describe the different types of cells found in Alveoli Discuss surfactant, alveolar septum, alveolar pores and alveolar macrophages	Lecture	1 hours	MCQS, OSPE & Viva

	Physiology	Functions of respiratory passageways	Describe the respiratory and non-respiratory functions of the respiratory passageways • Describe the mechanism involved in the Cough & sneeze reflex • Describe the mechanism of Yawning • Vocalization	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Pharmacology	Anti- Asthmatic drugs Anti tuberculosis drugs	Enlist Anti-asthmatic drugs Classify Anti-tuberculous drugs	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Pathology	Pneumonias Pulmonary Tuberculosis Bronchial Asthma Pulmonary Edema	Define pneumonia and enlist the causative pathogens of pneumonia Define primary and secondary Tuberculosis and state its etiology Describe the etiology, pathogenesis and clinical features of asthma Define pulmonary edema and classify it according to underlying causes	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Community Medicine	Prevention of Respiratory disorders	Discuss preventive strategies of different problems related to respiratory system Discuss the relationship of smoking with lung Diseases Describe preventive strategies for smoking	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Biochemistry	Effects of Temperature, PH and substrate concentration enzyme activity	Enlist and describe the factors affecting enzymes activities	Interactive lecture	1 hour	MCQS

	Biochemistry	Catalysis by enzyme **I**	• Describe Catalysis by Proximity • Describe Acid–Base Catalysis	Interactive lecture	1 hour	MCQS
	Biochemistry	Catalysis by enzyme **II**	• Describe Catalysis by Strain • Describe Covalent Catalysis	Interactive lecture	1 hour	MCQS
	Biochemistry	Types of enzyme inhibitors its clinical significance	• Describe types of enzymes inhibitors and its clinical significance • Effects of competitive, non-competitive and uncompetitive inhibitors on enzyme activity, • Describe effects of competitive and non-competitive inhibition on Lineweaver-Burke plot.	Interactive lecture	1 hour	MCQS
	Biochemistry	Michaelis Menten and Lineweaver-Burke equations WITHOUT derivation	Describe Mechanism of enzyme action and kinetics of enzyme activity	Interactive lecture	1 hour	MCQS
	Biochemistry	Regulation of enzyme activity	Describe covalent modification, allosteric regulation and regulation by gene induction, repression & de-repression of enzyme synthesis	Interactive lecture	1 hour	MCQS
	Biochemistry	Energy metabolism	• Describe Caloric value of food, • Describe Specific dynamic action (SDA) of food, • Describe respiratory quotient, metabolic rate (determination and factors affecting metabolic rate),	SGD (2)	2 Hours	MCQS

			Describe basal metabolic rate (BMR) (measurement, calculation, and factors affecting BMR)			
	Biochemistry	BMR	• Describe respiratory quotient, metabolic rate (determination and factors affecting metabolic rate), • Describe basal metabolic rate (BMR) (measurement, calculation, and factors affecting BMR)	Interactive lecture	1 hour	MCQS
	Biochemistry	Demonstration of pH (pH metery)	• Demonstrate and label the different components of pH meter Describe the practical implementation of pH metry in health & disease	Skill lab (2)	2 hours	OSPE
Theme 3 Breathlessness						
	Gross Anatomy	Mechanics of respiration	• Describe briefly mechanics of respiration • Describe different types of respiratory movement	Skill lab	2 hours	MCQS & Viva
	Physiology	Alveolar ventilation	• Define dead space • Discuss lung volumes and capacities • Explain lung function tests Elaborate the effect of dead space on alveolar ventilation • Differentiate anatomical dead space from physiological dead space	Interactive lecture	1 hour	MCQS, OSPE & Viva

			Measurement of dead space volume			
	Physiology	Pulmonary circulation	Explain the physiologic anatomy of the pulmonary circulatory system Describe the pressures in the pulmonary circulatory system Describe blood volume of the lungs Describe blood flow through the lungs and its distribution Describe the regional differences in pulmonary blood flow in an erect position. Describe the consequence of hypoxic pulmonary vasoconstriction on the distribution of pulmonary blood flow. Describe the pulmonary capillary dynamics Describe the development of pulmonary edema	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Gas exchange I	List the normal airway, alveolar, arterial, and mixed venous PO2 and PCO2 values. Describe respiratory unit Describe the physiologic anatomy of the respiratory membrane and its significance. Describe the factors that affect the rate of gaseous diffusion through the respiratory membrane. Describe the diffusing capacity of respiratory membrane for O2 and CO2 at rest and exercise.	Interactive lecture	1 hour	MCQS, OSPE & Viva

	Physiology	Gas exchange II	Describe the effect of ventilation/perfusion (V/Q) ratio on alveolar gas concentrations. Identify the average V/Q ratio in a normal lung. Explain the concept of physiologic shunt and physiologic dead space Describe the abnormalities of ventilation perfusion ratio in normal lung and chronic obstructive lung disease. Enlist common causes of hypoxemia	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Transport of O2 in the blood I	Define oxygen partial pressure (tension), oxygen content, and percent hemoglobin saturation as they pertain to blood. Describe Oxyhemoglobin dissociation curve (hemoglobin oxygen equilibrium curve) showing the relationships between oxygen partial pressure, hemoglobin saturation, and blood oxygen content. Describe the relative amounts of O2 carried bound to hemoglobin with that carried in the dissolved form.	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Transport of O2 in the blood II	State Henry's Law (the relationship between PO2 and dissolved plasma O2 content) Describe how the shape of the oxyhemoglobin dissociation curve influences the uptake and delivery of oxygen. Define P50 Describe how the oxyhemoglobin dissociation curve is affected by changes in blood temperature, pH, PCO2, and 2,3-DPG.	Interactive lecture	1 hour	MCQS, OSPE & Viva

			Describe how anemia and carbon monoxide poisoning affect the shape of the oxyhemoglobin dissociation curve, PaO2, and SaO2.			
	Physiology	Transport of CO2 in the blood	List the forms in which carbon dioxide is carried in the blood. Describe the percentage of total CO2 transported as each form. Describe the chloride shift and its importance in the transport of CO2 by the blood. Describe the enzyme that is essential to normal carbon dioxide transport by the blood and its location. Describe the carbon dioxide dissociation curves for oxy- and deoxyhemoglobin. Describe the interplay between CO2 and O2 binding on hemoglobin that causes the Haldane effect.	Interactive lecture	1 hour	MCQS, OSPE & Viva

	Physiology	Regulation of Respiration	• Describe the following 4 respiratory centers
			  • Dorsal respiratory centers
			  • Ventral respiratory centers
			  • Pneumotaxic respiratory centers
			  • Apneustic respiratory centers
			Enlist functions of each respiratory center in control of respiratory control
				Interactive lecture	1 hour	MCQS, OSPE & Viva

			• Describe the direct chemical control of respiratory center activity of H+ and CO2 ions Describe the role of peripheral chemoreceptors system in control of respiration			
	Physiology	Regulation of Respiration during exercise	• Describe the oxygen consumption in exercise • Explain pulmonary ventilation in exercise • Discuss physiology of high altitude • Discuss Space physiology • Discuss pathophysiology of acute mountain sickness	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Common Respiratory abnormalities I	• Discuss pathophysiology of o pulmonary edema o Pneumothorax o Pleural effusion Dyspnea • Discuss pathophysiology and clinical manifestations of o carbon mono-oxide poisoning o Chyne-stokes breathing o Sleep Apnea o Pneumonia	Interactive lecture	1 hour	MCQS, OSPE & Viva

	Physiology		Atelectasis • Discuss pathophysiology and clinical manifestations of o Asthma o Emphysema Caisson's disease • Explain clinical importance of lung function tests • Discuss respiratory failure • Discuss artificial respiration, uses & effects of O2 therapy	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Deep sea physiology	• Discuss deep-sea diving • Discuss hyperbaric conditions	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Physiology	Clinical examination of chest	• Perform the systemic examination of the respiratory system	Skill Lab	2 hours	MCQS, OSPE & Viva
	Forensic Medicines	Asphyxia	• Define Asphyxia • Describe different types of asphyxia • Identify classical signs of asphyxia	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Medicine	Introduction to Respiratory symptomatology PFT`s	Enumerate the various symptoms of respiratory disorders Interpret the Pulmonary Function Tests	Interactive lecture	1 hour	MCQS, OSPE & Viva

	Medicine	ARDS	Discuss acute lung injury and its correlation acute respiratory distress syndrome Describe the causes of acute respiratory distress syndrome Discuss the morphology of acute respiratory distress syndrome	Interactive lecture	1 hour	MCQS, OSPE & Viva
	Biochemistry	Therapeutic and diagnostic use of enzymes	• Discus application of determination of enzyme activities of certain enzymes in plasma in hepatic, muscle, prostatic, pancreatic, bone and cardiac diseases.	Interactive lecture	1 hour	MCQS
	Biochemistry	Balanced diet	• Define balanced diet Discuss the significance and application of balanced diet in health and disease	SGD (3)	2 Hours	MCQS
	Biochemistry	Proteins in nutrition	• Discuss Obligatory nitrogen loss, nitrogen balance, • Discuss nutritionally essential amino acids and their role in body growth and nitrogen equilibrium, • Describe determination of comparative nutritional efficiency and quality of dietary protein, Define (RDA)recommended dietary allowance of protein, protein energy malnutrition (kwashiorkor and marasmus).	SGD (4)	2 Hours	MCQS

	Biochemistry	protein energy malnutrition	• Describe determination of comparative nutritional efficiency and quality of dietary protein, • Define (RDA)recommended dietary allowance of protein, protein energy malnutrition (kwashiorkor and marasmus).	Interactive lecture	1 hour	MCQS
	Biochemistry	Phenomenon of surface tension	• Define surface tension • Describe the significance of surface tension in health and disease Demonstrate the phenomenon of surface tension	Skill lab (3)	2 hours	OSPE
	Biochemistry	Detection of ketone bodies	• Define ketosis • Enlist ketone bodies • Describe the effects of ketosis in health and disease Demonstrate the detection of ketone bodies in given sample	Skill lab (4)	2 hours	OSPE

Assessment Plan

Paper C (for year-1)			
Subject	**CVS module**	**Respiratory module**	**Total MCQs**
Gross Anatomy	9	12	21
Histology	4	4	8
Embryology	5	3	8
Physiology	34	20	54
Biochemistry	14	8	22
Pharmacology	1	0	1
Pathology	1	1	2
Community medicine	1	1	2
Forensic medicine	1	1	2
Total	**70**	**50**	**120**

OSPE (C)					
Final distribution of OSPE stations for year-1 (CVS 1 and Respiratory 1 modules)					
Subject	**CVS 1 module**	**Viva stations**	**Respiratory 1 module**	**Viva stations**	**Total OSPE stations (for final exam*)**
Gross Anatomy	4	1	1	1	5
Histology	3		3		
Embryology	0		0		
Physiology	7	1	3	1	5
Biochemistry	2	1	0	1	2
Total	16	3	7	3	12+6 (viva)=18
*out of total of 23 OSPE stations, 12 will be allocated for final exam plus 6 viva stations. A minimum of 18 stations will be used in final exams.					

Internal Assessment

Sr. No.	Criteria	Numbers
Theory:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Creative work/assignments/Task	1
3.	Continuous Assessment throughout block	2
4.	Block examination theory	3
5.	Pre prof Examination of block	4
	Total	**13**
Sr. No.	**Criteria**	**Numbers**
OSPE:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Log Book	3
3.	Discipline, Responsibility and team work	2
4.	Block examination OSPE	2
	Total	**10**