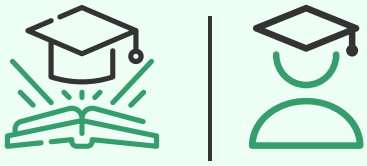
College of Medicine & Dentistry at The Hills

DEPARTMENT OF MEDICAL EDUCATION
COLLEGE OF MEDICINE AND DENTISTRY AT THE HILLS, ABBOTTABAD

CARDIOVASCULAR - I

Module

Block-C (1st Year)
MBBS



Duration: 4 weeks

Year
2024-25

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1 Vision

To be a leading institution in medical education, dedicated to cultivating a workforce of physicians and clinicians who excel in providing equitable, affordable, and exemplary healthcare while addressing the diverse health needs of our nation and the global community.

2 Mission

To deliver a transformative medical education that empowers future healthcare leaders to innovate in clinical care and health system design. Our mission is supported by a passionate and diverse faculty committed to fostering collaboration, upholding the highest ethical standards, and addressing healthcare disparities. We aim to inspire our students to engage with patients and communities, promoting inclusivity and teamwork in service to humanity.

3 List of abbreviations

Bio-L	Biochemistry Lecture	**OSPE**	Objectively Structured Practical Examination
Bio-P	Biochemistry Practical	**Paeds-L**	Pediatrics Lecture
Bio-SGD	Small Group Discussion in Biochemistry	**Patho-L**	Pathology Lecture
C.Med-L	Community Medicine Lecture	**Phar-L**	Pharmacology Lecture
DSL	Directed Self Learning	**Phy-L**	Physiology Lecture
FDT	Film/Demonstration/Tutorial	**Phy-P**	Physiology Practical
F.Med-L	Forensic Medicine Lecture	**Phy-SGD**	Small Group Discussion in Physiology
G.Anat-L	Gross Anatomy Lecture	**PBL**	Problem Based Learning
Histo-P	Histology Practical	**SDL**	Self-Directed Learning
IT	Information Technology	**SL**	Skill Lab
LGIS	Large Group Interactive Session	**SAQs**	Short Answer Questions
MCQs	Multiple Choice Questions	**SEQs**	Short Essay Questions
Med.Edu-L	Medical Education Lecture	**SGDs**	Small Group Discussions
PRIME	Professionalism and Communication Skills, Research, Identity Formation, Management and Leadership, Ethics		

4 Recommended List Of Icons

Introduction To Case

For Objectives

Critical Questions

Assessment

Resource Material

5 Overview of the Module/ Preface

Welcome to the Cardiovascular – I (CVS I) module, designed to provide a comprehensive education in medical science and practice. This module integrates theoretical knowledge with practical applications, focusing on core themes such as chest pain, breathlessness, ankle swelling, blood pressure, and palpitations. Through a combination of clinical rotations, interactive group sessions, small group discussions, self-directed learning, and skills/practical training, students will gain a deep understanding of Anatomy, Physiology, Biochemistry, and Medicine.

The study guide outlines the assessment components, including knowledge, basic sciences, and practical implications, as well as the evaluation tools, such as MCQs, SEQ, and OSPE. This transparency enables students to align their efforts with the evaluation criteria, promoting accountability and preparation for academic success.

As future medical professionals, graduates can explore diverse career pathways in clinical practice, research, Anatomy, Physiology, and Biochemistry. The study guide serves as an essential tool, providing clarity on module contents, instructional methodologies, faculty guidance, and assessment criteria. By engaging with the study guide, students can navigate their academic journey with confidence, maximizing their learning experience in the MBBS program.

6 Introduction/ Organization of Module

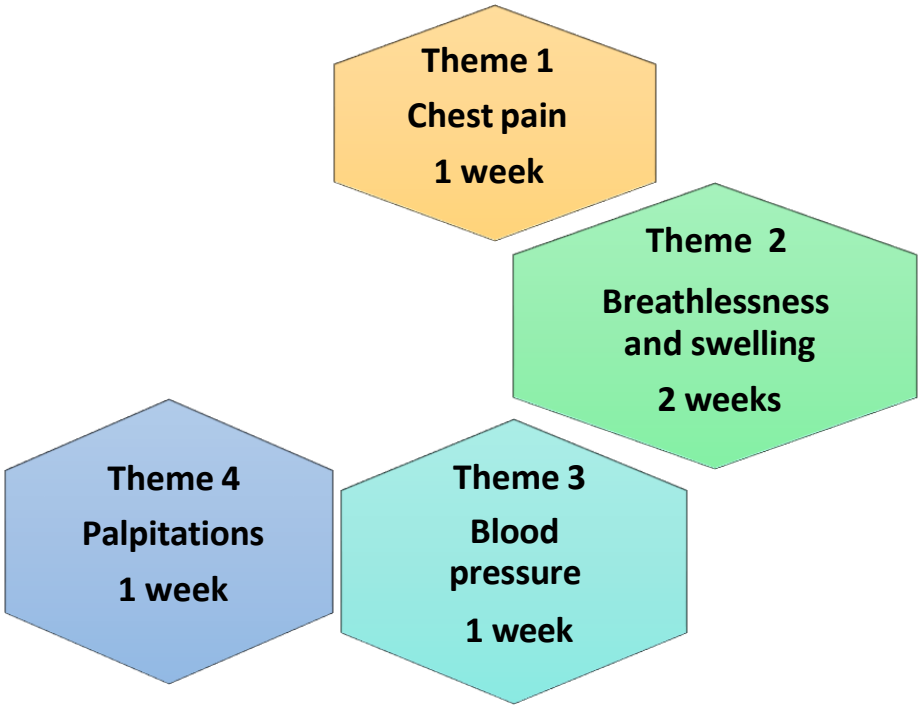
6.1 Introduction:

Upon completing the Cardiovascular System module at the College of Medicine and Dentistry at the Hills, Abbottabad, students will gain a fundamental understanding of common cardiovascular diseases, including their diagnosis, investigation, treatment, referral, prevention, and counseling. This comprehensive module is designed to introduce students to the basic concepts of the cardiovascular system, including the heart, lungs, and blood vessels, as well as electrocardiography and associated abnormalities. By integrating these concepts, students will develop a solid foundation in the cardiovascular system's functions, including the heart's role as a pump, blood vessels as conduits for blood circulation, and lungs as responsible for oxygenating blood and removing carbon dioxide. Upon completion of this module, students will be assessed through the Block C Exam, evaluating their mastery of the learning domains in musculoskeletal health.

6.2 Rationale:

The importance of a perfectly functioning cardiovascular system cannot be overstated, as its cessation for even a minute can lead to rapid death. Therefore, understanding the intricacies of the cardiovascular system and maintaining its health is crucial for overall well-being. This module is designed to address this critical need by providing students with a comprehensive understanding of the heart and cardiovascular system, including their structure, function, and regulation, in both healthy and diseased states. By exploring the intricacies of cardiovascular health and disease, students will gain a deeper appreciation for the significance of cardiovascular wellness and be better equipped to promote and maintain it in their future careers.

6.3 Organization of the study guide:



Theme 1: Chest Pain

This theme focuses on the evaluation and management of chest pain, a common symptom that can indicate various cardiovascular conditions, including myocardial infarction, angina, and pericarditis. Students will learn to differentiate between types of chest pain, identify risk factors, and develop diagnostic and treatment strategies.

Theme 2: Breathlessness and Swelling

This theme explores the causes and consequences of breathlessness (dyspnea) and swelling (edema), which can be indicative of cardiovascular diseases such as heart failure, pulmonary embolism, or valvular heart disease. Students will learn to assess and manage these symptoms, understanding the underlying pathophysiology and treatment options.

Theme 3: Blood Pressure

This theme delves into the importance of blood pressure regulation, hypertension, and hypotension. Students will learn to evaluate blood pressure measurements, identify risk factors for hypertension, and develop strategies for management and treatment.

Theme 4: Blood Pressure (Hypertension)

This theme builds on the previous one, focusing specifically on hypertension, its causes, consequences, and management. Students will learn to diagnose and treat hypertension, understanding the role of lifestyle modifications and pharmacological interventions.

Theme 5: Palpitation

This theme addresses the evaluation and management of palpitations, an awareness of irregular heartbeats that can be caused by various cardiovascular conditions, including arrhythmias, anxiety, or electrolyte imbalances. Students will learn to differentiate between types of palpitations, identify underlying causes, and develop diagnostic and treatment strategies.

7 Teaching Strategies:

The following teaching and learning methods are utilized to foster better understanding:

7.1 Large Group Formats:

a. **Interactive Lectures:** In large group settings, the lecturer introduces topics or common clinical conditions, explaining the underlying phenomena through interactive methods such as questions, visual aids, videos of patient interviews, and exercises. Students are actively engaged in the learning process.

b. **Directed Self-Learning:** Directed self-learning is an active approach where learners are provided with predefined learning objectives and receive guidance and supervision throughout the learning process. This method helps establish a strong foundation for independent and deep learning.

c. **Self-Directed Learning:** Students assume responsibility for their own learning through individual study, discussions with peers, and seeking information from the Learning Resource Center, teachers, and other resources both within and outside the college. Students can utilize designated college hours for self-study.

7.2 Small Group Formats:

a. **Small Group Discussions:** This format helps students clarify concepts, acquire skills, and develop attitudes. Sessions are structured around specific exercises, such as patient cases, interviews, or discussion topics. Students exchange opinions and apply knowledge gained from lectures, tutorials, and self-study. The facilitator's role is to ask probing questions, summarize, or rephrase to help clarify concepts.

b. **Practical Demonstrations:** Basic science practicals related to anatomy, biochemistry, and physiology are scheduled to enhance student learning.

c. **Problem-Based Learning (PBL):** In PBL sessions, students work in small groups to solve complex, real-world problems. This method encourages critical thinking, self-directed learning, and the application of knowledge in practical scenarios. Facilitators guide the process, helping students to develop problem-solving skills and integrate knowledge across disciplines.

d. **Journal Club:** The Journal Club involves students reviewing and presenting recent research articles. This activity promotes critical appraisal skills, keeps students updated with the latest scientific developments, and encourages the integration of evidence-based practices into their learning.

8 Assessment Strategies:

Assessments within the MBBS program at the College of Medicine and Dentistry at the Hills, Abbottabad consist of both formative and summative evaluations. These assessments are crucial for monitoring student progress and academic performance.

8.1 Formative Assessment:

Formative assessments, accounting for 10% of the total marks assigned to each block, serve as ongoing evaluations designed to provide feedback and promote learning. The allocation of this 10% can be determined in accordance with the blueprint of KMU and further distributed as per the recommendations of the academic council at the College of Medicine and Dentistry at the Hills, Abbottabad. Formative assessments are conducted after the completion of each module, ensuring students receive timely feedback to enhance their understanding and performance.

8.2 Summative Assessment:

Summative assessments, comprising 90% of the total assessment weighting, are conducted and overseen by KMU as part of the annual examination process. The summative annual examination is organized and conducted by KMU, which is responsible for evaluation and grading. This summative assessment evaluates students' comprehensive understanding of the curriculum and constitutes a significant portion of their final scores.

8.3 Assessment Tools:

Various assessment tools are employed to measure students' knowledge and competencies. These tools include:

1. **Written Examinations:** These include Multiple Choice Questions (MCQs) and Short Essay Questions (SEQs) that assess students' theoretical knowledge.
2. **Performance Assessments:** Objective Structured Practical Examinations (OSPE) and Objective Structured Clinical Examinations (OSCE) are used to evaluate practical skills and clinical competence.
3. **In-Training Assessments:** Clinical logbooks provide a comprehensive record of students' practical experiences and serve as a valuable tool for tracking their progress.
4. **Assignments:** Presentations, projects, and self-reflection assignments are included in the assessment process to enhance students' critical thinking and research skills.

8.4 Feedback Mechanism:

At the end of each module, a "Module Evaluation Form" will be provided to students, either in hard copy or online. Students will give their feedback on the "Course Content," "Learning Resources," "Teaching Methods," "Engagement & Motivation," and "Assessment Methods."

9 Table Of Specification

Module CVS of Black C				
Subject	No. of Hours Allocated in LOs	Percent Distribution	Assessment	
	Total		MCQs	OSPE
Gross Anatomy	24	24.7%	09	05
Histology			04	
Embryology			05	
Physiology	25	25.8%	34	05
Biochemistry	18	18.6%	14	01
PRIME	--	3.1%	--	--
Pharmacology	--	2.1%	01	--
Pathology	--	2.1%	01	--
Community Medicine	--	3.1%	01	--
General Medicine	--	10.3%	--	01
Forensic Medicine	--	1.0%	01	--
IT Skills	--	1.0%	--	--
Islamiyat	--	3.1%	--	--
SDL	--	5.2%	--	--
Total	**67**	**100%**	**70**	**12**

10 Learning Objectives

10.1 General Learning Outcomes

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

Knowledge

1. Describe the normal structure and function of the different parts of the heart, conducting system, the aorta and large elastic arteries, arteries, arterioles and capillaries, venules and veins.
2. Recognize and identify the changes in structure and/or functioning of the cardiovascular system in the following disease states: valvular heart disease, dysrhythmias, atherosclerosis and ischemic heart disease, congenital heart disease, hypertension and common syndromes like heart failure, stroke and shock that arise as complications.
3. Correlate etiology with the pathogenesis of different types of shock
4. Correlate the etiology with the pathogenesis of different thromboembolic phenomenon.
5. Describe the embryology of the heart and correlate it with various developmental anomalies
6. Describe the development of arterial, venous and lymphatic system
7. Describe the microscopic structure of myocardium, and blood vessels
8. Describe the cardiac cycle, cardiac output, and venous return
9. Discuss blood pressure and its regulation
10. Describe the mechanisms and types of circulatory shock and associated compensatory mechanisms
11. Describe the anatomy and common pericardial diseases
12. Describe the cardiac enzymes
13. Describe the mechanisms of impulse generation, conduction and excitation of myocardium
14. Discuss the normal ECG and common ECG abnormalities
15. Enlist the drugs used in ischemic heart disease and hyperlipidemias
16. Describe preventive strategies of cardiovascular diseases

Skills

1. Demonstrate the use of Stethoscope for Auscultation.
2. Identify normal and abnormal findings in the heart and blood vessels on gross, microscopic and radiologic examination
3. Interpret circulation physics
4. Interpret normal and distinguish abnormal ECGs
5. Record blood pressure and observe the effects of posture and exercise on blood pressure.
6. Elicit clinical history in a patient suspected of cardiovascular disease
7. Auscultate the heart sounds and differentiate between the normal and abnormal sounds on physical examination
8. Perform a focused physical examination of the CVS and recognize abnormalities in common disorders in the disease
9. Examine/ palpate all peripheral pulses and recognize alteration in volume, rate and rhythm
10. Examine JVP
11. Demonstrate systematic analysis of ECG.
12. Identify the position of borders and valves of the heart by surface marking on model / simulator.

13. Palpate and find apex beat, and auscultatory areas in the chest of the subject provided and describe their significance.
14. Differentiate between normal and displaced apex beat
15. Perform basic life support.
16. Interpret the cardiac enzymes
17. Detect lipids in a given sample

Attitude

1. Must be aware of the importance of lifestyle modification in the prevention and control of heart diseases
2. Describe increasing morbidity and mortality associated with cardiovascular disorders and its psycho-social impact on the individual and family
3. Demonstrate ability to give and receive feedback, respect for self and peers.
4. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals
5. Organize& distribute tasks

10.2 Specific Learning Outcomes

THEME–I: Chest Pain

	ANATOMY			
1	Surface anatomy	1. Describe the surface marking of the heart 2. Describe the surface marking of the heart valves 3. Illustrate the surface marking of the aorta on models / x-rays 4. Describe the surface marking of the superior vena cava 5. Describe the surface marking of the inferior vena cava 6. Describe the gross structure of the heart	01	LGIS
2.	Gross anatomy of the heart	1. Describe the anatomical position, borders, surfaces, external and internal features of the atria and ventricles of the heart 2. Explain the role of muscles bundles present in the ventricles in drawing the valvular cusps together during ventricular systole. 3. Explain role of skeleton of heart in preventing the incompetence of heart valves. 4. Explain the location and structure of all four valves of heart.	01	LGIS

		5. Explain the structure of interatrial and interventricular septum		
3	Coronary circulation	1. Describe the coronary arteries 2. Enlist the branches of each main artery 3. Describe the anastomosis of coronaries 4. Identify the area of the heart supplied by a coronary artery and its branches 5. Describe the venous drainage of the heart 6. Describe the lymphatic drainage of the heart	01	LGIS
4	Pericardium	1. Define pericardium 2. Describe different reflections of pericardium 3. Identify entry & exit of vessels of heart via pericardium 4. Define Pericarditis, Pericardial effusion and 5. Cardiac Tamponade	01	LGIS
Embryology				
5	Development of heart tube and its subdivisions	1. Explain the formation of heart tube with special reference to primary & secondary heart fields 2. Enlist the subdivisions of heart tube & their fate 3. Appraise the mechanism of cardiac looping and enlist its abnormalities. 4. Explain different methods of septal formation 5. Describe division of atrioventricular canal. 6. Describe the formation of right and left atrium and pulmonary veins 7. Describe the embryological steps involved in formation of interatrial and interventricular septum. 8. Explain the process of development and fusion of aorticopulmonary septum in primitive heart. 9. Discuss the contribution of neural crest cells in the developing heart.	01	LGIS
HISTOLOGY				
6	Histology of heart muscles	1. Explain the characteristics of cardiac muscle cell	01	LGIS

		2. Explain the Structure of Intercalated disc 3. Define the junctional specializations making up the intercalated disk 4. Describe identification of different microscopic views of Cardiac muscle and its ultra-structures 5. Differentiate histologically between cardiac and skeletal muscle and smooth muscles 6. Enumerate histological layers of heart wall		
	PHYSIOLOGY			
7	Cardiac muscles	1. Explain the physiologic anatomy of the cardiac muscle 2. Describe the properties of the cardiac muscle	01	LGIS
8	Coronary circulation	1. Describe the physiologic basis coronary circulation	01	LGIS
	BIOCHEMISTRY			
9	Cardiac enzymes	1. Identify the enzymes that increase in myocardial infarction 2. Describe Cardiac enzymes and their pattern of elevation in ischemic heart diseases	01	LGIS
10	Lipids	1. Define and Classify lipids 2. Describe the functions of lipids in the body	01	LGIS
11	Cholesterol	1. Describe the Chemical Structure and function of cholesterol 2. Describe the fate of cholesterol in the body	01	LGIS
12	Lipoproteins	1. Classify lipoproteins and their functions	01	LGIS
13	Role of Minerals in Cardiac Muscles Contractility	1. Describe the role of Na, K, Ca and Mg in cardiac muscles contractility and their biochemical abnormalities	01	LGIS
14	Cardiac Manifestations of Vitamin B1 deficiency	1. Describe the Cardiac Manifestations of Vitamin B1 deficiency	01	LGIS
PHARMACOLOGY				
15	Drug Treatment of CAD	1. Enlist the groups of drugs used in the treatment of CAD (angina and MI)	01	LGIS
16	Lipid Lowering Drugs	1. Enlist the groups of lipids lowering drugs	01	LGIS

PATHOLOGY				
17	Coronary circulation	1. Describe the steps of coronary thrombosis 2. Describe the etiology of coronary thrombosis	01	LGIS
18	Coronary Artery Disease	1. Describe the risk factors, and lab. Diagnosis of CAD	01	LGIS
19	Atherosclerosis	1. Define and Enlist the stages of atherosclerosis	01	LGIS
FORENSIC MEDICINE				
20	Medicolegal aspects of sudden death due to cardiovascular diseases	1. Describe the Medicolegal aspects of sudden death due to cardiovascular diseases	01	LGIS
COMMUNITY MEDICINE				
21	Prevention of CVD	1. Describe primordial, primary, secondary and tertiary prevention of CV diseases in community	01	LGIS
LAB WORK				
HISTOLOGY				
22	Cardiac Muscle	1. Identify the Cardiac Muscle under the microscope	02	Demonstration/ practical
PHYSIOLOGY				
23	Basic Life Support	1. Perform basic life support.	02	Demonstration/ practical
BIOCHEMISTRY				
24	Lipid Detection	1. Detection of lipids in a given sample. 2. Detection of cholesterol in a given sample.	02	Demonstration/ practical
DIRECTED SELF LEARNING				
ANATOMY				
25	Surface Anatomy of the Heart	1. Describe the surface marking of the heart 2. Describe the surface marking of the heart valves 3. Illustrate the surface marking of the aorta on models	01	DSL
PHYSIOLOGY				
26	Cardiac muscles	1. Explain the physiologic anatomy of the cardiac muscle 2. Describe the properties of the cardiac muscle	01	DSL
BIOCHEMISTRY				

27	Cardiac enzymes	1. Identify the enzymes that increase in myocardial infarction 2. Describe Cardiac enzymes and their pattern of elevation in ischemic heart diseases	01	DSL

Theme-II (Breathlessness and ankle swelling)

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
	EMBRYOLOGY			
1	Fetal circulation	1. Describe the physiological changes in circulation after birth	01	LGIS
2	Cardiac developmental anomalies	1. Enlist the developmental anomalies of heart. 2. Describe the congenital anomalies of the heart: 3. ASD 4. VSD 5. PDA 6. Tetralogy of Fallot 7. Transposition of the great vessels 8. Hemangiomas and 9. Telangiectasia	01	LGIS
	PHYSIOLOGY			
3	Cardiac cycle	1. Describe the Cardiac cycle 2. Describe the concept of systole and diastole, 3. Describe the role of atria and ventricles as pumps, 4. Describe the functions of heart valves, 5. Correlate the cardiac cycle events with ECG 6. Describe the mechanism of production of normal and abnormal heart sounds 7. Relate heart sounds with cardiac cycle, 8. Describe the metabolism and oxygen utilization of cardiac muscle 9. Describe the regulation of cardiac cycle	01	LGIS
4	Cardiac output	1. Describe pressure volume loop (end-systolic volume / end-diastolic	01	LGIS

		volume / ejection fraction / systolic volume / systolic work output) 2. Explain the Frank-Starling mechanism of the heart for the control of cardiac output by venous return 3. Describe the methods for measuring of cardiac output 4. Describe normal cardiac output and venous return during rest and during activity 5. Enlist the causes of abnormally high and abnormally low cardiac output 6. Explain the mechanisms of normal cardiac contractility and the role of calcium ion/ ATPase pumps 7. Explain cardiac output (regulation/measurement) and peripheral resistance and its regulation 8. Explain the factors regulating cardiac output and venous return.		
5	Blood flow I	1. Describe the Biophysics and Interrelationships of Pressure, Flow, and Resistance in terms of Ohm's law and Poiseuille's Law 2. Describe starling forces 3. Describe regulation of blood flow 4. Define basal tone. 5. List several substances potentially involved in local metabolic control of vascular tone. 6. State the local metabolic vasodilator hypothesis. 7. Describe physiological Vasodilators and Vasoconstrictors and their mechanisms	01	LGIS
6	Blood flow II	1. Describe the factors affecting the local blood flow including auto-regulation. 2. Describe the function of capillaries 3. Describe circulatory changes during exercise	01	LGIS

		4. Describe blood flow to different organs like brain, heart, liver and skin during exercise		
7	Lymphatic system	1. Describe the function of lymphatic system in the maintenance of interstitial fluid volume. 2. Describe the effects of Interstitial Fluid Pressure on Lymph Flow. 3. Describe how changes in capillary hydrostatic pressure, plasma oncotic pressure, capillary permeability, and lymphatic function can lead to tissue edema	01	LGIS
GENERAL MEDICINE				
8	Functions of heart valves	1. Describe the functions of mitral, tricuspid, aortic and pulmonic valves 2. Describe the hemodynamics and sequel related to stenosis and regurgitation of heart valves 3. Describe the mechanism of production of normal and abnormal heart sounds	01	LGIS
	Heart failure	1. Define Heart failure 2. Differentiate between right-sided Heart failure and left-sided heart failure	01	LGIS
LAB WORK				
CLINICAL / GENERAL MEDICINE				
9	Chest Radiographs	1. Identify normal cardiac shadow, borders and cardiomegaly on chest radiographs.	02	SGF
10	Heart Model	1. Identify the position of borders and valves of the heart by surface marking on model / simulator	02	SGF
11	CVS Examination	1. Palpate and find apex beat, and auscultatory areas in the chest of the subject provided and describe their significance. 2. Demonstrate the use of Stethoscope for Auscultation. 3. Differentiate between normal and displaced apex beat	02	SGF
SMALL GROUP DISCUSSIONS				
ANATOMY				

12	Study of CVS Models	1. Identify the structures on gross heart models 2. Identify the structures on embryo heart models	02	SGD
	PHYSIOLOGY			
13	Functions of Heart Valves	1. Describe the functions of mitral, tricuspid, aortic and pulmonic valves.	02	SGD
	BIOCHEMISTRY			
14	Cardiac muscles contractility	1. Describe the role of Na, K, Ca and Mg in cardiac muscles contractility.	02	SGD
DIRECTED SELF LEARNING				
	ANATOMY			
15	Fetal Circulation	1. Describe the fetal circulation	01	DSL
	PHYSIOLOGY			
16	Cardiac Cycle	1. Describe the Cardiac Cycle, correlate the cardiac cycle events with ECG, relate heart sounds with cardiac cycle & describe the regulation of cardiac cycle	01	DSL
	BIOCHEMISTRY			
17	Functions of Lipids	1. Describe the functions of lipids in the body	01	DSL

Theme-III (Blood Pressure)

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
	HISTOLOGY			
1	Histology of blood vessels	1. Describe the histological composition of vessel 2. Describe the microscopic structure of artery and vein 3. Differentiate histologically between artery and vein under light microscope 4. Describe the histological composition of lymphatic channels	01	LGIS
	EMBRYOLOGY			
2	Development of arteries and veins	1. Describe the development of arterial system 2. Describe the development of venous system	01	LGIS

		3. Describe the congenital abnormalities in in the vessels. 4. Coarctation of Aorta		
	PHYSIOLOGY			
3	Blood Pressure	1. Define blood pressure 2. Describe the causes of High / low BP 3. Discuss the mechanisms for rapid and long term control of blood pressure (including Renin Angiotensin system) 4. Describe the effects of sympathetic and parasympathetic stimulation on the heart and circulation	01	LGIS
	MEDICINE			
4	Circulatory Shock	1. Define Circulatory Shock 2. Explain the physiologic causes of circulatory shock 3. Explain the stages of circulatory shock 4. Describe cardiogenic shock 5. Describe Hemorrhagic Shock 6. Describe of Neurogenic Shock 7. Describe Anaphylactic Shock 8. Describe Septic Shock 9. Explain the physiology of treatment in Shock	01	LGIS
	PHARMACOLOGY			
5	Antihypertensive Drugs	1. Describe the mechanisms of drugs used in the treatment of Hypertension	01	LGIS
	COMMUNITY MEDICINE			
6	Prevention of hypertension	1. Describe the preventive strategies of hypertension	01	LGIS
	LAB WORK			
	HISTOLOGY			
7	Histology of blood vessels	1. Identify salient features of a medium sized artery & vein in a cross-section under microscope. 2. Identify the histological differences between medium size artery & vein under microscope.	02	Demonstration / Practical
	PHYSIOLOGY			

8	Blood pressure	1. Measure the blood pressure. 2. Measure the effect of posture and exercise on blood pressure. 3. Examine the arterial pulses. 4. Auscultate the heart sounds.	02	Demonstration / Practical
	BIOCHEMISTRY			
9	Cardiac Enzymes	1. Interpretation of Cardiac Enzymes	02	Demonstration / Practical
	SMALL GROUP DISCUSSIONS			
	ANATOMY			
10	Blood Vessels	1. Describe the histological composition of blood vessels.	02	SGD
	PHYSIOLOGY			
11	Circulatory Shock	1. Define Circulatory Shock 2. Explain the Physiologic causes of circulatory shock 3. Explain the stages of circulatory shock 4. Describe Cardiogenic shock 5. Describe Hemorrhagic Shock 6. Describe of Neurogenic Shock 7. Describe Anaphylactic Shock 8. Describe Septic Shock 9. Explain the Physiology of treatment in Shock	02	SGD
	BIOCHEMISTRY			
12	Lipoproteins	1. Define & classify lipoproteins 2. Describe the functions of lipoproteins	02	SGD
	DIRECTED SELF LEARNING			
	ANATOMY			
13	Pericardium	1. Define pericardium 2. Describe different reflections of pericardium 3. Identify entry & exit of vessels of heart via pericardium	01	DSL
	PHYSIOLOGY			
14	Blood Pressure	1. Discuss the mechanisms for rapid and long term control of blood pressure including Renin Angiotensin system	01	DSL
	BIOCHEMISTRY			
15	Cholesterol	1. Describe the chemical structure, function and fate of cholesterol.	01	DSL

Theme-IV (-Palpitations)

S.No.	Subject	Learning ourcomes/Objectives	Hours	MIT
	ANATOMY			
1	Conduction system of the heart	1. Describe the different components of conduction system a. SA Node b. AV Node c. Bundle of His d. Purkenje Fibers e. Bundle branches 2. Describe the sympathetic innervation of heart 3. Describe the parasympathetic innervation of the heart	01	LGIS
	PHYSIOLOGY			
2	Excitation and contraction of cardiac muscles I	1. Describe the excitation–contraction process in cardiac muscle. 2. Describe Chronotropic, Inotropic and Dromotropic Effects 3. Describe Chronotropic, Inotropic and Dromotropic Effects 4. Differentiate excitation–contraction process in cardiac and skeletal muscle cells 5. Describe gap junctions and the significance of functional syncytium 6. Explain phases of cardiac muscle action potential 7. Describe the characteristics of cardiac action potentials and the role of “slow calcium” channels in causing plateau and its significance.	01	LGIS
3	Excitation and contraction of cardiac muscles II	1. Define Pacemaker and explain why SA node is the normal pacemaker of the heart 2. Describe the significance of AV nodal Delay 3. Define Ectopic Pacemaker and describe its causes 4. Describe the effects of sympathetic and parasympathetic	01	LGIS

		stimulation on the heart rate and conduction of cardiac action potentials 5. Define various types of refractory periods 6. Differentiate the refractory period of cardiac muscle with that of skeletal muscle 7. Describe the significance of prolonged action potential in cardiac muscle 8. Describe the physiological anatomy of the sinus node 9. Define automaticity and rhythmicity and conductivity 10. Describe the specialized excitatory and conductive pathway of the cardiac muscle tissue		
	MEDICINE			
4	ECG	1. Describe the characteristics of normal ECG, time duration of waves, segments and voltages 2. Explain how to record ECG 3. Describe the AV nodal, ventricular impulse conduction 4. Interpret ECG paper and its calibration	01	LGIS
	COMMUNITY MEDICINE			
5	CVD prevention	1. Identify the major risk factors which contribute to common diseases of the cardiovascular system 2. Enumerate modifiable and non-modifiable risk factors of CV diseases 3. Apply primordial, primary, secondary and tertiary prevention of CV diseases in community	01	LGIS
		LAB WORK		
	PHYSIOLOGY/ GENERAL MEDICINE			
6	ECG	Perform systematic analysis of ECG	02	Demonstration / Practical
		SMALL GROUP DISCUSSIONS		
	ANATOMY			
7	Innervation of the Heart	1. Describe the sympathetic & parasympathetic innervation of heart	02	SGD
	PHYSIOLOGY			

8	Pacemaker	1. Define Pacemaker and explain why SA node is the normal pacemaker of the heart 2. Define Ectopic Pacemaker and describe its causes	02	SGD
DIRECTED SELF LEARNING				
ANATOMY				
9	Conduction system of the heart	1. Describe the different components of conduction system	01	DSL
PHYSIOLOGY				
10	ECG	1. Describe the characteristics of normal ECG and explain how to record ECG. 2. Interpret ECG paper and its calibration	01	DSL
BIOCHEMISTRY				
11	Lipoproteins	1. Define & classify lipoproteins. 2. Explain the structure of lipoproteins. 3. Enlist the functions of lipoproteins.	01	DSL

11 Learning Opportunities and Resources

1. Anatomy

Books:

- *Clinical Anatomy by Regions* by Richard S. Snell (Latest Edition)
- *Gray's Anatomy for Students* (Latest Edition)
- *Clinically Oriented Anatomy* by K.L. Moore (Latest Edition)
- *Netter's Atlas of Human Anatomy* (Latest Edition)
- *Last's Anatomy* (Latest Edition)

Online Resources:

- TeachMeAnatomy – Comprehensive anatomy resource with diagrams and explanations.
- AnatomyZone YouTube Channel – 3D anatomy tutorials.

2. Histology

Books:

- *Textbook of Histology* by Junqueira (Latest Edition)
- *diFiore's Atlas of Histology with Functional Correlations* (Latest Edition)
- *Atlas of Human Histology* by Wheater's (Latest Edition)
- *Textbook of Histology* by Laiq Hussain (Latest Edition)

Online Resources:

- Histology Guide – A virtual histology lab with slides and explanations.
- Armando Hasudungan YouTube Channel – Educational videos on histology and related topics.

3. Embryology

Books:

- *Langman's Medical Embryology* (Latest Edition)
- *The Developing Human* by Keith L. Moore (Latest Edition)

Online Resources:

- Embryology at UNSW – Detailed embryology resource from the University of New South Wales.
- Dr. Najeeb Lectures YouTube Channel – In-depth video lectures on embryology and other basic medical sciences.

4. Physiology

Books:

- *Textbook of Medical Physiology* by Guyton and Hall (Latest Edition)
- *Ganong's Review of Medical Physiology* (Latest Edition)

Online Resources:

- Vivo Interactive Physiology – Interactive tutorials on physiology topics.
- PhysioPathoPharmaco YouTube Channel – Physiology explanations and tutorials.

5. Biochemistry

Books:

- *Harper's Illustrated Biochemistry* (Latest Edition)
- *Lippincott's Illustrated Review: Biochemistry* (Latest Edition)

Online Resources:

- MedlinePlus Biochemistry – Basic biochemistry concepts with clinical correlations.

- Osmosis YouTube Channel – Visual and concise videos on biochemistry and other medical topics.

6. Pharmacology
Books:
- *Katzung's Basic and Clinical Pharmacology* (Latest Edition)

Online Resources:
- Pharmacology YouTube Channel by Ninja Nerd – Detailed pharmacology lectures and notes.
- GoodRx Pharmacology Resources – Practical applications of pharmacology in medicine.

7. Pathology
Books:
- *Robbins Basic Pathology* (Latest Edition)

Online Resources:
- PathologyOutlines.com – An online pathology resource with a focus on differential diagnosis.
- Dr. John Minarcik YouTube Channel – Free pathology lectures and tutorials.

8. Community Medicine
Books:
- *Essential Community Medicine* (Latest Edition)
- *K. Park's Textbook of Preventive and Social Medicine* (Latest Edition)

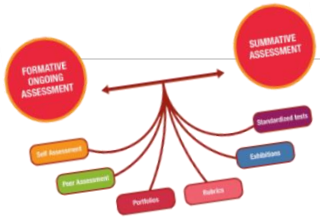
Online Resources:
- CDC Public Health – Extensive resources on public health and community medicine.
- Public Health England YouTube Channel – Videos on various community health topics.

9. Forensic Medicine
Books:
- *Parikh's Textbook of Medical Jurisprudence, Forensic Medicine, and Toxicology* (Latest Edition)

Online Resources:
- Forensic Medicine Online – Detailed forensic medicine resources for students.
- Forensic Pathology Lectures YouTube Channel – Educational videos on forensic pathology.

10. General Medicine
Books:
- *Davidson's Principles and Practice of Medicine* (Latest Edition)

Online Resources:
- Medscape – Comprehensive resource for clinical medicine and continuing medical education.
- Geeky Medics YouTube Channel – Clinical skills and general medicine tutorials.



12 Examination and Methods of Assessment:

12.1 Examination Instructions:

- **Arrival Time:** Students must arrive at the examination venue at least 15 minutes before the scheduled start time. Latecomers arriving 15 minutes after the start of the exam will not be allowed to enter the examination hall, and if permitted, they will not receive extra time.
- **Identification:** Students without a College ID Card and a white Lab Coat will not be permitted to sit for the exam.
- **Emergency Protocol:** In case of an emergency, such as a medical issue, students should immediately inform the examination supervisor.
- **Prohibited Items:** Students are required to submit any prohibited items, such as mobile phones, smartwatches, electronic devices, books, notes, or any unauthorized materials, before entering the examination hall.
- **Conduct:** Students must maintain complete silence within the examination hall. Any communication with fellow students is strictly prohibited, and all invigilator instructions must be followed without exception.
- **Attendance:** Students must properly mark their attendance during the examination.
- Leaving the Hall: No student will be allowed to leave the examination hall before half of the exam time has elapsed. The exam paper must be properly handed over to the examiner before leaving.
- **Compliance:** Failure to adhere to these guidelines may result in disqualification from the examination.

12.2 Internal Assessment (Total 10% Marks):

The internal assessment comprises a module test, featuring MCQs and OSPE, administered at the end of the module in accordance with the university's exam format. This test consists of 120 MCQs, accounting for 10% of the total marks in both theory and practical components, with the results to be submitted to the university prior to the final examination.

12.3 External Assessment: (Total 90% Marks)

- To appear in any university examination, more than 75% attendance in all disciplines is mandatory for the students.
- The Paper C will be comprised of 120 MCQs. The distribution of 90% Marks for Paper C Written Exam will be as under:

Block C (Paper C) Theory Paper			
Subject	**CVS Module-I**	**Respiratory Module-I**	**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**

- The distribution of OSPE stations for Paper **C is** as under:

Block C (Paper C) OSPE		
Specialty	**Practical**	**No. of Stations**
CVS Anatomy	Surface Anatomy Internal features of the heart on models CVS Models Cardiac muscle under the microscope Medium sized artery under the microscope Histological features of veins	5
CVS Physiology	Recording of 12 lead ECG Interpretation of ECG Examination of arterial and venous pulses Recording of blood pressure Examination of the apex beat and heart sounds Demonstrate the effect of posture and exercise on Blood Pressure Basic Life Support	5
CVS Biochemistry	Detection of lipids in a given sample Interpretation of cardiac enzymes	1
CVS Radiology	Identify normal cardiac shadow, borders and cardiomegaly on chest radiographs	1
Respiratory Anatomy	Lung Models Microscopic structure of trachea Microscopic structure of bronchi Microscopic structure of lungs	3
Respiratory Physiology	Spirometry Vitalography Vitalography (Interpretation) Stethography	3
Total		18

13 For inquiry and troubleshooting

Please contact
Department Of Medical Education

14 Module Evaluation Form

MBBS Year: _____ Block: _____ Module: _____

1. (Unsatisfactory) 2 (Fair) 3 (Satisfactory) 4 (Good) 5 (Excellent)

Category: Course Contents

No.	Question	1	2	3	4	5
1	To what extent did the course contents align with the stated learning objectives of the module?					
2	How clear and comprehensive were the course materials provided in this module?					
3	Were the core topics adequately covered, ensuring a well-rounded understanding of the subject?					
4	How current and up-to-date were the course contents in reflecting recent advancements?					
5	Did the module incorporate real-world applications and case studies effectively?					
	Category: Learning Resources					
6	Were the learning resources (e.g., textbooks, online materials, laboratory facilities) readily available and easily accessible?					
7	How helpful were additional learning resources such as supplementary readings or multimedia content?					
8	Did the module offer adequate support for research and independent study?					
9	Were digital resources and online platforms effectively utilized to enhance the learning experience?					
10	Were there sufficient opportunities for hands-on practice and practical application of knowledge?					
	Category: Teaching Methods					
11	How well did instructors engage with students and create a supportive learning environment?					
12	Were diverse teaching methods (e.g., lectures, group discussions, simulations) effectively employed?					
13	How responsive were instructors to questions, concerns, and feedback from students?					
14	To what extent did instructors provide timely and constructive feedback on assignments and assessments?					
15	Were opportunities for collaborative learning and peer-to-peer interactions encouraged and facilitated?					
No.	**Category: Engagement and Motivation**					
16	To what extent did the module use real-world examples and practical applications to engage students?					
17	How well were active learning techniques (e.g., problem-solving, case studies) integrated into the curriculum?					
18	Did the module provide opportunities for students to pursue their individual interests within the subject matter?					
19	Were assessments designed to challenge and motivate students to excel in their studies?					
Category: Inclusivity and Diversity						
20	How well did the module accommodate different learning styles and preferences among students?					

21	Were efforts made to include diverse perspectives, cultures, and backgrounds in the curriculum?					
22	How effectively were accommodations provided for students with varying levels of prior knowledge?					
	Category: Overall					
No.	**Question**	**1 (Very Poor)**	**2 (Poor)**	**3 (Fair)**	**4 (Good)**	**5 (Excellent)**
23	How would you rate the overall quality of this module?					

15 Students Diary/Notes

S.NO	DATE	TOPICS	PENDING/COMPLETED	COMMENTS

PROGESS:_____


College of Medicine & Dentistry at The Hills