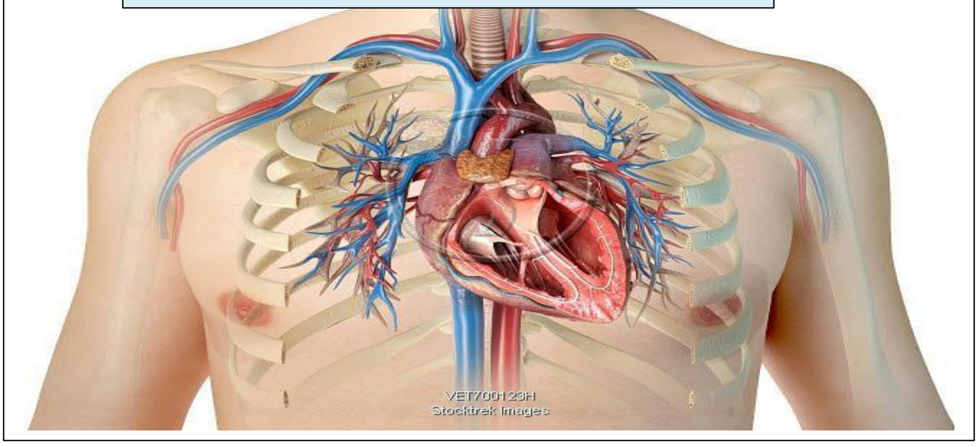
RAI FOUNDATION MEDICAL COLLEGE

CARDIOVASCULAR - I MODULE

FIRST YEAR MBBS, ACADEMIC SESSION 2024-25

BLOCK: III(CARDIOVASCULAR - I)
Academic Year: 2025
Duration: 6 Weeks



DISCLAIMER

- Developing a study guide is a dynamic process and undergoes iteration according to the needs and priorities.
- This study guide is subjected to the change and modification over the whole academic year.
- However, students are advised to use it as a guide for respective modules.
- It is to declare that the learning objectives (general and specific) and the distribution of assessment tools (both theory and practical) are obtained from Rai Foundation Medical College, Sargodha. These can be obtained from: https://www.uhs.edu.pk/
- The time tables are for guiding purpose. It is to advise that final timetables are always displayed over the notice boards of each lecture hall.
- Students are encouraged to provide feedback via module coordinator.

Vision Statement

To be an institution of excellence in medical education, research, and patient care, fostering innovation, compassion, and a profound commitment to addressing healthcare challenges at local and global levels.

Mission Statement

We are dedicated to producing competent, ethical medical graduates who exemplify empathy, social accountability, and excellence in patient care. Through innovative education and critical thinking, they will advance clinical practice, scientific research, and lifelong learning to meet local and global healthcare needs.

Table of Contents

Module Committee

Sr.no	Name	Department	Role
1.		Principal	
2.		DME	Director
3.		DME	Assistant Director
4.		DME	Senior Demonstrator
Module Team			
5.		HOD Biochemistry	Block Coordinator
6.		Asso. Prof. Physiology	Module Coordinator
7.		Asst Professor DME	Module Developer
8.		Senior Demonstrator	Module Developer
9.		Professor Anatomy	Member
10.		HOD Physiology	Member
11.		HOD Anatomy	Member
12.		Professor Physiology	Member
13.		Professor Medicine	Member
14.		Senior Demonstrator	Member
15.		Pathology	Member
16.		Asso.Prof. Pharmacology	Member
17.		Senior Lecturer Community Medicine	Member
18.		Asst. Prof. Psychiatry (Behavioral Science)	Member

Introduction to Study Guide

It is an aid to Inform students how student learning program of the module has been organized, to help students organize and manage their studies throughout the module and guide students on assessment methods, rules and regulations.

The Study Guide:

— Communicates information on organization and management of the module.
— This will help the student to contact the right person in case of any difficulty.
— Defines the objectives which are expected to be achieved at the end of the module.
— Identifies the learning strategies such as lectures, small group teachings.

Module Outcomes:

— Provides a list of learning resources such as books, computer-assisted learning programs, web links, and journals, for students to consult in order to maximize their learning.
— Highlights information on the contribution of continuous on the student’s overall performance.
— Includes information on the assessment methods that will be held to determine every student’s performance.

Achievement of Objectives:

- Focuses on information pertaining to examination policy, rules and regulations.

Students will experience an integrated curriculum.

Integrated Curriculum:

An integrated curriculum is all about making connections, whether to real life or across the disciplines, about skills or about knowledge. An integrated curriculum fuses subject areas, experiences, and real-life knowledge together to make a more fulfilling and tangible learning environment for students. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab are characteristics of integrated teaching program.

Marks Distribution

BLOCK III – Cardiovascular - 1 Module					
Theory	Part I - MCQs	85 Marks	**Practical**	OSPE	56 Marks
				OSCE	16 Marks
	Part II- SEQs	35 Marks		OSVE	48 Marks
	Internal Assessment	30 Marks		Internal Assessment	30 Marks
	Total	150 Marks		Total	150 Marks

Theme	Subject	MCQ (1 Mark)	SEQ (5Mark each)	Marks	Oral / Practical / Clinical Exam			
					OSPE (08 Marks each)	OSCE (10 Marks each)	Structured OSVE (16 Marks each)	Marks
Normal Structure	Anatomy & Applied / Clinical	16	2	26	1	-	1	**24**
Normal Function	Physiology & Applied / Clinical	31	4	51	4	-	1	**48**
	Biochemistry & Applied / Clinical	18	1	23	2	-	1	**32**
Disease Burden & Prevention	Community Medicine Public Health	06	-	06	-	-	-	**-**
	Behavioral Sciences	02	-	02	-	-	-	**-**
Pathophysiology & Pharmaco-therapeutics	Pathology	07	-	07	-	-	-	**-**
	Pharmacology	05	-	05	-	-	-	**-**
CFRC	CFRC 1-1	-	-	-	-	1	-	**08**
PERLS	PERLS 1-1	-	-	-	-	1	-	**08**
		85	**7×5 = 35**	**120**	**08×7 = 56**	**2×08 = 16**	**3 × 16= 48**	**120**

Organization of Module

INTRODUCTION

The Cardiovascular system comprises the study of the heart & circulatory system. The initial learning activities will help in understanding the normal structure & development of the organs of the system. Understanding of anatomical details of each component of Cardiovascular System (CVS) will be accompanied by study of normal physiological mechanisms. This will help in better understanding the possible pathological conditions of the system, including some of the most prevalent conditions in society like ischemic heart disease, hypertension, shock, heart block, heart failure. This will be followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects).
This study guide has been developed to help guide you and keep you focused on the objectives for this module.
Welcome to the field of medicine and hope that the journey ahead will be exciting and fulfilling for you all!!

Teaching and learning strategies:

The following teaching / learning methods are used to promote better understanding:

1. Interactive Lectures
2. Hospital / Clinic visits
3. Small Group Discussion
4. Practical
5. Skills session in skill labs
6. Case-Based Learning (tutorials)
7. Directed Self-Learning

- **Interactive lectures:**
  An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture - based class of any size.

- **Hospital / Clinic visits:**
  In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

- **Small group discussion (SGD):**
  Students learn from each other. Everyone gets more practice at expressing their ideas. A two-way discussion is almost always more creative than individual thoughts. Social skills are practiced in a 'safe' environment e.g. tolerance, cooperation.

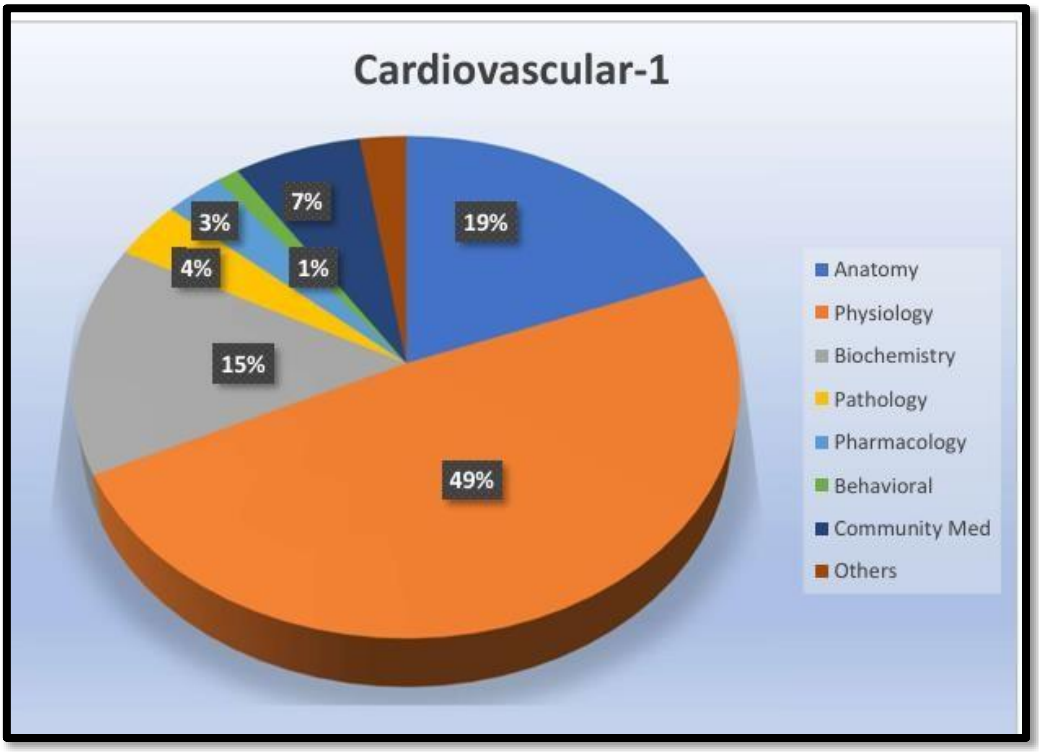
- **Skills session:**
  Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Laboratories of various departments.

- **Case Based Learning (CBL):**

  A small group discussion format where learning is focused on a series of questions based on a clinical scenario. Students discuss and answer the questions by applying relevant knowledge gained previously in clinical and basic health sciences during the module and construct new knowledge. The CBD will be provided by the concerned department. It is an active learning & teaching strategy which promotes application of foundational knowledge in relevant clinical scenarios.

- **Directed Self-learning (DSL):**
  Directed Self-learning, which involves studying with indirect supervision in a classroom/Library, is a valuable way to learn and is quickly growing in popularity among parents and students.
  Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

INTEGRATING DISCIPLINES OF FOUNDATION I MODULE



Module Outcomes

By the end of Cardiovascular I module, students of 1st year MBBS will be able to

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

Themes of Cardiovascular- I Module

S. No	Theme	Duration
1.	Cardiac Miscle	1 week
2.	Cardiac Rhythm	1 week
3.	Circulation	1 week
4.	Arterial Blood Pressure	1 week
5.	Coronary Circulation	1 week
6.	Shock	1 week

ANATOMY				
GENERAL ANATOMY				
Topic	**Specific Learning objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Mediastanum	Define mediastinum giving its boundaries and compartments.	SGD (Dissection Hall & Museum)	C1	MCQs, SEQs, OSVE, OSPE
	List the contents of its various compartments.		C1	
	Describe the formation, tributaries, and termination of superior vena cava		C2	
	Describe the formation, branches, and relations of ascending aorta, aortic arch and descending thoracic aorta.		C2	
	Discuss the distribution of ascending aorta, aortic arch and descending thoracic aorta in reference to their branches.		C2	
	Describe formation, course and tributaries of azygous, hemizygous and accessory hemizygous veins.		C2	
	Describe the course, relations, and distribution of vagus and thoracic splanchnic nerves in relation to nerve supply of heart.		C2	
Pericardium	Describe Pericardium and its parts with emphasis on their nerve supply. Discuss their clinical significance	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the pericardial cavity mentioning transverse and oblique sinuses along with their significance.		C2	
	Describe the anatomical correlates of various pericardial conditions like pericardial rub, pericardial pain, pericarditis, pericardial effusion, and cardiac tamponade.		C2	
	Describe the anatomical basis for Paracentesis / pericardiocentesis.		C2	
Heart	Describe the external features of heart.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	List various chambers of heart mentioning their salient features and openings.		C1	
	Describe the arterial supply of heart: coronary arteries and their distribution with special emphasis on collaterals established during ischemia.		C2	
	Describe the sites of anastomosis between right and left coronary arteries with the participating vessels.		C2	
	Discuss the anatomical correlates of cardiac arterial supply.		C2	
	Describe the anatomical correlates of		C2	

Specific Learning Objectives

	electrocardiography, cardiac referred pain.			
	Describe the anatomical b		C2	
Heart	Describe the features of angina pectoris and myocardial infarction and correlate them anatomically.		C2	
	Describe the venous drainage of heart.		C2	
	Describe the alternative venous routes to the heart.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Identify the vessels supplying the heart with their origins / terminations.		C2	
	Describe the formation, relations, and distribution of cardiac plexus.		C2	
	Describe components and significance of fibrous skeleton of heart.		C2	
	Describe the cardiac valves.		C2	
	Explain the anatomical basis for valvular heart diseases.		C2	
	Perform surface marking of various anatomical landmarks of heart and great vessels.		C2 /P	
	Identify the salient features of heart and great vessels Integrate with on Computed tomography/ Magnetic Resonance Imaging CT/ MRI.		C2 / P	
EMBRYOLOGY & POST- NATAL DEVELOPMENT				
Topic	**Specific Learning objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Introduction	Describe the early development of heart and blood vessels	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the development of pericardial cavity.		C2	
Development of Heart	Define parts of primitive heart tube and give its folding.	LGIS	C1	
	Describe the development of various chambers of heart with emphasis on their partitioning.		C2	
	Identify various parts of developing heart tube and structures derived from them during embryonic and fetal life (Models and specimens)		C2 / P	
	Describe the embryological basis of dextrocardia and ectopia	LGIS	C2	MCQs, SEQs, OSVE, OSPE

Developm ent al Defects of Cardiac Valves & Septum	cordis			
	Describe the partitioning of primordial heart: atrioventricular canal and atrium.		C2	
	Describe the development of sinus venosus.		C2	
	Justify clinically & embryologically significant types of atrial septal defects.		C3	
	Describe probe patent foramen ovale		C2	
	Describe the partitioning of arteriosus and bulbus cordis.		C2	
	Describe the formation of ventricles and interventricular septum.		C2	

	Describe the clinical features and embryological basis of ventricular septal defects.		C2	
	Describe the development of cardiac valves and conducting system.		C2	
Lymphatic System	Describe the development of lymphatic system.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
Development al Defects	Correlate embryological and clinical presentation of developmental defects of heart: • Tetralogy of Fallot, • Patent ductus arteriosus, • Unequal division of arterial trunks, • Transposition of great vessels • Valvular stenosis, • Coarctation of aorta	LGIS	C3	
Development of Arteries	Describe the formation and fate pharyngeal arch arteries	LGIS	C2	
	Describe the anomalies of great arteries emerging from heart: Coarctation of aorta, anomalous arteries		C2	
Development of Veins	Describe the development of embryonic veins associated with developing heart: Vitelline veins, Umbilical Veins and Common cardinal vein and their fate	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the formation of superior & inferior vena cava and portal vein with their congenital anomalies.		C2	
	Illustrate the development of superior vena cava, inferior vena cava and portal vein.		C2	
MICROSCOPIC ANATOMY (HISTOLOGY)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Heart & Cardiac Muscle	Describe microscopic structure of Heart wall (Endocardium, Myocardium, Epicardium)	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe histology of Cardiac skeleton, SA (sinoatrial) node, AV (atrioventricular) node, Purkinje fibers.		C2	
	Describe the microscopic and ultramicroscopic structure of cardiac muscle emphasizing on Tubules, sarcoplasmic reticulum and intercalated discs.		C2	
	Draw a labelled diagram of histological structure of cardiac muscle.		C2	
Blood Vessels & Arteries	Describe general histological organization of blood vessels: Tunica intima, media and adventitia.	LGIS	C2	MCQs, SEQs, OSVE, OSPE

	Draw labelled histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids.		C2	
	Describe histological features of arteries: Muscular arteries, elastic arteries, Arterioles.		C2	
Veins	Describe histological features of veins and exchange vessels: large veins, medium sized veins, venules, capillaries, and sinusoids.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Compare and contrast the light microscopic structure of arteries and veins.		C2	
Applied Histology	Describe the histopathological basis of thrombus and embolus formation.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the histological basis of arteriosclerosis and atherosclerosis.		C2	
	Describe role of arterioles in hypertension		C2	
Lymphatic System	Describe histological features of Lymph vascular system (Lymph capillaries, Lymph vessels & Lymphatic duct).	LGIS	C2	MCQs, SEQs, OSVE, OSPE
MICROSCOPIC ANATOMY (HISTOLOGY) PRACTICAL				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Histological features of Heart	Identify histological structure of cardiac muscle.	Practical	C2 / P	Integrated OSPE
	Draw a labelled diagram of histological structure of cardiac muscle.	Practical	C2 / P	
Histological features of Blood Vessels	Identify histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids.	Practical	C2 / P	
	Draw labelled diagrams of histological sections of elastic artery, muscular artery, arterioles, vein, capillaries and sinusoids.	Practical	C2 / P	Integrated OSPE

PHYSIOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Cardiac Muscle	Explain the physiological anatomy of cardiac muscle.	LGIS / SGD	C1	MCQs, SEQs, OSVE, OSPE
	Explain the functional importance of intercalated discs.		C2	
	Discuss the properties of cardiac muscles.		C3	
	Describe and draw the phases of action potential of ventricle.		C2	
	Describe and draw the phases of action potential of SA node along with explanation of the mechanism of self-excitation/ Auto rhythmicity		C2	

	of SA node.			
Cardiac Cycle	Define and give the duration of the absolute and relative refractory period in cardiac muscle.	LGIS	C1	MCQs, SEQs, OSVE
	Describe the mechanism of excitation-contraction coupling and relaxation in cardiac muscle.		C2	
	Explain with illustration the pressure & volume changes of left ventricle during cardiac cycle		C2	
	Explain & draw relationship of ECG (Electrocardiography) with cardiac cycle.		C2	
	Explain with illustration the physiological basis of atrial pressure waves in relation to cardiac cycle.	LGIS	C2	MCQs, SEQs, OSVE
	Define cardiac output, stroke volume, end diastolic volume & end systolic volume.		C2	
	Highlight normal values of the cardiac output, stroke volume, end diastolic volume & end systolic Volume.		C1	
Regulation of Heart Pumping	Describe the Frank starling mechanism.	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Describe the autonomic regulation of heart pumping.		C2	
	Describe the effect of potassium, calcium ions & temperature on heart function.		C2	
	Define chronotropic effect- positive and negative.		C1	
	Define the inotropic effect: positive and negative.		C1	
	Define dromotropic effect: positive and negative.		C1	
	Describe the location of adrenergic & cholinergic receptors in heart.		C2	
	Name the receptors present in coronary arterioles.		C1	
	Explain sympathetic & parasympathetic effects on heart rate & conduction velocity		C2	
Conducting System of Heart	Explain with illustartion the conducting system of heart.	LGIS	C2	MCQs, SEQs, OSVE
	Describe the physiological basis and significance of AV nodal delay.		C2	
Electrocardiogram (ECG)	Explain the ectopic pacemaker.	LGIS / SGD	C2	MCQs, SEQs, OSVE, OSPE
	Explain with illustration the physiological basis of durations of waves, intervals, and segments of normal ECG.		C2	
	Describe the standard limb leads,		C2	

	Augmented limb leads & precordial leads.			
	Define Einthoven's Triangle & Einthoven's law.		C1	
	Explain the physiological basis of upright T wave in normal ECG.		C2	
	Describe the location and significance of J point in ECG.		C2	
	Explain the physiological basis of current of injury.		C2	
ECG Abnormalities	Enlist the ECG changes in angina pectoris.	LGIS/ SGD	C1	MCQs, SEQs, OSVE, OSPE
	Enlist the ECG changes in myocardial infarction.		C1	
	Plot the mean cardiac axis.		C2	
	Enlist the physiological & pathological causes of right axis deviation of heart.		C1	
	Enlist the physiological & pathological causes of left axis deviation of heart		C1	
	Describe the abnormalities of T wave and their causes.		C2	
Effect of Electrolyte on ECG	Describe the effect of hypokalemia and hyperkalemia on ECG	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Describe the effect of hypocalcemia and hypercalcemia on ECG.		C2	
Cardiac Arrhythmias	Define tachycardia and enlist its causes.	LGIS	C1	
	Define bradycardia and enlist its causes.		C1	
	Classify arrhythmias		C2	
	Explain the physiological basis of sinus arrhythmia.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the physiological basis of reflex bradycardia in Athletes.		C1	
	Explain the carotid sinus syndrome.		C2	
	Enlist the causes of atrioventricular block.		C1	
	Explain the types of atrioventricular blocks.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the ECG changes in 1st, 2nd & 3rd degree heart block.		C2	
	Explain the cause, physiological basis & ECG changes in Stokes Adam syndrome / ventricular escape.		C2	
	Enlist the causes of premature contractions.		C1	
	Explain the causes and ECG changes of premature atrial contractions.		C2	

	Explain the physiological basis of pulses deficit.	LGIS/ SGD	C2	
	Explain the causes and ECG changes in Premature Ventricular Contraction (PVC).		C2	
	Enlist the causes and ECG findings in Long QT syndrome.		C1	
	Explain the causes, physiological basis, features, ECG changes & management of atrial fibrillation.		C2	
	Explain the causes, physiological basis, features & ECG changes of ventricular fibrillation.		C2	
	Explain the physiological basis, features & ECG changes of atrial flutter.		C2	
	Compare Flutter and Fibrillations.		C2	
Organization of Circulation	Explain the functional parts of circulation (arteries, arterioles, capillaries, veins, venules).	LGIS	C2	MCQs, SEQs, OSVE
Blood flow	Explain the pressures in systemic & pulmonary circulation.		C2	
	Explain the types of Blood flow and significance of Blood flow Reynolds number.		C2	
Local & Humoral Control of Blood flow	Describe local control of blood flow according to tissue needs.	LGIS	C2	MCQs, SEQs, OSVE
	Discuss humoral control of local blood flow.		C2	
	Explain long term control of local blood flow.		C2	
	Describe vascular control by ions and other chemical factors.		C2	
	Name the organs in which auto regulation of blood flow occurs during changes in arterial pressure.		C1	
Nervous Regulation of circulation	Explain the role of autonomic nervous system for regulating the circulation.	LGIS	C2	MCQs, SEQs, OSVE
	Explain the vasomotor center.		C2	
	Explain the control of vasomotor center by higher nervous centers.		C2	
	Explain emotional fainting / vasovagal syncope.		C2	
	Recognize vessels constituting micro-capillaries.		C2	
	Enumerate hydrostatic and osmotic factors that underlie starling's hypothesis for capillary function.		C1	
Rapid Control of Arterial Blood Pressure	Explain the role of nervous system in rapid control of arterial blood pressure.	LGIS	C2	MCQs, SEQs, OSVE
	Explain the regulation of arterial		C2	

	blood pressure during exercise.			
	Enlist different mechanisms for short term regulation of arterial blood pressure.		C1	
	Explain the role of baroreceptors in regulation of arterial blood pressure.		C2	
	Explain the role of chemoreceptors in regulation ofarterial blood pressure.		C2	
	Make a flow chart to discuss the role of Atrial volume reflexes/ Bainbridge reflex in control of blood pressure.		C2	
	Make a flow chart to show the reflex responses to increased blood volume which increase blood pressure and atrial stretch.		C2	
	Describe the role of CNS ischemic response in regulation of the blood pressure.		C2	
	Explain the Cushing reflex		C2	
	Explain the role of abdominal compression reflex to increase the arterial blood pressure regulation of the blood pressure.		C2	
Renal Regulation of Arterial Blood Pressure	Make a flow chart to discuss the role of renin Role of angiotensin system for long term control of blood pressure.	LGIS	C2	MCQs, SEQs, OSVE
	Make a flow chart to show the regulation of blood pressure in response to increase in ECF (Extra Cellular Fluid) volume.		C2	
	Make a flow chart to show the regulation of blood pressure in response to increase in salt intake.		C2	
	Make a flow chart to show the regulation of blood pressure in response to increase in salt intake.		C2	
Cardiac output	Define cardiac output, cardiac index & venous return with their normal values.	LGIS	C1	MCQs, SEQs, OSVE
	Discuss the factors regulating cardiac output.		C2	
	Discuss factors regulating venous return.		C2	
Skeletal Muscle Circulation	Explain the regulation of skeletal muscle blood flow at rest & during exercise.		C2	
Coronary Circulation	Explain the physiological anatomy of coronary circulation.	LGIS	C2	MCQs, SEQs, OSVE
	Explain the regulation of coronary blood flow.		C2	
	Explain the physiological basis of angina, myocardial &		C2	

	subendocardial infarction			
	Explain the regulation of coronary blood flow.		C2	
Circulatory Shock	Define & enlist different types of shock.	LGIS	C1	MCQs, SEQs, OSVE
	Explain the causes, features, and pathophysiology of hypovolemic /hemorrhagic shock.		C2	
	Explain the causes, features, and pathophysiology of septic shock.		C2	
	Explain the causes, features, and pathophysiology of neurogenic shock.		C2	
	Explain the causes, features, and pathophysiology of anaphylactic shock.	LGIS	C2	
	Discuss the treatment of different types of shock.		C2	
	Explain the different stages of shock.		C2	
	Explain the mechanisms that maintain the cardiac output & arterial blood pressure in non-progressive shock.	LGIS	C2	
	Enlist different types of positive feedback mechanisms that can lead to the progression of shock.		C1	
Heart Sounds	Enlist the different types of heart sounds and explain the physiological basis of each.	LGIS	C1	MCQs, SEQs, OSVE, OSCE
	Enlist the causes of 3rd and 4th heart sounds.		C1	
	Explain the causes & physiological basis of murmurs caused by valvular lesions.		C2	
	Enumerate abnormal heart sounds		C1	
	Describe the physiological basis of each abnormal sounds.		C2	

PRACTICAL

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Electrocardiogram	Record an electrocardiogram by correct lead placement and connections a to identify normal heart sounds.	Lab	C2 / P	OSPE, OSCE
Blood Pressure	Determine the effect of posture and exercise on blood pressure by auscultatory method.		C2 / P	
	Measure the blood pressure of the subject by palpatory and auscultatory methods.		C2 /P	
Pulse	Examine arterial pulse to recognize normal characteristics of pulse.		C2 /P	
JVP	Examine neck veins to determine Jugular Venous Pulse (JVP).		C2 /P	

BIOCHEMISTRY			
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**
Lipids	Classify lipids.	LGIS / SGD	C2
	Discuss the biomedical functions & properties of lipids.		C2
Fatty Acids	Classify fatty acids.	LGIS / SGD	C2
	Discuss the role of trans saturated, saturated, poly- and mono-unsaturated fatty acids in diet on lipid profile.		C2
	Discuss lipid peroxidation and its significance		C2
Eicosanoids	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane, and prostacyclin)	LGIS	C2
Hyperlipidemias	Interpret the disorders associated with impairment of lipoprotein metabolism especially atherosclerosis and LDL (Low-Density Lipoprotein) oxidized.	LGIS / SGD	C2
	Discuss the signs and symptoms of hyperlipidemia.		C2
	Interpret data related to hyperlipidemia.		C4
Fat Soluble Vitamins	Discuss the sources, biomedical importance, active states, deficiency and excess of fat-soluble vitamins: Vitamins A.D. E and K.	LGIS	C2

Water Soluble Vitamins	Discuss the sources, biomedical importance, active states, deficiency and excess of water-soluble vitamins: Vitamins B group.	LGIS	C2
Minerals	Discuss the sources, biomedical importance, active states, deficiency and excess of minerals and trace elements especially zinc, Mg, Na, K, I, Ca, P, Se, S, Cu.	LGIS / SGD	C2

PRACTICAL BIOCHEMISTRY

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A
Cardiac Markers	Perform cardiac markers Creatine Kinase and Lactate Dehydrogenase (CK and LDH)	Practical Lab	C2 / P
Interpretation of Lab report	Interpret lab reports based on enzymes for diseases like cardiac disorders and hyperlipidemias.		C2 / P

Community Medicine				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Prevention Models	Describe the various strategies and models to prevent diseases.	LGIS	C2	MCQs
Primordial & Primary Prevention	Describe primordial prevention and its application to preventing CVS diseases.		C2	
	Depict the concept of primary prevention and its prevention in context to CVS.	LGIS	C2	
Health Promotion	Discuss the basic concept of health promotion and its application to CVS.	LGIS	C2	
Secondary & Tertiary Prevention	Apply secondary and tertiary preventions on CVS diseases (coronary heart disease, ischemic heart disease, hypertension).	LGIS	C2	MCQs
Non communicable Diseases	Describe the concept of cardiovascular diseases as non-communicable diseases.		C2	
Risk Assessment	Recognize the risk factors in the community for CVS diseases.	LGIS	C2	MCQs
	Discuss interventions to prevent the risk factors in community.		C2	

BEHAVIORAL SCIENCE				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Biological Basis of Behavior	Recognize various psychosocial aspects of Cardiovascular conditions.	LGIS	C2	MCQs
	Discuss strategies to deal with the psychosocial aspects of CVS conditions (such as Hypertension, Coronary artery disease, Heart failure, Arrhythmias, and other cardiovascular conditions) on Individual, Family and Society.		C2	
Psychological Disorders	Discuss psychological basis of emotional fainting & its impact	LGIS	C1	MCQs

PHARMACOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Anti-hypertensive drugs	Discuss briefly the therapeutic effect of various antihypertensive drugs.	LGIS	C2	MCQs
Antianginal drugs	Discuss briefly the therapeutic effect of various antianginal drugs.	LGIS	C2	
Antiarrhythmic drugs	Discuss briefly the therapeutic effect of various antiarrhythmic drugs)	LGIS	C2	
Drugs for Cardiac Failure	Discuss briefly the therapeutic effect of drugs used in cardiac failure.	LGIS	C2	

PATHOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Thrombosis & Infarction	Classify types of thrombosis, embolism, and infarction.	LGIS	C2	MCQs
	Discuss the pathophysiology of thrombosis, embolism, and infarction.		C2	
Hypertension	Identify the types and causes of hypertension.	LGIS	C1	
	Discuss the clinical consequences of hypertension and atherosclerosis.		C2	
Shock	Discuss the pathophysiology of shock.	LGIS	C1	
Heart failure	Classify the types of heart failure.	LGIS	C1	
	Identify the causes leading to heart failure. .		C2	
Ischemic Heart Disease	Identify the types of ischemic heart disease	LGIS	C2	
	Discuss the pathophysiology of different types of ischemic heart disease.		C2	
Cardiac Output	Explain the pathological causes of high & low cardiac output.		C1	

AGING				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Hypertension	Discuss the effect of age on blood vessels with reference to hypertension	LGIS	C2	MCQs
Cardiac Attack	Discuss the risk of cardiac attack in old age and weather conditions	LGIS	C2	
Valvular Heart Disease	Discuss the effect of age on valvular system of the heart.	LGIS	C2	
Arrhythmia	Discuss the effect of age on neural conduction of the heart in relation to arrhythmia.	LGIS	C2	
Role of Female Hormone	Discuss the protective role of female hormone against CVS diseases in women of reproductive age group.	LGIS	C2	

CLINICAL SKILLS (CSIM)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Auscultation	Demonstrate auscultation of heart sounds	Skill Lab	C2 / P	OSCE
Ankle Swelling	Perform detection of ankle swelling/edema – pitting /non pitting	Skill Lab	C2 / P	
Abdominal Jugular Reflex	Perform Abdominal jugular reflex	Skill Lab	C2 / P	

Pedal & Carotid Pulse	Perform detection of pedal and carotid pulses.	Skill Lab	C2 / P	
Lymph Node	Perform cervical and axillary lymph node examination.	Skill Lab	C2 / P	

PERLS (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP SKILLS)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Communicator	Discuss structure and validity of an Argument.	LGIS	C2	OSCE
	Write an argument.		C4	
Resilience	Demonstrate patience and tolerance on negative feedback from teacher.	Role Play	C2	OSCE
Adaptability	Demonstrate healthy coping mechanisms to respond to stress.	LGIS	C2	OSCE
	Write a reflection on team work in small groups.			

Time Tables:

The timetables for the module will be shared via WhatsApp groups and the notice boards in advance.

Assessment Tools

Theoretical knowledge is tested by a written examination system constituted by multiple choice questions (MCQ) and SEQs. The assessment of practical knowledge involves oral, spot, or objective structured practical examinations (OSPE).

Multiple Choice Questions (MCQ/SEQs):

Multiple choice questions (MCQ/SEQs) are a form of assessment for which students are asked to select the best choice from a list of answers.
MCQ/SEQ consists of a stem and a set of options. The stem is usually the first part of the assessment that presents the question as a problem to be solved; the question can be an incomplete statement which requires to be completed and can include a graph, a picture or any other relevant information. The options are the possible answers that the student can choose from, with the correct answer called the key and the incorrect answers called distractors.
Correct answer carries one mark, and incorrect ‘zero mark’. There is NO negative marking.

Students mark their responses on specified computer-based sheet designed for the college.
The block exam will comprise of 85 MCQ/ 7 SEQs each of 5 marks and will be compiled according to the shared blueprint.

Short Essay Questions (SEQ)

Short Essay questions generally ask for brief, text-based responses. They can be used to assess students' understanding of and ability to think with subject matter content, discourage guessing of answers, in-depth knowledge of concepts, and formulation of an answer.

Objective Structured Practical or Clinical Examination (OSCE / OSPE)

- The content may assess application of knowledge, or practical skills.
- Student will complete task in define time at one given station.
- All the students are assessed on the same content by the same examiner in the same allocated time.
- A structured examination will have observed, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Rest station is a station where there is no task given, and in this time student can organize his/her thoughts.
- The Block OSPE / OSCE will be comprise of 12 examined stations. The stations will be assigned according to the shared blueprint.

Internal Evaluation:

Internal evaluation is a process of quality review undertaken within an institution for its own ends. Internal evaluation criteria will be shared with faculty and 20 % on internal assessment will be observed in each module.

Attendance Requirement:

A minimum of 85% attendance is mandatory to sit for the examinations.

Professional Examination:

Criteria for appearing in Professional examination are according to rules and regulations shared by UHS which are available on their website. The criteria is;

- At least 85 % cumulative attendance in all blocks.
- An average 50 % minimum score in all blocks
- Certificate of good conduct from college
- Certificate of having appeared in all block exams conducted by the college

Learning Resources for Students

Anatomy

- Snell Clinical Anatomy 10th ed
- B.D Churasia
- Nelter Atlas
- Langman Embryology (12th Edi)
- Laiq Hassain Basic Histology (8th Ed)
- Difore Atlas Histology

Physiology

- Guyton and Hall physiology (14th Ed)
- Essentials of Medical Physiology by Mushtaq Ahmed

Biochemistry

- Harpers Illustrated Biochemistry (32nd Ed)
- Lippincott's Biochemistry
- Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.

Community Medicine:

- Kuzma
- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)
- Ilays shah Ansari 8th Edition
- Textbook of Epidemiology-----------LEON GORDIS

Pathology:

- Vinary Kumar, Abdul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.

Pharmacology:

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.

Behavioral Sciences:

- Handbook of Behavioral Sciences by Prof. Mowaddat H.Rana, 3rd Edition

Apart from these resource learning, students can consult books available in library or recommended by the specialty experts.