Jinnah Medical & Dental College

Cardiovascular System Module 1 & II

Study Guide

MBBS
2022-23

Wherever the art of Medicine is loved,
there is also a love of Humanity.

Hippocrates

VISION

To set local and global standards for quality patient outcomes – creating a culture of excellence to promote a transformative experience for the 21st century clinicians, educators and researchers to benefit all humanity.

MISSION

To develop well-rounded academicians, thinkers, clinicians and researchers by strengthening a global view, broadening intellectual foundations and teach effective communication. It is our aspiration to cultivate creative and critical thinking skills for problem solving, sensitive to cultural and ethical values and responsibilities. Our graduates will be role models and society leaders.

Team Members of Cardiovascular system Module I &II 2022-23

Name	Committee	Department
Professor Dr. Muhammad Baqir Soomro	Member	Anatomy
Professor Dr. Shahid Ahsen	Member	Biochemistry
Professor Dr. Sadaf Fatima	Member	Physiology
Professor Dr. Sanower Ali	Member	Community Medicine
Professor Dr. Imran Afzal	Member	Forensic Medicine
Professor Dr.Mahdev Harani	Member	Pathogen & Microbiology
Professor Dr. Samia Perwaiz Khan	Member	Pharmacology
Dr. Zeelaf Shahid Associate Director	Member	Medical Education

Introduction

A very warm welcome to medical students in the Cardiovascular module. This module has been developed to impart integrated teaching as a part of modular curriculum in Jinnah Medical & Dental College, Karachi. Cardiovascular 1 module (1st year) covered in 4 weeks and Cardiovascular 2 module (3rd year) covered in 5 weeks. This module will comprehensively cover anatomical, physiological and biochemical aspects of cardiovascular system with input from the departments of surgery, medicine, pharmacology, pathology and community medicine.

This module features the anatomy and development of heart and circulatory system. In physiology, after learning the physiological functions of the healthy heart and the variations in its functions during illness in previous module, this module has been planned to study the organization of cardiovascular system, regulation of blood flow, blood pressure and the related pathophysiology. Hyperlipidemias play a pivotal role in pathogenesis of atherosclerosis leading to ischemic heart disease. Also, cardiac enzymes have a key role in diagnosis, treatment and prognosis of ischemic heart diseases. In biochemistry students will be learning the structural, functional and biomedical importance of lipids and enzymes.

Rationale

It is designed to provide students with not only knowledge about basics of Cardiovascular system but also develop their ability to apply information to solve problems

JMDC CURRICULUM SEQUENCE: MBBS 1-5 YEARS

Year																						
1	**Module 1**	**EOM**	**Module 2**	**EOM**	**Module 3**	**EOM**	**Module 4**	**EOM**	**Module 5**												**EOM* Exam of Module**	
	Foundation-1 8 weeks		Blood-1 4 weeks		Locomotor-1 8 weeks		Respiratory-1 4 weeks		CVS-1 4 weeks													
	PAKISTAN STUDIES & ISLAMIAT																					
2	**Module 6**	**EOM**	**Module 7**	**EOM**	**Module 8**	**EOM**	**Module 9**	**EOM**	**Module 10**	**EOM**	**Module 11**				**EOM**	**Module 12**					**EOM**	
	GIT-1 4 weeks		Head & Neck-1 5 weeks		Neurosciences-1 7 weeks		Special Senses 3 weeks		Endocrine-1 5 weeks		Reproductive-1 4weeks					Urinary-1 5weeks						
	Communication Skills Patient Safety & Infection Control Professionalism & Ethics																					
3	**Module 13**	**EOM**	**Module14**	**EOM**	**Module15**	**EOM**	**Module16**	**EOM**	**Module17**				**EOM**	**Module 18**							**EOM**	
	Foundation 2 10 weeks		Blood-2 5weeks		Locomotor-2 4 weeks		Respiratory-2 4 weeks		CVS-2 5 weeks					GIT-2 7weeks								
	Clinical Rotations (Each Batch) WT* = Ward test																					
	Communication Skills Patient Safety & Infection Control Professionalism & Ethics																					
R1	**Medicine 2 weeks**	**WT**	**Psychiatry 2weeks**	**WT**	**Surgery 2 weeks**	**WT**	**Orthopedics 2 weeks**	**WT**	**OBS/ GYN 2 weeks**	**WT**	**Pediatrics 2 weeks**	**WT**	**Eye 2 weeks**	**WT**	**Ent 3 weeks**	**WT**						
R2	**Medicine 2 weeks**		**Psychiatry 2weeks**		**Surgery 2 weeks**		**Orthopedics 2weeks**		**OBS/ GYN 2 weeks**		**Pediatrics 2 weeks**		**Eye 2 weeks**		**Ent 3 weeks**							
4	**Module 19**	**EOM**	**Module 20**	**EOM**	**Module 21**	**EOM**	**Module 22**	**EOM**	**Module 23**	**EOM**	**Module 24**	**EOM**	**Module 25**	**EOM**	**Module 26**	**EOM**	**Module 27**		**EOM**			
	Nervous Sys & Psychiatry 2 8 weeks		H & N & SP Senses 2 (Eye) 4 weeks		H & N & SP Senses 3 (Eye) 4 weeks		Endocrinology 2 4 weeks		Repro 2 6 weeks		Urinary 2 4 weeks		Derma 2 weeks		Orthopedics 2 weeks		Rehab 2 weeks					
	Lectures ENT																					
	Clinical Rotations (Each Batch)																					
	Communication Skills Patient Safety & Infection Control Professionalism & Ethics																					
R1	**Medicine 3 weeks**	**WT**	**Psychiatry 3 weeks**	**WT**	**Surgery 3 weeks**	**WT**	**Ortho pedics 3 weeks**	**WT**	**OBS/ GYN 3 weeks**	**WT**	**Pediatrics 3 weeks**	**WT**	**Eye 3 weeks**	**WT**	**Ent 3 weeks**	**WT**						
R2	**Medicine 3weeks**	**WT**	**Surgery 3weeks**	**WT**	**Eye 3weeks**	**WT**	**Ent 3weeks**	**WT**														
	LECTURES R*= Rotation**																					
5	**Medicine**				**Surgery**				**OBS/Gynae**				**Pediatrics**									
	Clinical Rotations																					
	Communication Skills Patient Safety & Infection Control																					
R1	**Medicine 4 weeks**				**Surgery 4 weeks**				**OBS/ GYN 4 weeks**				**Pediatrics 4 weeks**									
R2	**Medicine 5 weeks**				**Surgery 5 weeks**				**OBS/ GYN 5 weeks**				**Pediatrics 5 weeks**									

Final Exam

Students Assessment

There will be an end of rotation ward test after completion of clinical posting which will comprise the following components: -

i. Written Assessment

The theory paper will have components of one – best type multiple – choice questions (MCQs).

ii. Practical / lab examination:

This will comprise Objective Structured Clinical Examination (OSCE) The OSCE will have both observed and non-observed stations. The end of clinical posting will be of 2 hours duration. This will comprise the following components:

The OSPE/ OSCE will be conducted in batches. The students will be having different patterns of OSPE/OSCE in the subjects of Basic and clinical sciences.

Summary of marks of each module exam

Theory (BCQs) = 100 marks

OSPE (10 stations) = 100 marks

Total = 200 marks

Internal Assessment:

• Continuous monitoring of attendance and practical assessment in short groups By Mini CEX and logbooks.

• It may be in the form of MCQs (BCQs), Ward tests, and OSCE.

• Internal assessment carries 20% weightage

Course Evaluation:

Course evaluation will be obtained through a feedback form which will be posted on the JMC website

Mandatory Policy:

Eligibility for sitting in Professional Examinations is as follows:

- 75% overall Class Attendance
- 75% Attendance all Clinical Wards with passing marks in all Clinical Ward Tests.
- Minimum 40% aggregate marks on all Internal Examinations (Module Tests, Midterm, Pre-Professional Examinations)
- MBBS 1st Year: Complete all Professional Communication assignments with passing marks
- MBBS 1st & 2nd Year: Obtain passing marks in Behavioral Sciences & Research Module assessments
- MBBS 2nd Year: Presentation in Journal club at least twice in a year
- MBBS 4th & Final Year: CPC Presentation at least once in a year
- Skills Labs: Must be completed with passing marks
- Research Paper must be completed before MBBS 4 Professional Examination

Failure to Meet the Eligibility Requirements:

- A Student failing to meet the above listed eligibility for sitting in the professional examination will NOT be allowed to sit in 1st attempt of the Professional Examination.

The college has the right to withhold all students who however, not met the eligibility requirements from sitting in the 1st attempt.

- Such students who have been withheld from sitting in the 1st attempt of the Professional exam because of failure to meet the eligibility requirements will be allowed only to sit in the retake of that examination.

  It is expected that deficiency in requirements of Professional communication assignments, Behavioral Sciences & Research Module assessments, journal Club presentations, CPC, Skills Labs must be made up and fulfilled before a student will allowed to sit in the retake exam.

DETAILS OF ATTENDANCE POLICY

The CR is responsible to bring attendance sheets from Student Affairs Office to each class. At the end of class, the attendance sheet must be signed and returned by the faculty member to the Student Affairs Office. No attendance sheets from students will be accepted.

These attendances will be compiled together as follows:

LECTURE ATTENDAN**CE** = # Lectures Attended / Total # of Lectures

PRACTICAL ATTENDANCE = # Practicals Attended / Total # of Practicals

TUTORIAL ATTENDANCE = # Tutorials Attended / Total # of Tutorials

NOTE: All tutorials will be conducted by a Senior Faculty Member (AP or above), assisted by a Junior Faculty Member (Lecturer)

FINAL CLASS ATTENDANCE =

$$\frac{\%\text{Lecture Attendance} + \%\text{Tutorial Attendance} + \%\text{Practical Attendance}}{3}$$

Teaching / Learning Methods

The teaching learning sessions of this module will be of diverse types:

a. Large group interactive sessions (LGIS)
b. Small group teaching will include tutorials and, case – based learning session.
c. Problem – based learning sessions.
d. Practical session will comprise sessions on early exposure to clinical methods and practical laboratory demonstrations.
e. Seminars: on different topics, in which students will make oral presentations on different aspects of the allocated topic.
f. Self-directed learning sessions: This is the time during which students are expected to revise what they have learnt in the class, clear their concepts by consulting different textbooks, reference material and prepare their assignments and projects.

MAIN CONTENT AREAS

ANATOMY

General Anatomy:

- Circulatory system

Histology:

- Blood vessels and heart

Embryology:

- Development of heart and vessels
- Placenta and fetal circulation

Gross Anatomy

- Heart and great vessels
- Mediastinum

PHYSIOLOGY

- Overview of circulation, biophysics of pressure, flow and resistance
- Vascular distensibility and function of arterial and venous system
- Microcirculation, lymphatic system, capillary fluid exchange, interstitial fluid and lymph flow
- Local and humoral control of tissue blood flow
- Nervous regulation of circulation and rapid control of arterial pressure
- Role of kidney in long term control of arterial pressure and hypertension: the integrated system for arterial blood pressure regulation
- Cardiac output, venous return and their regulation
- Muscle blood flow, cardiac output during exercise, the coronary circulation and ischemic heart disease
- Cardiac failure, heart valves, heart sounds, valvular and congenital heart defects, circulatory shock and its treatment

BIOCHEMISTRY

- Chemistry of lipids
- Enzymes

COMMUNITY MEDICINE

- Coronary heart diseases and its prevention
- Hypertension
- Rheumatic Heart Disease

FORENSIC MEDICINE

- Forensic sexology I, II, III, IV, V, VI
- Aspirin and Paracetamol poisoning

PATHOLOGY & MICROBIOLOGY

- Hypertensive Vascular Disease + Heart disease
- Atherosclerosis.
- Aneurysms and Dissection
- Vasculitis
- Disorders of Blood Vessel Hyper-reactivity, Veins and Lymphatics
- Vascular Tumours
- Heart Failure
- Congenital Heart Disease
- Ischemic Heart Disease
- Valvular Heart Disease & Non-infected vegetation
- Cardiomyopathies & Myocarditis
- Pericardial Diseases & Tumours of Heart

Pharmacology

- Drug therapy of Acute Coronary Syndrome
- Drugs used in the treatment of Angina pectoris & Myocardial Infarction
- Anti-hypertensive Drugs I & II
- Drug therapy of CCF
- Drug treatment of cardiac arrhythmias I & II
- Anti-hyperlipidemic drugs

General Learning Objectives:

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

ANATOMY

- Explain the major anatomical features of heart and mediastinum.
- Describe the gross structure, development and histology of heart and major blood vessels.

PHYSIOLOGY

- Explain the organization of cardiovascular system.
- Describe the local blood flow control mechanisms.
- Explain the regulation of blood pressure and cardiac output.
- Relate the pathophysiology of congenital and acquired cardiac dysfunctions.

BIOCHEMISTRY

- Explain the structure and functional importance of lipids.
- Discuss the role of enzymes in health and disease.

COMMUNITY MEDICINE

- Explain Coronary heart diseases and its prevention
- Discuss Hypertension
- Describe Rheumatic Heart Disease

FORENSIC MEDICINE

- Discuss Virginity & Pregnancy and their medico legal perspectives
- Explain Delivery and its medico legal aspects
- Explain Impotence, Sterility & Artificial insemination
- Discuss Abortion & its medico legal aspects
- Describe Natural Sexual offenses
- Explain Unnatural sexual offence
- Discuss Sexual Perversions

- Discuss Aspirin and Paracetamol poisoning

PATHOLOGY & MICROBIOLOGY

- Describe Hypertensive Vascular Disease + Heart disease
- Discuss Atherosclerosis.
- Explain Aneurysms and Dissection
- Discuss Vasculitis
- Describe Disorders of Blood Vessel Hyper-reactivity, Veins and Lymphatics
- Discuss Vascular Tumours
- Explain Heart Failure
- Describe Congenital Heart Disease & Ischemic Heart Disease
- Explain Valvular Heart Disease & Non-infected vegetation
- Discuss Cardiomyopathies & Myocarditis
- Describe Pericardial Diseases & Tumours of Heart

PHARMACOLOGY

- Discuss Drug therapy of Acute Coronary Syndrome
- Explain Drugs used in the treatment of Angina pectoris & Myocardial Infarction
- Describe Anti-hypertensive Drugs I & II
- Discuss Drug therapy of CCF
- Explain Drug treatment of cardiac arrhythmias I & II
- Discuss Anti-hyperlipidemic drugs

Recommended Reading Material

ANATOMY

A. GROSS ANATOMY

1. K.L. Moore, Clinically Oriented Anatomy
2. Richard L. Drake, Gray's anatomy for students

B. HISTOLOGY

1. B. Young J. W. Health Wheather's Functional Histology
2. di Fiore's Atlas of histology and functional correlations

C. EMBRYOLOGY

1. Keith L. Moore. The Developing Human
2. Langman's Medical Embryology

BIOCHEMISTRY

TEXT BOOKS

1. Harper's Illustrated Biochemistry
2. Lippincott's Illustrated reviews of Biochemistry
3. Lehninger's Principles of Biochemistry
4. Biochemistry by Devlin

PHYSIOLOGY

A. TEXTBOOKS

1. Textbook of Medical Physiology by Guyton And Hall
2. Human Physiology by Lauralee Sherwood
3. Berne & Levy Physiology
4. Best &Taylor Physiological Basis of Medical Practice

B. REFERENCEBOOKS

1. Ganong's Review of Medical Physiology

COMMUNITY MEDICINE

- Public Health and Community Medicine by Shah Ilyas Ansari, 8th Edition
- Park's Textbook of Preventive and Social Medicine by K Park 24th Edition Epidemiology and Biostatistics:
- Epidemiology by Leon Gordis, Fifth Edition
- Basic Statistics for the Health Sciences by Jan W. Kuzma, Fifth Edition.

FORENSIC MEDICINE

- Gautam Biswas Book of Forensic Medicine
- Parikh's Book of Forensic Medicine

PATHOLOGY

- Basis of Pathology by Robbins & Cotran
- Review of Microbiology by Livingston

PHARMACOLOGY

- Katzung. Basic & clinical Pharmacology- 15th Edition
- Katzung and Trevor's Pharmacology. Examination & Board Review- 13th Edition
- Rang and Dales Pharmacology. 9th Edition

Cardiovascular Module 1

Organization

Time requirements: Basic Medical Sciences

• Anatomy	29 Hours
• Physiology	45 Hours
• Biochemistry	14 hours
• Hours	
	88 Hours

Cardiovascular Module II

Organization

Time requirements:

• Community Medicine	8 Hours
• Forensic Medicine	11 Hours
• Pathology & Microbiology	26 Hours
• Pharmacology	9 Hours
	54 Hours

Total = 142 Hours

Cardiovascular-1 Module

ANATOMY LECTURES

S. NO.	LEARNING OBJECTIVES By the end, the student should be able to	Content	TEACHING Activity Duration	ASSESSMENT
1	• Explain the organization of cardiovascular system • Name the components of cardiovascular system • Name the vessels related to the heart. • Describe the location, coverings, borders & surfaces of the heart • Discuss the external features of heart • Briefly discuss the chambers and valves of the heart • Discuss the different circulatory circuits and their working **(K)**	Overview of Cardiovascular system (CVS)	LGIS 50 Mins	MCQs
2.	• Describe the boundaries of middle mediastinum • Discuss the contents of the middle mediastinum • Explain the different coverings of heart (pericardium) • Discuss the location of pericardial sinuses • Discuss the clinical conditions associated with the Pericardium **(K)**	Middle Mediastinum: Pericardium	LGIS 50 Mins	MCQs
3.	• Describe the location, coverings, borders & surfaces of the heart • Discuss the external features of heart • Briefly discuss the chambers and valves of the heart • Discuss the different circulatory circuits and their working **(K)**	External features of the Heart	LGIS 50 Mins	MCQs
4.	• Describe the anatomical position of the heart • Describe the chambers and valves of the heart • Discuss the internal features of chambers and valves of right & left sides of heart **(K)**	Heart: Internal features- I & II	LGIS 50 Mins	MCQs
5.	• Discuss the basic structure of blood circulatory system • Enumerate the layers of the walls of heart • Describe the histological characteristics of cardiac muscle • Discuss the structure and significance of intercalated discs **(K)**	Histology of Heart	LGIS 50 Mins	MCQs

6.	• Describe coronary circulation and its importance • Name the different branches of coronary arteries and their area of supply • Discuss variations of coronary artery disease • Discuss clinical manifestations of blockage of coronary arteries • Describe variations of coronary arteries and right and left dominance. • Discuss Myocardial Infarction and Angina Pectoris in relation to vessel occlusion and area supplied. **(K)**	Coronary blood vessels, blood supply of heart	LGIS 50 Mins	MCQs
7.	• Describe the conducting system of heart • Explain the different components of conducting system • Discuss blood supply of conducting system of heart • Discuss the innervation of heart and clinical relevance of cardiac pain. **(K)**	Conducting system of heart and nerve supply	LGIS 50 Mins	MCQs
8.	• Describe the position of the heart • Identify the surface anatomy of heart on a mannequin or normal subject • Identify the surface marking of the borders, great vessels and valves of heart • Identify the surface markings of the areas of auscultation. **(K) (S)**	Surface markings of heart and valves, great vessel	Demonstrations 50 Mins	MCQs
9.	• Discuss the development of heart tube • Describe the development of: ✓ atria and interatrial septum ✓ AV valves and aortic and pulmonary valves ✓ ventricles and interventricular septum • Describe the partitioning of outflow tract and contribution of neural crest cells to this process **(K)**	Development of Heart	LGIS 50 Mins	MCQs
10	• Describe congenital heart defects • Discuss clinical features of heart defects **(K)**	Congenital Anomalies of the Heart **(Excluding vessels)**	LGIS 50 Mins	MCQs
11	• Discuss the relation of pharyngeal arches and aortic arches • Explain the fate and formation of aortic arches • Describe the formation of brachiocephalic trunk, common carotid and left subclavian arteries • Describe the anomalies of arterial system **(K)**	Development of arterial system & anomalies	LGIS 50 Mins	MCQs
12	• Describe the major veins of heart, coronary sinus, anterior • Explain the development and fate of umbilical vitelline and cardinal veins • Describe the anomalies of venous system • cardiac veins, venae cordis minim	**Development of vein and anomalies**	LGIS 50 Mins	MCQs

	(K)			
13	• Describe the components of fetal circulation • Describe the location of foramen ovale • Describe the ductus arteriosus • Explain the path of fetal circulation • Explain the changes in circulation after birth • Discuss the problems with persistence of fetal component circulation after birth (Patent ductus arteriosus and patent foramen ovale) **(K)**	**Fetal Circulation**	LGIS 50 Mins	MCQs

ANATOMY TUTORIALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	□ Identify parts of the heart and major vessels on normal chest X ray **(K)**	Anatomic Radiology	Tutorial 90 mins	MCQ's

ANATOMY PRACTICALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	• Describe the characteristic histological features of cardiac muscle and layers of heart walls under the light microscope **(S)**	**Histology of the heart**	Demonstration 90 mins	OSPE

	• Describe the characteristic histological features of blood vessels under the light microscope **(S)**	**Histology of vessels**	Demonstration 90 mins	OSPE

BIOCHEMISTRY LECTURES

S.NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	**LIPID METABOLISM** □ Describe coronary heart diseases □ Discuss the epidemiology of coronary artery diseases □ Describe the prevention and control of coronary artery diseases **(K)**	Fatty Acid & Triacylglycerol Metabolism	LGIS 50 Mins	MCQ's
	• Discuss the beta oxidation of fatty acids • Discuss the regulation of beta oxidation • Describe energy generation during beta oxidation • Name the steps of unsaturated fatty acid oxidation • Compare fatty acid synthesis with fatty acid oxidation **(K)**	**Beta oxidation**	LGIS 50 Mins	MCQ's
	• Briefly describe the structure and functions of cholesterol • Describe the mechanism of cholesterol synthesis and its degradation • Discuss the regulation of cholesterol metabolism • Explain the formation of Bile salts and vitamin D • Describe the clinical significance of cholesterol • Discuss the biochemical role of cholesterol in CVS diseases • Discuss the clinical significance of hyperlipidaemia **(K)**	**Cholesterol Metabolism**	LGIS 50 Mins	MCQ's
	• Classify the lipoproteins • Discuss the metabolism, transport and clinical significance of lipoproteins **(K)**	**Transport of Lipids**	LGIS 50 Mins	MCQ's

	• Classify the Ketone bodies • Describe the biochemical role of Ketone bodies, their synthesis and utilization • Discuss the mechanism of ketoacidosis • Discuss the clinical significance of ketone bodies **(K)**	**Ketone Bodies Metabolism**	LGIS 50 Mins	MCQ's
2.	**Oxidants & antioxidants** □ Discuss the biochemical role of oxidants and antioxidants and their specific role in the progression of CVS diseases **(K)**	**Oxidants & antioxidants**	LGIS 50 Mins	MCQ's
3.	□ **ROLE OF MINERALS IN BLOOD PRESSURE REGULATION** • Discuss hypertension and its risk factors • Describe the mechanism of action of sodium and potassium in blood pressure regulation • Explain dietary approaches to reduce hypertension • List other life style interventions for the management of hypertension **(K)**	Role of minerals in blood pressure regulation	LGIS 50 Mins	MCQ's

BIOCHEMISTRY TUTORIALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	□ • Discuss the importance of lipid profile in CVS diseases • Correlate the laboratory investigations with relevant clinical conditions **(K)**	**Lipid Profile**	SGD 90 MINS (Tutorial)	MCQ's
	• Discuss the importance of cardiac bio-markers in CVS diseases • Correlate the laboratory investigations with relevant clinical conditions **(K)**	**Cardiac Biomarkers**	SGD 90 MINS (Tutorial)	MCQ's

BIOCHEMISTRY PRACTICALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	• Identify the chemical tests and bio-techniques to detect Triacylglycerol • Outline the method for detection of Triacylglycerol in a sample • Describe the estimation of TAGs in the given sample by Spectrophotometry • Correlate the laboratory investigations with relevant clinical conditions **(S)**	Triacylglycerol (TAGs)	Demonstration 90 mins	OSPE
	• Identify the chemical tests and bio-techniques to detect total cholesterol, HDL & LDL • Outline the method for detection of total cholesterol, HDL & LDL in a sample • Perform the estimation of total cholesterol, HDL & LDL in serum by Spectrophotometry • Correlate the laboratory investigations with relevant clinical conditions **(S)**	Total Cholesterol, HDL (High Density Lipoprotein) & LDL (Low Density Lipoprotein) Estimation	Demonstration 90 mins	OSPE
	• Outline the bio-techniques for detection of cardiac bio-markers in a sample • Discuss the importance of cardiac bio-markers in the diagnosis of CVS disease • Correlate the laboratory investigations with relevant clinical conditions **(S)**	Cardiac Bio-markers	Demonstration 90 mins	OSPE

PHYSIOLOGY LECTURES

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Contents	LEARNING Activities (Duration)	ASSESSMENT
1.	• Define the properties of cardiac muscles • Explain the phenomenon of generation of action potential in cardiac muscles and process of excitation contraction coupling **(K)**	Properties of cardiovascular muscles	LGIS 50 MINS	MCQs
2.	• Describe the conducting system of heart, and role of pacemaker in maintaining cardiac rhythm • Explain the regulation of heart rhythm and conduction by autonomic nervous system **(K)**	2. Excitatory and conductive system of heart	LGIS 50 MINS	MCQs
3.	• Describe events of cardiac cycle and associated events (pressure changes and heart sound generation), and its effect on volume of heart chambers and vessels (aorta, pulmonary artery) **(K)**	3. Cardiac cycle and heart sounds	LGIS 50 MINS	MCQs
4.	• Describe 12 lead ECG record • Define Einthoven's triangle & Einthoven's law **(K)**	ECG 1: Lead System	LGIS 50 MINS	MCQs
5.	• Explain the normal ECG waves **(K)**	ECG 2: Normal ECG pattern	LGIS 50 MINS	MCQs
6.	• Analyse ECG vectors and their interpretation • Define right & left axis deviation **(K)**	ECG 3: Vector Analysis	LGIS 50 MINS	MCQs
7.	• Define arrhythmia • Discuss the common cardiac arrhythmias, their causes and effects **(K)**	Cardiac arrhythmia	LGIS 50 MINS	MCQs
8.	• Define vascular distensibility and compliance • Define blood flow pressure and resistance in different blood vessels • Explain veins and their functions **(K)**	Overview of circulation (blood flow, pressure, resistance)	LGIS 50 MINS	MCQs

9.	• Define cardiac output and factors regulating cardiac output **(K)**	Cardiac output, venous return and its regulation	LGIS 50 MINS	MCQs
10.	• Define arterial blood pressure state mechanism of regulation of blood pressure (short, intermediate, long term) **(K)**	Nervous regulation of circulation and arterial pressure	LGIS 50 MINS	MCQs
11.	• Discuss the processes and regulatory mechanisms of intermediate and long-term control of blood pressure **(K)**	Intermediate and long-term control of blood pressure	LGIS 50 MINS	MCQs
12.	• Explain the process of Acute and long-term blood flow regulation • Discuss auto regulation of blood flow • Describe humoral regulation of circulation **(K)**	Local control of blood flow	LGIS 50 MINS	MCQs
13.	• Describe Starling Equilibrium for capillary exchange	Micro-circulation	LGIS 50 MINS	MCQs
14.	• List the functions of lymphatic systems • Define oedema and its types • Describe the process of oedema formation **(K)**	Lymphatic system and oedema	LGIS 50 MINS	MCQs
15.	• Explain physiological causes of shock, its stages and types **(K)**	Circulatory shock	LGIS 50 MINS	MCQs
16.	• Describe cardiovascular adaptation to exercise **(K)**	CVS adaption during exercise	LGIS 50 MINS	MCQs
17.	• List the common ischemic heart diseases • Define common IHDs • Discuss the changes and effects of common IHDs **(K)**	Ischemic Heart Diseases (IHD)	LGIS 50 MINS	MCQs

PHYSIOLOGY PRACTICALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	ASSESSMENT
1.	• Describe how to record refractory period of cardiac muscles through power lab **(S)**	**Power lab: The refractory period of cardiac muscle**	Demonstration 90 mins	OSPE
2.	• Describe how to setup ECG machine and arrangement of leads **(S)**	**ECG (its major components, Correlation of ECG and heart sounds)**	Demonstration 90 mins	OSPE
3.	• Describe how to differentiate between normal and abnormal heart sounds **(S)**	**Normal and abnormal heart sounds**	Demonstration 90 mins	OSPE
	• Examine arterial pulses in normal human subject • Define common abnormal arterial pulsations **(S)**	**Examination of arterial pulses**	Demonstration 90 mins	OSPE
	• Describe how to record blood pressure by palpatory and auscultatory methods **(S)**	**Recording of blood pressure**	Demonstration 90 mins	OSPE

Week 4

End of Cardiovascular Module

Cardiovascular Module 1 Test Theory

Cardiovascular Module 1 Test OSCE

Cardiovascular-11 Module

COMMUNITY MEDICINE — Lectures

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	Assessment
1.	□ Describe coronary heart diseases □ Discuss the epidemiology of coronary artery diseases □ Describe the prevention and control of coronary artery diseases **(K)**	Coronary heart diseases and its prevention	LGIS 50 MINS	MCQs
2.	□ Classify Hypertension □ Describe epidemiology of hypertension □ Discuss prevention and control **(K)**	Hypertension	LGIS 50 MINS	MCQs
3.	□ Describe the signs and Symptoms & diagnostic criteria of Rheumatic Heart Disease □ Explain the process of control and prevention of Rheumatic heart disease **(K)**	Rheumatic Heart Disease	LGIS 50 MINS	MCQs

FORENSIC MEDICINE — Lectures

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	TEACHING Activities (Duration)	Assessment
1.	□ Describe signs of virginity on medico legal examination □ List the differences between true and false virgin on examination □ Define defloration along with causes of rupture of hymen □ State the method of estimation of duration of a torn hymen □ Calculate EDD (Expected date of delivery) □ List the signs of pregnancy (presumptive, probable and definite signs) □ Describe the diagnosis of pregnancy in medico legal cases □ List the motives of feigned pregnancy □ List the abnormal forms of pregnancy □ Define Legitimacy and legitimate child as per law **(K)**	**Forensic sexology: Virginity & Pregnancy and their medico legal perspectives**	LGIS 50 MINS	MCQs

2.	Describe signs of recent delivery in living and in dead Describe the signs of remote delivery in living and in dead State the medico legal aspects of delivery **(K)**	**Forensic sexology II: Delivery and its medico legal aspects**	LGIS 50 MINS	MCQs
3.	Define consummation of marriage List the causes of nullity of marriage and divorce from legal aspects Describe Impotency and sterility with legal dictums List the causes of impotency and sterility Mention the steps of examination of a case of impotency and how to give opinion in such a case Discuss artificial insemination, its types, procedure, precautions in selecting a donor and legal implications, Surrogate birth **(K)**	**Forensic sexology III: Impotence, Sterility & Artificial insemination**	LGIS 50 MINS	MCQs
4.	Define the types of abortion List the grounds for abortion with special emphasis on pregnancy after rape Define criminal abortion, its type according to Pakistan Penal Code and unskilled, semi-skilled and skilled methods of criminal abortion List the complications of Criminal abortion List the causes of death in criminal abortion and autopsy findings **(K)**	**Forensic sexology IV: Abortion & its medico legal aspects**	LGIS 50 MINS	MCQs
5.	Classify sexual offenses State the legal definition of Rape Mention the procedure of examination of a victim of rape, collection of specimens during examination Mention the procedure of examination of an accused person Discuss rape in children List the complications following rape with special stress on Post-traumatic Stress Disorder List the problems in medico legal examination of victim of rape Define Incest and its legal aspects **(K)**	**Forensic sexology V: Natural Sexual offenses (Rape & Incest)**	LGIS 50 MINS	MCQs
6.	Describe legal definition of sodomy and its types Discuss the steps of examination of a victim of Sodomy, a habitual passive agent (Catamite), and habitual active agent (Sodomite) Describe the method of collection of samples from passive and active agent Describe the following: o Bestiality and the method of examination in such cases o Tribadism or female homosexuality and its legal aspects o Buccal coitus **(K)**	**Forensic sexology VI: Unnatural sexual offence**	LGIS 50 MINS	MCQs

7.	□ Define a sexual pervert □ List the various types of sexual perversions with special emphasis on Sadism, lust murder, necrophilia, necrophagic, Masochism, Transvestism and Transsexualism and other sexual perversions their medico legal aspects **(K)**	**Forensic sexology VII: Sexual Perversions**	LGIS 50 MINS	MCQs
8.	□ Describe the mode of action, sign and symptoms, fatal dose, fatal period, treatment and medico legal importance of aspirin & paracetamol poisoning **(K)**	**Aspirin and Paracetamol poisoning**	LGIS 50 MINS	MCQs

PATHOLOGY & MICROBIOLOGY

Lectures

S. NO.	LEARNING OBJECTIVES **By the end of module, the students should be able to**	Content	TEACHING Activities (Duration)	Assessment
1.	□ Discuss vascular wall injury response □ Discuss the causes, pathogenesis and morphology of hypertensive vascular injury □ Explain types of hypertensive heart disease **(K)**	Hypertensive Vascular Disease + Hypertensive heart disease	LGIS 50 MINS	MCQs
2.	□ Define Arteriosclerosis & Atherosclerosis □ Describe the epidemiology and risk factors of Atherosclerosis □ Discuss in detail the pathogenesis, morphology and clinical consequences of Atherosclerotic disease **(K)**	Atherosclerosis	LGIS 50 MINS	MCQs
3.	□ Define aneurysm and dissection of vessel wall □ Explain the pathogenesis, morphology & clinical features of aneurysms □ Discuss Aortic dissection with relation to pathogenesis, morphology & clinical features **(K)**	Aneurysms and Dissection	LGIS 50 MINS	MCQs
4.	□ Define Vasculitis □ List the types of vasculitis □ Discuss the aetiology, pathogenesis, morphology and clinical features of various types of Vasculitis **(K)**	Vasculitis	LGIS 50 MINS	MCQs

5.	□ Discuss various disorders of blood vessel hyper-reactivity: i. Raynaud Phenomenon ii. Myocardial Vessel Vasospasm □ Discuss various disorders of veins and lymphatics including: i. Varicose Veins ii. Thrombophlebitis and iii. Phlebothrombosis iv. Superior and Inferior Vena Cava Syndromes v. Lymphangitis and Lymphedema **(K)**	Disorders of Blood Vessel Hyper-reactivity, Veins and Lymphatics	LGIS 50 MINS	MCQs
6.	□ Classify vascular tumours □ Discuss benign, borderline and malignant vascular tumours with respect to aetiology, pathogenesis and morphology **(K)**	Vascular Tumours	LGIS 50 MINS	MCQs
7.	□ Define cardiac failure □ Discuss the aetiology, pathogenesis, morphology and clinical features of left sided and right sided heart failure **(K)**	Heart Failure	LGIS 50 MINS	MCQs
8.	□ Classify congenital heart diseases □ Explain the pathophysiology, morphology and clinical features of left to right, right to left diseases □ Briefly discuss congenital obstructive lesions **(K)**	Congenital Heart Disease	LGIS 50 MINS	MCQs
9.	□ Define ischemic heart disease & myocardial infarction (MI) □ Discuss the significance of time in diagnosing and treating acute MI □ Describe the morphological features of MI □ Discuss the clinical features of an acute attack of MI □ Discuss the laboratory evaluation, consequences, complications and prognosis of MI **(K)**	Ischemic Heart Disease 1	LGIS 50 MINS	MCQs
10.	□ Define Coronary Artery Disease (CAD) □ Discuss its consequences and various clinical presentations □ Explain its epidemiology and risk factors □ Describe Angina and its types □ Discuss the coronary blood supply and types of infarction □ Briefly discuss the features of chronic IHD and sudden cardiac death **(K)**	Ischemic Heart Disease 2	LGIS 50 MINS	MCQs
11.	□ Classify valvular defects of mitral and aortic valves valvular heart disease □ Discuss the aetiology, pathogenesis, morphology and clinical features of infective endocarditis, rheumatic fever and rheumatic heart disease □ Discuss non-infected vegetation of heart **(K)**	Valvular Heart Disease & Non-infected vegetation	LGIS 50 MINS	MCQs

12.	□ Define cardiomyopathy □ Discuss types of cardiomyopathies □ List the conditions associated with cardiomyopathy □ Explain the morphology and clinical features cardiomyopathy □ List the causes of myocarditis □ Discuss the morphology of myocarditis **(K)**	Cardiomyopathies & Myocarditis	LGIS 50 MINS	MCQs
13.	□ Define pericardial effusion & Hemopericardium □ Discuss causes, pathogenesis & morphology of different types of pericarditis □ Classify tumours of heart □ Discuss the pathogenesis and morphology of primary tumours of heart □ Discuss the clinical effects of non-cardiac neoplasms **(K)**	Pericardial Diseases & Tumours of Heart	LGIS 50 MINS	MCQs
14.	□ List the pathogens causing cardiovascular diseases □ Discuss in detail the organism Streptococcus viridians group Epstein bar virus, Trypanosoma □ Briefly discuss the properties, pathogenesis, transmission, clinical findings, laboratory diagnosis, epidemiology, treatment and prevention of other pathogens causing CVS diseases **(K)**	Pathogens causing Cardiovascular diseases) (Streptococcus viridians group, Staphylococcus aureus and epidermidis, Candida, Pseudomonas, HACEK Group organisms, Trypanosoma, Candida, Coxsackie virus, Cytomegalovirus, Epstein bar virus)	LGIS 50 MINS	MCQs

Pharmacology Lectures

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Content	Teaching Activities (Duration)	Assessment
1.	□ Discuss classification, basic & clinical pharmacology of different drug groups used in ACS **(K)**	Drug therapy of Acute Coronary Syndrome	LGIS 50 MINS	MCQs
2.	□ Classify Anti-Anginal drugs □ Explain basic & clinical pharmacology of Anti-Anginal drugs □ Discuss treatment of ischemic heart diseases (IHD) including the basic & clinical pharmacology of these drugs **(K)**	Drugs used in the treatment of Angina pectoris & Myocardial Infarction	LGIS 50 MINS	MCQs

3.	□ Discuss drugs of different classes used to treat HTN □ Explain their basic & clinical Pharmacology **(K)**	Anti-hypertensive Drugs I & II	LGIS 50 MINS	MCQs
4.	□ Discuss classification of drugs used in cardiac failure □ Explain their basic and clinical Pharmacology **(K)**	Drug therapy of CCF	LGIS 50 MINS	MCQs
5.	□ Classify anti-arrhythmic drugs □ Explain the basic & clinical pharmacology of anti-arrhythmic Drugs **(K)**	Drug treatment of cardiac arrhythmias I & II	LGIS 50 MINS	MCQs
6.	□ Classify Anti-hyperlipidemic drugs □ Discuss their basic and clinical Pharmacology **(K)**	Anti-hyperlipidemic drugs	LGIS 50 MINS	MCQs

Forensic Medicine TUTORIALS

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Contents	Teaching Activities (Duration)	Assessment
1.	□ Describe the mode of action, signs and symptoms, treatment, post-mortem findings and medico-legal importance of the Cardiac poisons; Digitalis, Aconite, and Nicotine **(K)**	Toxicology Cardiac poisons	SGD 90 MINS (Tutorial)	MCQs
2.	□ Describe the procedure of taking swabs in cases of victims of rape and sodomy □ Write the medico legal report of rape and sodomy cases **(K)**	Forensic Sexology: Medico legal Report of case of sexual assault	SGD 90 MINS (Tutorial)	MCQs
3.	□ Describe the technique and medico legal importance Polygraph and Brain Finger Printing □ Discuss the importance of questioned documents in Forensic investigation □ Describe the Forensic Lab **(K)**	Forensic Lab Techniques	SGD 90 MINS (Tutorial)	MCQs

4.	□ Describe the mode of action, signs and symptoms, treatment, post-mortem findings and medico-legal importance of Cannabis & Cocaine **(K)**	Cannabis & Cocaine Poisoning	SGD 90 MINS (Tutorial)	MCQs

Pathology Tutorials

S. NO.	LEARNING OBJECTIVES By the end of module, the students should be able to	Contents	Teaching Activities (Duration)	Assessment
1.	□ Discuss the risk factors and morphology of atherosclerosis □ Discuss the aetiology, morphology and clinical features of infective endocarditis, rheumatic fever and rheumatic heart disease **(K)**	**Atherosclerosis**	SGD 90 MINS (Tutorial)	MCQs
2.	□ Discuss vascular tumours with special emphasis on morphological aspects **(K)**	**Vascular Tumours**	SGD 90 MINS (Tutorial)	MCQs
3.	□ Discuss the morphological features of MI □ Elaborate the clinical features of an acute attack of MI □ Discuss its Laboratory evaluation **(K)**	**Myocardial Infarction**	SGD 90 MINS (Tutorial)	MCQs
4.	□ Discuss the aetiology, morphology and clinical features of infective endocarditis, rheumatic fever and rheumatic heart disease **(K)**	**Rheumatic heart disease & Infective Endocarditis**	SGD 90 MINS (Tutorial)	MCQs

Week 4

End of Cardiovascular Module II

Cardiovascular Module 2 Test Theory

Cardiovascular Module 2 OSCE

Medical Education 1st & 3rd year Lectures / Workshop

S.NO	Learning Objectives (domain) At the end of session, student will be able to:	Content Areas	Teaching Activity (Duration)	Assessment
1.	• Discuss the journey From School into College **(K)**	**From School into College** • Plan of medical education in college • Organization of undergraduate medical curriculum • Modular Curriculum	LGIS 50 mins	–
2.	• Explain the Study Guide Session **(K)**	**Study Guide Session** • Introduction of study guides • How to avail maximum benefit from study guides	LGIS 50 mins	_
3.	• **Describe the methods of different study skills (K)**	**Study Skills** • Difference in teaching and learning in school / college and a medical institution • Learning knowledge • Learning skills	LGIS 50 mins	_
4.	• Describe the basis of problem – based learning. **(K)** • Follow the process / steps of problem – based learning session. **(S)**	**Problem – based Learning** • Basics of problem-based learning • Process / steps of problem – based learning • Practical demonstration of PBL session	Workshop (2 hours)	_
5.	• Describe the basics of medical professionalism and outline the behavioral descriptors of students. **(K)**	**Medical Professionalism** • History of medical professionalism • Principals of medial professionalism • Behaviors required from medical students	LGIS 50 mins	_
6.	• Discuss Medical and Islamic ethics	Medical & Islamic Ethics-II • History of Medical and Islamic ethics • Principals of Medical & Islamic ethics	LGIS 50 mins	_

Learning resource: How to succeed at medical school, Dason Evans & Jo Brown, 2009

TIME TABLES

Jinnah Medical & Dental College

MBBS I - Batch 24 (2021)

CARDIOVASCULAR I MODULE 2021 - WEEK 1

Lecture Venue: ZOOM

MON Aug 23	RESPIRATORY MODULE TEST							
TUES Aug 24	RESPIRATORY MODULE TEST							
WED Aug 25	8:30-10:00 ABC – Professional Communication			10:15-11:05 ANATOMY CVS Overview & Middle Mediastinum	11:10-12:00 PHYSIOLOGY Cardiac Muscle Properties Dr. Sassi		12:00-1:30 PHYSIOLOGY PRACTICAL ABC-DRY LAB Arterial Pulses	
THUR Aug 26	8:30-10:00 PHYSIOLOGY PRACTICAL DEF-DRY LAB Arterial Pulses			10:15-11:05 BIOCHEMISTRY Fatty Acid &Triacylglycerol Metabolism	11:10-12:00 ANATOMY Pericardium		12:00-1:30 DEF – Professional Communication	
FRI Aug 27	8:30-9:20 PHYSIOLOGY Heart Conducting System Dr. Sadaf	9:25-10:15 ANATOMY External Heart Features		10:45-11:35 BIOCHEMISTRY Beta Oxidation	11:40-12:30 PHYSIOLOGY Cardiac Action Potential Dr. Sassi			

Jinnah Medical & Dental College
MBBS 3 - Batch 22 2021
CARDIOVASCULAR 2 MODULE–Week 1

Lecture Venue: JMDC LH 103; Monday, Tuesday, Saturday: JMCH Auditorium

MON 26 July	CLINICS (Rotation 13; Week 1) (9:00 – 12:00)			12:10-1:00 COMMUNITY MEDICINE Pertussis & Prevention Dr. Faryal	1:10-2:00 FORENSIC MEDICINE Toxicology Aluminum Phosphide & Paraquat Poisoning Dr. Imran Afzal	SELF STUDY
TUES 27 July	CLINICS (Rotation 13; Week 1) (9:00 – 12:00)			12:10-1:00 COMMUNITY MEDICINE Pneumonia, SARS & COVID Dr. Sanowar	1:10-2:00 FORENSIC MEDICINE Toxicology Naphthalene Poisoning Dr. Imran Afzal	SELF STUDY
WED 28 July	8:30-9:20	9:30-10:20				1:45-3:15
	RESPIRATORY MODULE TEST					
THURS 29 July	RESPIRATORY MODULE TEST					
FRI 30 July	8:30-9:20 PATHOLOGY Vessel Wall Disease Atherosclerosis	9:25-10:15 PHARMACOLOGY ACS Drug Therapy		10:45-11:35 PATHOLOGY Hypertensive Vascular Disease Hypertensive Heart Disease	11:40-12:30 PATHOLOGY Aneurysms & Dissection	PRAYER
SAT 31 July	CLINICS (Rotation 13; Week 1) (9:00 – 12:00)			12:10-1:00	SELF STUDY	

TRANSPORT WILL LEAVE JMDC FOR KORANGI AT 8:15 AM MONDAY, TUESDAY, SATURDAY