Cardiovascular SYSTEM

Block cvs-213

Student Study Guide

Block cvs-213

2024-2025

Sohag

university

Prepared by Departments of

Anatomy & Histology Physiology & Biochemistry

Pathology & Pharmacology

Microbiology &Parasitology

Departments

Revised by

Medical Education Department
Sohag University

CONTENTS

Block specification

Basic Information:

Overview

Program on which the course is given: Bachelor of Medicine and Surgery (M.B.B.Ch.).

Elements (Major or Minor) of the program: Undergraduate

Departments offering the course: Integrated Anatomy, Histology, Biochemistry, Physiology, Micro, Parasitology, Pathology, Pharmacology.

Academic year/level: 2nd year, 4thsemester

Date of specification approval: 2024-2025.

Title: Cardiovascular system

Code: CVS-213

Credit points: 9

Weeks: 6 weeks

Lecture: 55 hours

Practical: 30 hours

Student learning activities: 135 hours

{Case based group discussion: 20 hours. 30 hrs. formative assessment

Total: 270 hours

CVS-213 System Block Map					
Block	**Points**	**Weeks**	**Contact hours**	**Non- contact hours**	**Marks**
Cvs-213	9	6weeks	135hr/ 4.5 points	135 Hours/4.5 points	135 marks

Names and Contact Information of Staff Responsible for The Block:

Block coordinator

Dr. zahraa Mohamed Ismael
E_ mail: zahraashour90@gmail.com

Department coordinators

- **Dr zahraa Mohamed ismael.Human Anatomy Department**
- **Prof. Doha Saber Mohamed, Histology Department**
- **Dr.amany abdelrahman , Medical Physiology Department**
- **Prof. Aida Abdeen Mahmoud, Medical Biochemistry Department**
- **Dr. Amira Esmail Ahmed, lecturer of Microbiology and immunology**
- **Dr. Manal Reyad GabAllah, Parasitology Department**
- **Dr. Eman Mohammed Ali, Pharmacology Department**
- **Dr. Nagwa Abd El-Sadek Ahmed, Pathology Department**

Heads of Departments Sharing in The Block:

- **Heads of departments sharing in the block:**
- **Prof.Ahmad Talaat, Head of Human anatomy and Embryology department.**
- **prof. Nagwa sayed Ahmed: head of Medical Biochemistry department.**
- **Prof. Doha Saber Mohamed, Head of Medical Histology and Cell biology department.**
- **Prof. Hanaa Ahmed El- Hady: the head of Medical Parasitology department.**
- **Prof. Mona Fetooh Muhamad, Head of Microbiology & immunology department.**
- **Prof. Sanaa Abdelal Omran, Head of Pharmacology department.**
- **Prof. Afaf Elnashar , Head of pathology department**
- **Prof.Hoda Mustafa Moghazy, Professor and Head of Physiology department.**

A-COURSE DESCRIPTION:

Cardiovascular Module is an organ system course. It was designed to focus on anatomical (with development), histological & physiological character of the system. It also includes the pathological and biochemical changes during disease state and explains the pharmacological treatment of the disease which includes the possible prevention of those diseases.

This will be delivered within a clinical context with some common cardiovascular diseases such as hypertension, ischemic heart disease and arrhythmia.

B- Professional information:

I- Block Aims

Overall aim of the block:

1- Overall aim of the block: By the end of the block, the student will be able to: understand fundamental clinically oriented normal microscopic and macroscopic structure and function of the cardiovascular system, together with the pathological abnormalities that may afflict the system and drugs that are used in treatment.

By the end of this block the students are expected to be able to:

1. Identify the anatomy of the mediastinum, heart chambers, valves, general and topographic of the great vessels and then distribution.
2. Describe the basic histological structures of different parts of the cardiovascular system, normal embryological development with common congenital abnormalities.
3. Describe and understand the electrocardiogram, cardiac cycle, hemodynamics, regulation of blood flow and blood pressure, microcirculations, and the mechanism of

circulatory shock.

4. Understand the metabolism of the cardiac muscles and the value of the cardiac enzymes and Troponins and their role in the diagnosis of acute myocardial disease.
5. Recognize the role and types of lipoprotein disorders and the mechanism of
formation of atherosclerosis.
6. Recognize the characteristics of microorganisms that cause infection of the cardiovascular system, their pathogenicity and methods of identification.
7. Define the most common types of cardiovascular diseases with emphasis on the etiology, mechanism, morphology and briefly correlate the pathological aspects of diseases with clinical manifestations.
8. Understand the mechanisms of action, pharmacokinetics, uses and adverse effects of commonly used drugs in the treatment of cardiac failure, cardiac arrhythmias, hypertension, angina and drugs used in hyperlipidemia.

Plans for developing and improving the course:

1) Continuous updating of the information, knowledge and skills included in the course through the continuous search for new knowledge and skills available in recent publications (books, research, internet and others).

2) Continuous improvements in teaching methods to encourage the students to participate effectively in the various academic activities.

3) Continuous evaluation of the course content, students' performance and establish plans accordingly.

2- NARS competencies covered by the block

NARS areas covered by the block

The competency areas of the NARS- Medicine competency framework are

1- The graduate as a health care provider.

2- The graduate as a health promoter.

3- The graduate as a professional.

4- The graduate as a scholar and scientist.

5- The graduate as a member of the health team and a part of the health care system.

6- The graduate as a lifelong learner and researcher.

Sub competencies

1.1 Take and record a structured, patient centered history.

1.2 Adopt an empathic and holistic approach to the patients and their problems.

1.3 Assess the mental state of the patient.

1.4 Perform appropriately-timed full physical examination of patients, appropriate to the age, gender, and clinical presentation of the patient while being culturally sensitive.

1.5 Prioritize issues to be addressed in a patient encounter.

1.6 Select the appropriate investigations and interpret their results taking into consideration cost/ effectiveness factors.

1.7 Recognize and respond to the complexity, uncertainty, and ambiguity inherent in medical practice.

1.8 Apply knowledge of the clinical and biomedical sciences relevant to the clinical problem at hand.

1.9 Retrieve, analyze, and evaluate relevant and current data from literature, using information technologies and library resources, in order to help solve a clinical problem based on evidence (EBM).
2.1 Identify the basic determinants of health and principles of health improvement.

2.2 Recognize the economic, psychological, social, and cultural factors that interfere with wellbeing.

2.3 Discuss the role of nutrition and physical activity in health.

2.4 Identify the major health risks in his/her community, including demographic, occupational and environmental risks; endemic diseases, and prevalent chronic diseases. >

3.1 Exhibit appropriate professional behaviors and relationships in all aspects of practice, demonstrating honesty, integrity, commitment, compassion, and respect.

3.2 Adhere to the professional standards and laws governing the practice, and abide by the national code of ethics issued by the Egyptian Medical Syndicate.

3.3 Respect the different cultural beliefs and values in the community they serve.

3.4 Treat all patients equally, and avoid stigmatizing any category regardless of their social, cultural or ethnic backgrounds, or their disabilities.

4.1 Describe the normal structure of the body and its major organ systems and explain their functions.

4.2 Explain the molecular, biochemical, and cellular mechanisms that are important in maintaining the body's homeostasis.

4.3 Recognize and describe main developmental changes in humans and the effect of growth, development and aging on the individual and his family.

4.4 Explain normal human behavior and apply theoretical frameworks of psychology to interpret the varied responses of individuals, groups and societies to disease

3- Intended Learning Outcomes

A- Knowledge:

By the end of the course, students should be able to:

A 1-Describe the normal anatomy of the mediastinum.
A 2- Describe the normal anatomy of the pericardium and the heart.
A 3-Describe the surface landmarks of the heart and its borders.
A 4- Describe the internal structure of the heart
A 5- Describe course, relations and branches of the coronary blood vessels and cardiac veins, describe course, relations and branches of main nerves supplying the heart
A 6- Describe the steps of development of the heart.
A 7- Describe the steps of development cardiac septa: interatrial, a trio-ventricular
A 8- Describe the different congenital anomalies of the heart and mention the mechanism of
A 9-Describe the basic structure of blood vessels (Tunica intimae, media and

adventitia).
A 10- Describe the types of blood capillaries (with special references to endothelium, smooth muscle fibers and vascular C.T.).
A11-List the specialized arteries (cerebral, pulmonary, coronary and umbilical).
A12- Mention special sensory structures of arteries.
A13- Define excitability and know action potentials in the cardiac muscle, the cause of long action potential and plateau and describe the ionic basis of each phase of the action potential, and the characteristics of the action potential in different regions of the heart, including the pacemaker potential.
A14- Describe the extrasystole and its mechanism.
Al 5- Define rhythmicity and know the rhythrnicity in different parts of the cardiac muscles and factors affecting it, describe vagal tone and vagal escape.
Al6- Define cardiac pressure-volume relationships (contractility), describe the excitation¬contraction coupling pressure, identify the regulation of cardiac contractility (frank-starling law, staircase phenomenon, homometric regulation) and describe the influence of heart rate.
A17- Describe course, relations and branches of aorta, pulmonary trunk. superior vena cava and inferior and azygos venous system
A18- Describe the different stages of development and congenital malformations of aortic arches, vitelline& umbilical arteries and venous system.
A19-Describe the conductive system, initiation and propagation of cardiac impulse, conduction mechanism, pathways and conduction defects
A20- Describe electrocardiogram (leads, normal wave, intervals, voltage and cardiac axis).
A21-Illustrate the abnormalities seen in ECG (rate, rhythm. conduction, myocardial lesion, and ECG changes with electrolyte disturbance).
A22-Identify the cardiac cycle and its phases. Correlate cycle events with heart sounds, murmurs and ECG.
A23 -Define arterial pulse wave (pulse pressure curve) and its significance.
A24- Describe the jugular venous pulse and its significance.
A25- Identify heart sounds (normal and abnormal, character and causes).
A26- Identify the causative organism of rheumatic fever.
A27- Understand the mechanism and pathophysiology of rheumatic fever.
A28- Recognize the role of molecular mimicry and type II hypersensitivity.
A29- Identify the most common causative organisms of infective carditis.
A30- Learn about HACEK organisms and bacteria responsible for “culture negative” endocarditis.
A31-List the high-risk diseases associated with occurence of IE.
A32- Understand the pathogenesis of IE.
A33- Recognize the different diagnostic methods of IE.

A34- Define rheumatic fever and discuss its etiology, pathogenesis, pathology and compilations.
A35- Enumerate pathological types of pericarditis and its causes.
A36- Outline the clinical features and complications of pericarditis and the main types of endocarditis.
A37- Summarize the clinical features. Pathogenesis and appearance of vegetation in each of these types.
A38- Learn about the most common viruses causing myocarditis (Coxackie B virus. Echovirus & Adenovirus).
A39- Describe the clinical significance of viral myocarditis
A40- State the laboratory diagnosis of the causative viruses.
A41- Classify the causes of valvular heart disease.
A42- Describe the morphology and pathological consequences of stenosis and incompetence of the different valves.
A43- List causes and types of congenital heart diseases.
A44- Describe the effects of the common types of adult congenital heart disease including ASD. VSD, coarctation of the aorta and tetralogy of fallot.
A45- Define myocarditis / Pancarditis and pericarditis.
A46-List the parasites causing myocarditis/ Pancarditis (Trypanosoma cruzi, Trypanosoma brucei rhodesiense and Trypansoma brucei gambiense. Toxoplasma gondii, Taenia solium and Trichinella spiralis) or pericarditis (Entamoeba histolytica, Echmococcus granulosus).
A47- Identify the life cycle of each parasite.
A48- Recall the infective and diagnostic stages of each parasite.
A49- State the vasosensitive areas (baroreceptors, chemoreceptors and their role in regulation of circulation), heart rate and its regulation.
A50- Describe the effect of exercise and posture on CVS.
A51- Describe cardiac output and state components controlling it. Define various related terms, including stroke volume, cardiac index, end diastolic and end systolic volumes. Explain the importance of cardiac reserve, mechanisms and limitations, and heart failure (pathophysiology, causes and consequences).
A52- Classify antiarrhythmic drugs and describe the indications and adverse effects of the commonly used drugs.
A53- Define heart failure, enumerate its types, and mention their mechanism.
A54- Enumerate causes of right and left sided heart failure.
A55- Define cor pulmonale and enumerate its causes.
A56- List the drugs used to treat heart failure and describe the pharmacology of the drugs used to treat heart failure.
A57- Describe the microscopic appearance of general structure of blood vessels.
A58- Recognize the different parts of the blood vessel wall.

A59- Discuss the normal structure of endothelial cells.
A60- List the types of arteries and veins.
A61- Compare different types of arteries and veins.
A62- Compare different layers of arterial walls and the corresponding one of the venous walls.
A63- Describe the general structure of blood capillaries.
A64- Mention different types of blood capillaries (Continuous, fenestrated, and sinusoidal capillaries).
A65- Recognize the different types of special arteries.
A66- Discuss the normal sensory structure of blood vessels (carotid sinuses & carotid and aortic bodies).
A67-Compare between different three types of blood capillaries.
A68- How the structure of the blood capillaries adapts its functions.
A69- How the structure of the different special arteries adapts their functions.
A70- Define blood flow, mention factors determining blood flow (resistance) through the blood vessel, and describe the physical characters of blood flow, mechanism of murmurs.
A71- Determine relationships between pressure, resistance and flow.
A72-Describe different mechanisms invoked in blood flow regulation.
A73-Describe innervation of blood vessels, vasomotor tone, its mechanism, factors influence the diameter of arterioles.
A74-Describe arterial blood pressure (physiological variations, factors determine ABP, renin angiotensin system), know the arterial blood pressure control mechanisms (rapidly acting, intermediate, and long-term mechanisms)
A75- Describe different types, mechanism and pathophysiology of hypertension.
A76-Endothelium-derived relaxing factors and Endothelium-derived constricting factors.
A77- Describe other factors affecting vascular tone.
A78- Define the term atherosclerosis and the risk factors for its development and mention its pathogenesis.
A79 - Describe the morphological changes that occur in vessel walls in the various stages of development of atheroma.
A80-0utline the common complications of atheroma.
A81-Defme systemic hypertension, enumerate its causes and mention its types.
A82- Describe the effects of systemic hypertension, particularly on the vessels, heart, kidney and brain and list causes of death in patients affected with systemic hypertension.
A83- Define secondary hypertension and list its causes.
A84-Classify antihypertensive drugs and describes the mechanism and adverse effects of the commonly used drugs.

A85- Define and list different types of lipoproteins.
A86- Explain the rationale of plasma protein formation and describe their transport in blood.
A87 - Describe the structure of cholesterol and list its sources, precursors, functions, and derivatives.
A88- Outlines the key types of dys-lipoproteinemia. their common causes and complications.
A89-List the drugs used to treat hyperlipidemia and describe the indications and adverse effects of the used drugs.
A90-Describe capillary blood flow and pressure and factors affecting/regulating them, capillary fragility, pulsation. Illustrate how the water moves across the capillary wall demonstrates the mechanisms of pulmonary and systemic oedema.
A91- Define venous pressure, factors that influence it.
A92- Describe coronary blood flow and factors affecting it. Illustrate vascular smooth muscle excitation-contraction coupling, define constricting mechanisms and vasodilator mechanisms. Ischemic heart disease (character of pain, mechanism of pain, ECG changes).
A93- List the main cardiac markers (SGOT, LDH. Troponin and CPK) and their isoenzymes.
A94- Explain the importance of these markers in diagnosis and monitoring of cardiac disease.
A95- Describe the test precautions in estimating SGOT, LDH, and CPK.
A96- List the risk factors for ischemic heart disease and enumerate cause and effects of coronary occlusion.
A97-Discuss sites, macroscopic changes and relate these to histological changes of myocardial infarction.
A98- List the possible complications of myocardial infarction.
A99- List the drugs used to treat angina pectoris and describe the pharmacology of the drugs used to treat angina.
A100- Describe the different collagen diseases affecting arteries and morphological changes that occur in vessel wall in the various collagen diseases affecting arteries.
A101- Define aneurysm and outline simple classification.
A102- Define varicose veins and enumerates its common sites.
A103- Describe hemorrhage and the compensatory reactions during hemorrhage (Immediate compensation, medium. Long term compensation).
A104- Describe circulatory shock (definition, classifications, mechanisms, and stages), types, mechanism, and stages of shock.
A105-Describe the Intrinsic and extrinsic reflexes, central and autonomic control of CVS.

A106- Describe the effect of exercise on CVS.

B- Intellectual skills:
By the end of the course, students should be able to:

Bl - Interpret the normal anatomical structures on plain X ray radiograph of the chest.
B2 - Interpret some clinical findings in relation to developmental basis (pericardial sinuses)
B3- Interpret anatomical facts with its major clinical applications (bare area of the pericardium, pericardiocentesis, heart surgery, heart lung machine) and interpret some clinical findings in relation to developmental basis.
B4 - Compare between the structures of (large arteries, medium sized, small arterioles) and (large veins, medium sized and small venules).
B5 - Differentiate between the specialized arteries (cerebral, pulmonary, coronary and umbilical).
B6- How the structure of the heart and blood vessels adapt their functions.
B7- Interpret anatomical facts with its major clinical applications (coronary bypass grafting, cardiac catheter).
B8- State the diagnosis of rheumatic fever.
B9- Learn the most important preventive measures of rheumatic fever.
B10-Define myocarditis and cardiomyopathy and enumerate their types.
B11- Demonstrate the pathological lesions in the heart caused by each parasite.
B12- Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).
B13- Describe laboratory diagnosis, imaging and pathologic studies of some disease related to the most common parasites and Recall prevention of them.
B14- Interpret some clinical findings in relation to the developmental basis of the blood vessels.
Bl5-Interpret histological facts with clinical applications (phlebitis, arterial aneurysm, and varicose veins).
Bl6-Interpret histological facts with clinical applications (coronary atherosclerosis, edema).

C- Psychomotor Skills:
By the end of the course, students should be able to:

Cl-Demonstrate the anatomy of the heart: borders and surfaces and interior of the

four chambers.
C2-Demonstrate the anatomy of coronary arteries
C3- Demonstrate normal plain x-ray of the chest.
C4-Demonstrate the microscopic structure of different layers of cardiac wall.
C5-Demonstrate the microscopic structural differences between ordinary cardiac muscle and Purkinje muscle fibers.
C6- Demonstrate the microscopic structure of large arteries, large veins and medium sized arteries& veins.
C7- Illustrate the different types of special arteries.
C8 - Describe electrocardiogram (leads, normal wave, intervals, voltage and cardiac axis).
C9 - Illustrate the abnormalities seen in ECG (rate, rhythm, conduction, myocardial lesion, and ECG changes with electrolyte disturbance).
C10- Perform and interpret the ECG.
C11 - Discuss and interpret physiological cases, ECG.
C12 -Participate in laboratory tutorials, exercises, and physiological case scenarios.
C13 -Understand the principle and interpretation of Ant streptolysin O test for diagnosis of Rheumatic fever.
Cl4- Describe the microscopic structure and cultural characteristics of: Streptococcus pyrogens and Streptococcus Viridians.
C15- Understand the principle of blood culture and its importance in diagnosis of Infective endocarditis.
Cl6- Define the biochemical tests that differentiate between Streptococcus Viridians and Streptococcus pneumoniae.
C17- Identify the gross pathology of rheumatic valvular lesions (chronic rheumatic valvulitis: mitral and aortic stenosis).
Cl8- Recognize the gross and microscopic appearance of myocardial infarction
C19-Demonstrate the gross and microscopic features of atherosclerosis (atheroma).
C20-Illustrate the abnormalities seen in ECG (rate, rhythm, conduction, myocardial lesion)
C21 - Interpret ECG and discuss the abnormalities in the waves and interval.
C22-Define arterial pulse wave (pulse pressure curve) and its significance.
C23-Palpate the pulse at the main pulse points and interprets on its characteristics.
C24- Measure the arterial blood pressure.
C25- Discuss and interpret physiological cases with blood pressure.
C26- Demonstrate the microscopic structure of:

- Continuous blood capillaries.
- Fenestrated blood capillaries.
- Sinusoidal blood capillaries.

C27- Illustrate the normal sensory structure of blood vessels (carotid Sinuses & carotid and aortic bodies).
C28- Identify the drug of choice in treatment of hypertension associated with other diseases.
C29- Write prescriptions for different types of hypertension and hypertension associated with other diseases.
C30 - Describe the mechanism of action, main uses and adverse effects of the drug samples that are commonly used to treat hypertension.
C31- Identify the precaution of sample collection and preparation.
C32- List the different parameters evaluating serum lipid profile.
C33- Estimate serum TAG. total cholesterol and calculate LDL- cholesterol as well as the ratio between LDL- & HDL- cholesterol.
C34- Describe the diagnostic importance of each of the lipid profile parameters & their relation to atherogenicity.
C35- Write prescriptions for different types of angina pectoris and heart failure.
C36- Describe the mechanism of action, main uses and adverse effects of drug samples that are commonly used to treat angina, CHF, arrythmias and hyperlipidemia.
C37- Demonstrate the anatomy of mediastinum and the great vessels in the thorax (or leaving and entering various chambers of the heart).
C38 - Demonstrate various anomalies of great vessels and placental circulation.

D- General, skills:

By the end of the study, students should be able to:

D1-Practice the skill of self-learning.
D2-Demonstrate personal responsibility.
D3-Practice the skill of respect colleagues.
D4-Adhere the value of teamwork by acting in small group.
D5-Qualify adequate cooperation with his/her colleagues.
D6-Justify the efforts required to accomplish the tasks in specified time
D7- Set the use of sources of biomedical information to remain current with advances in knowledge and practice.
D8- Display freely, keeping an ethical behavior.
D9-Share in the work efficiently with the instruments and equipment's of the department in a responsible manner keeping them intact and clean.
D10- Modify his capability to describe, discuss and solve problems
D11-Reflect on and assess his/her performance using various performance indicators and information sources.

Course contents (Topics to be covered)

	Title of lectures	ILOs	Departments	Week NO.	NARS	Hours	References
1.	Anatomy of mediastinum &, the pericardium and the heart surfaces and borders.	Al, A2, A3 B1, B2	Anatomy	1	1.5,1.7, 1.8,1.9, 3.1., 3.2 4.1, 4.3 4.5, 4.6 5.3	2hrs	-Lippincott Illustrated Reviews: Integrated System, Kluwer, 2016, pp. 157- 159. -Oxford Handbook of medical sciences, Oxford university press, second edition. pp.416,422.
2.	Internal structure of the heart and its blood supply	A4, A5	Anatomy	1	1.8,1.9 3.1., 3.2 4.1, 4.3 4.5, 4.6	2hrs	Lippincott Illustrated Reviews: Integrated System. Wolters Kluwer, 2016, pp. 151-157.
3.	Basic structure of the heart	A.9, B.4	Histology	1	5.7, 6.1, 6.2, 6.3, 6.A, 6.6	1hr	Integrated Systems Lippincott illustrated review ,p. 159 173-177,9 -134 First Aid for the basic science (organ system) chapter 1 .10 27, p. 370

4.	**Electrophysiology of cardiac muscle and origin of the heart beat heart beat**	**A13, A14**	**Physiology**	**1**	**4.3: 4.6**	**2hrs**	**11(29-31, 104) 43(117-122)**
5.	**Cardiac muscle excitation**	**A15, A16**	**Physiology**	**1**	**.1: 4.2**	**1hr**	**1(32-33)** **11(62-63, 68-69**
6.	**Heart development and its anomaly.**	**A6, A7, A8**	**Anatomy**		**1.8,19** **3.1.,3.2** **4.1, 4.3** **4.5, 4.6**	**2hrs**	**Oxford Handbook of medical sciences, Oxford university press, second edition, pp.418-421.**
7.	**Conduction system in the**	**A19**	**Physiology**	**1**	**4.1; 4.3: 4.6**	**1hr**	**11(34-35) 12(379)**
8.	**The electrocardiogram ram**	**A20-A22**	**Physiology**	**1**	**4.1: 4.2: 4.3: 4.6**	**2hrs**	**121(36-37)** **12(378-380)**
9.	**ECG and arrhythmia**	**A22- A23**	**Physiology**	**1**	**4.1; 4.2; 4.3; 4.6.**	**1hr**	**11(36-37, 104** **109) 142(380-381)**
I0	**Cardiac cycle**	**A23**	**Physiology**	**1**	**4.1;4.2; 4.3; 4.6**	**2hrs**	**11(40-41, 114** **11, 12(373-374, 377** **378)** **3 (269-272)**
11.	**Jugular curve and radial curve and heart sound**	**A24,** **A25**	**Physiology**	**1**	**4.1: 4.6**	**1 hour**	**3(108, 177-180)**

12.	**Rheumatic fever**	**A26,** **A27,** **A28**	**Microbiology**	**1**	**1.6, 1.8, 2.4, 2.6,** **4.5, 4.6, 4.8**	**1 hour**	**-First aid for Basic science 60, 61** **-Lippincott's illustrated reviews,** **100, 101,112, 113, 133** **-Elsevier's Integrated review":Immunology and** **Microbiology 1105, 106, 107,108.** **-First aid for the USIMLE**

13.	**Infective Endocarditis**	**A29, A30, A31, A32, A33**	**Microbiology**	**1**	**1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8**	**1 hour**	**-First Aid for Basic Science 58,59 -Lippincotts illustrated reviews, 132 - 136 Elsevier's Integrated review":Immunology and Microbiology 105-108. 112, 116, 117,119,120. -First Aid for the USMLE step 1 2018, 28th Edition [Tao Le, Vikas Bhushan, Matthew, Sochat) 15-13: 978 1260116120, ISBN :-10 1260116123.**
14.	**Carditis**	**A34,A35, A36,A37**	**Pathology**	**1**	**4.5 4.6 4.8**	**2 hours**	**-Integrated pathology 189-193 -Integrated pathology 187-188**

15.	**Viral Myocarditis:**	**A38, A39, A40**	**Microbiology**	**1**	**1.6, 1.8, 2.4, 2.5, 2.6, 4.5, 4.6, 4.8**	**1 hour**	**-First aid for Basic Science -57** **-Lippincott's illustrated reviews 136- 138,** **-Elsevier's Integrated review Immunology and Microbiology 131-135.** **-First aid for the USMLE Step 12018, 28th Edition** **[Tao Le, Vikas Bhushan, Matthew Sochat) 15-13:978 1260116120, 15-10: 1260116123**

16.	**Valvular and congenital heart diseases**	**A41 A42,A43 , A44, A45**	**Pathology**		**4.5 4.6 4.8**	**2 hours**	**Integrated pathology 193-194**

17.	**Cardiac Involvement with Parasitic Infections.**	**A46, A47, A48, B11, B12, B13**	**Parasitology**	**1**	**1.8. 2.1, 2.4, 2.5, 2.6, 2.9, 4.5, 4.8**	**1 hour**	**A-Garcia, Lynne Shore, and David A. Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016. pp 6-18: 130-142:218293:362-392**
18.	**heart rate and cardiovascular reflexes**	**A49, A50**	**physiology**	**1**	**4.1, 4.2**	**1 Hour**	**11(62-63, 68-69)**

19. **20.**	**Cardiac output and cardiac reserve** **Antiarrhythmic drugs**	**A51** **A52**	**physiology** **Pharmacology**	**1** **1**	**4.1; 4.2; 4.3; 4.6** **1.16** **4.7**	**2 hrs** **2hrs**	**1(42-45, 100 101) 12 (382-389)** **Elsevier's integrated-review-Pharmacology-second edition-Chapter 8 (CVS)** **Pages: 159-163** **Pharmacology- second edition** **Chapter 8** **(CVS) Pages; 159-163**
21.	**Heart failure**	**A53**	**Physiology**	**1**	**4.5,4.6,**	**1 hour**	**12(382-389)** **14 (163-173)**
22.	**Drugs used in the treatment of heart failure**	**A56**	**Pharmacology**	2	**4.7**	**2 hours**	**Elsevier's integrated-review Pharmacology-second edition-Chapter 8 (CVS) Pages: 155-159**

23.	The anatomy of great vessels and its developments, placental circulation	A17, A18	Anatomy	2	1.2,1.5, 1.7 1.8,1.9 3.1., 3.2 4.1, 4.3 4.5, 4.6 5.3	2hrs	Lippincott Illustrated Reviews: Integrated System, Wolters Kluwer, 2016, pp. 173- 174. Oxford Handbook of medical sciences, Oxford university press, second edition, pp.442
24.	Blood vessels	A.9 B 4	Histology	1	4.1, 5.6 5.7, 6.1, 6.2, 6.3, 6.4, 6.6	1 hour	Integrated medical sciences. The essential p.3 4-35.
25.	The structure the blood capillaries, arteries and sensory structures of blood vessels	A.10, A.11, A12 B 5	Histology	1	5.7, 6.1, 6.2, 6.3, 6.4, 6.6 4.8, 5.6	1hour	First Aid for the Usmile Step l 20199. 281, P.450
26.	Hemodynamics	A69, A70,	Physiology	1	4.1; 4.2; 4.3; 4.6	1 hour	11(54-55) 12(394-395)
27.	Blood pressure and flow in the arteries and Arterioles	A71- A72, A73	Physiology	1	4.1;4.2; 4.3; 4.6	1 hour	11(46-47,86-87) 12(402-406)
28.	Regulation of the vasculature	A74	Physiology	1	4.1:4.2	1hour	41(56)

29.	Atherosclerosis	A78, A79, A80	Pathology	1	4.5, 4.6 4.8	1 hour	Integrated pathology 171-174
30.	Hypertension	A81, A82, A83	Pathology	1	4.5, 4.6 4.8	1 hour	Integrated pathology 170-171
31.	Antihypertensive drugs	A84	Pharmacology	3	4.7	1 hour	Elsevier's integrated-review-Pharmacology-second edition-Chapter 8 (CVS) Pages: 142-152
32.	Plasma lipoproteins and cholesterol (Hyperlipidemia)	A85, A86, A87, A88,	Biochemistry	3	1.6,1.8, 1.11 4.2. 4.8	2 hours	Integrated medical sciences, pp 53-55. Lippincott's illustrated Reviews integrated systems, pp 181-182.First aid for the basic Science, Organ's systems, pp55-57.
33	Treatment of hyperlipidemia	A89	Pharmacology	3	4.7	1hour	Elsevier's integrated-review-Pharmacology-second edition-Chapter 8 (CVS) Pages: 162-167
34.	The microcirculation and the venous system	A90, A91	Physiology	1		1 hour	11(50-51) 11(52-53
35.	The coronary Circulations and vascular smooth muscle excitation contraction coupling	A82, A92	Physiology	1	4.1; 4.2; 4.3; 4.6	1 hour	41(38-39, 58) 2:374-377

36.	Cardiac enzymes and other proteins markers.	A93 A94 A95	Biochemistry	4	1.6, 1.8,1.11 4.2,4.5, 4.8	2hours	Integrated medical sciences, pp 61. Lippincott's illustrated Reviews integrated systems, pp 172 First aid for the basic science, Organ's
37.	Ischemic heart disease	A96, A97, A98	Pathology	4	1.6, 4.5, 4.6, 4.7	1 hour	Integrated pathology 174-180
38.	Drugs used to treat angina pectoris	A99	Pharmacology	4	1.16 4.7	1 hour	Elsevier's integrated-review-Pharmacology-second edition-Chapter 8 (CVS) Pages: 153-154
39.	Vasculitis, aneurysm and varicose veins	A100, A101, A102	Pathology	4	4.5, 4.6 4.8	1 hours	Integrated pathology 182-186
40.	Shock and hemorrhage	A 103-104	Physiology	1	4.2; 4.3. 4.6	1 hour	11(70-71), 142(408-413) 143(278-286)
41.	Cardiovascular reflexes and Cardiovascular effects of exercise	A105-A106	Physiology	1	4.1:4.2	1 hour	1(62-63, 68-69)

B. Practical Laboratory Sessions

N0	Title of practical session	ILOs	Week	Department	Contact hours	NARS
1.	**Practical skills in the anatomy of the heart (1)**	c 1. -Demonstrate the anatomy of the heart: borders and surfaces and interior of the four chambers. c 2-Demonstrate the anatomy of coronary arteries. c .3-Demonstrate normal plain X—ray of the chest.	**1st**	Anatomy	2	3.1,3.2,4.8,5.3,6.3,6.4
2.	**Histology of the Heart and blood vessels.**	C2.1- Demonstrate the microscopic structure of different layers of cardiac wall. C2.2-Demonstrate the microscopic structural differences between ordinary cardiac muscle and Purkinje muscle fibers. C2.3- Demonstrate the microscopic structure of large arteries, large veins and medium sized arteries and veins. C2.4-Illustrate the different types of special arteries.	**1st**	Histology	2	

3	**ECG Practical skills**	A3.1- Describe electrocardiogram (leads, normal waves, duration, voltage and cardiac axis). 3.2 - Illustrate the abnormalities seen in ECG (rate, conduction, myocardial lesion, and ECG changes with electrolyte disturbance). Describe ECG axis, and interpret axis deviation	I st	Physiology	2		1.11 4.8
4	**Lab Diagnosis of the Rheumatic fever and infective Endocarditis**	C4.1. Identify methods of specimen collection C4.2. Identify the microscopic features of causative bacterial pathogens. C4. 3. Recognize the media and the biochemical reactions used for bacterial identification C4. 4. Understand laboratory tests used for diagnosis of causative viral pathogens	2nd	Microbiology	**2**		**1.8,** 1.11, **2.5, 4.6,** **4.8**
5	**Pathology of the CVS**	C17 the gross pathology of rheumatic valvular lesions (chronic rheumatic valvulitis: mitral and aortic stenosis) & gross picture of fibrinoud pericarditis	2nd	Pathology	**2**		
6	**abnormal ECG practical**	A9- Illustrate the abnormalities seen in ECG (rate, rhythm, conduction, myocardial lesion). C6.1- Distinguish normal ECG, interpret physiological cases. ECG. Analyze case scenarios based on ECG findings	2nd	Physiology	**2**		**1.11:** **4.8**

7	**Arterial pulsation and mauremt tof arteria blood pressure**	Describe normal arterial pulse wave (pulse pressure curve) and its significance. Palpate the pulse at the main pulse points and interpret on its characteristics. Measure the arterial blood pressure. Discuss and interpret physiological cases with blood pressure.	3rd	Physiology	2	
8	**Histology of the blood vessels**	c8-1- Demonstrate the microscopic structure of: - Continuous blood capillaries. - Fenestrated blood capillaries. - Sinusoidal blood capillaries. c8-2- Illustrate the normal sensory structure of blood vessels (carotid Sinuses carotid and aortic bodies).	3rd	**Histology**	2	1.11: 4.8
9	**Prescriptions and drug samples for hypertension**	C9.1-identify the drugs of choice in treatment of hypertension associated with other diseases. C9.2-write prescriptions for different types of hypertensions and hypertension associated with other diseases C9.3- describe the mechanism of action, main uses and adverse effects of drug for treatment of	3rd	pharmacology	2	1.13

		hypertension.				
10	**Lipid profile and cardiac biomarkers**	C10.1 - Identify the precaution of sample collection and preparation. C10.2- List the different parameters evaluating serum lipidprofile C10.3- Estimate serum TAG, total cholesterol and calculate LDL- cholesterol as well as the ratio between LDL &HDL-cholesterol. C10.4- Describe the diagnostic importance of each of the lipid profile parameter and their reltion toatherogenicity.	4th	Biochemistry	2	1.13

11	Prescription and drug samples for angia and CHF	C11.1- write prescriptions for different of angia prectoris and heart fail C11.2-describe the mechanism of action, main uses and adver effects of drug samples that are commonly used to Used to treat angia, CHF, arrythmias and hyperlipidemia.	4th	pharmacology	2	1.6,1.11 ,4.8
12	**Anatomy-development of great vessels**	C37 -Demonstrate the anatomy of mediastinum and the great vessels in the thorax.	4th	Anatomy	2	**3.1, 3.2 4.8,**
13	**anomalies of the great vessels and Placental**	C38-Demonstrate various anomalies of great vessels and placental circulation.	4th	anatomy	2	**5.3 63, 6.4**
14	**Pathology of CVS**	C18.Recognize the gross and microscopic appearance of myocardial 1111101 C19.Demonstrate the gloss and microscopic features of atherosclerosis (atheroma).	4th	Pathology	2	

15	**Arterial blood pressure and capillary fragility test**	C24- Measure the arterial blood pressure. C25- Discuss and interpret physiological cases with blood pressure	4th	physiology	2	

C-Group Discussion (GD)

1st week	1. Cases of heart disease (Histology) 2. Cases of congenital anomalies of the heart (Anatomy) 3. Cases of stab wound (Anatomy) 4. Cases of jugular renous pulse and its relation to cardiac cycle (Physiology). 5. Cases of abnormal ECG pattern (Physiology)	D1-Practice the skill of self-learning. D2-Demonstrate personal responsibility. D3-Practice the skill of respecting colleagues. D4-Adhere to the value of teamwork by acting in small groups. D5-Qualify adequate cooperation with his/her colleagues. D6-Justify the efforts required to accomplish the tasks in specified time.
2nd week	6. Cases of rheumatic and infective endocarditis (Microbiology). 7. Cases of myocarditis and amoebic pericarditis	

	(Parasitology). 8. Cases of carditis (Pathology). 9. Cases of cardiac reserve (Physiology)	D7-Set the use of sources of biomedical information to remain current with advances in knowledge and practice. D8-Display freely, keeping an ethical behavior D9-Share in the work efficiently with the instruments and equipments of the department in a responsible manner keeping them intact and clean. D10-Modify his capability to describe, discuss and solve problems. D11-Reflect on and assess his/her performance using various performance indicators and information sources.
3rd	10. Cases of atherosclerosis and hypertension cases (Histology) 11. Cases of congenital anomalies of the great vessels (Anatomy). 12. Cases of Dyslipidemia (Biochemistry). 13. Cases of Hypertension (Pharmacology). 14. Case of Regulation of ABP (Physiology). 15. Cases of Hyperlipidemia (Pharmacology). 16. Cases of angina and CHF (Pharmacology)	
4th week	17. Cases of Hypertension (Pathology). 18. Cases of myocardial infarction (Anatomy & Pathology). 19. Cases of Hemorrhage and shock (Physiology 20. Cases of Heart failure (Physiology).	

Teaching and learning methods:

Lectures for knowledge and intellectual skill outcomes.

Practical sessions to gain psychomotor skills and using practical book.

Self-directed learning (SDL) and case-based group discussion for the topics studied in lectures

or related topics; including libraries, E-learning (photographs, reading cases and solving of questions - available online) as well as consulting professors for gathering of information.

Student Assessment:

1. Formative:

This is used to monitor student's learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning.

It's given at least once in the form of quizzes that is made available for the students at the E-learning site at the end of the block.

Answers are presented instantly after the attempts and discussed on the students groups or in person with the teaching staff

Questions should be consistent with the level of the final exam. The student's attendance is a condition for entering the summative exams. The electronic or paper achievement file must be used to follow up on the students' evaluation, and its completion is a condition for entering the final exams

2. Summative

It is used to evaluate student's achievements at the end of the block. The grades tell whether the student achieved the learning goal or not.

The student's performance will be assessed according to the following:

Assessment task	Type of assessment	Proportion of Total Assessment	
End block examination	Mcqs	20%	27marks
Portifolio	Mcqs	10%	14 Marks
Final Exams	MCQs (50%), Short answer questions and modified essay questions	40%	54 Marks
OSPE exam		30 %	40 Marks
Total		100%	135 Marks

List of references and recommended books:

1- Lecture handouts & practical sessions of all basic sciences Departments.
2- Basic medical sciences website on the Internet.
3- Web site of all basic sciences Departments.
4- Essential Books: (Text Books):

Histology:

1-Integrated Systems Lippincott illustrated review

Histology and myocyte contractile function p. 159

Histology of the arteries, veins, and capillaries p 173-177

Histology of cardiac muscles p -134

2-First Aid for the basic science (organ system)

layers of the heart chapter 1 P.10-27

Ultrastructure of sarcomere. P. 370

3-Integerated medical sciences. The essentials The histology of heart tissue P.34-35.

ultrastructure of sarcomere P.34-35.

4-First Aid for the Usmile Step1 2019

Histological structure of pericardium P.281

ultrastructure of sarcomere P.450

5-Junquirae Histology Text Book (sections of cardiovascular system and muscles)

Anatomy:

1. Snell, R.: Clinical Anatomy, last edition-Lippincott, Williams & Wilkins.
2. Lippincott Illustrated Reviews: Integrated System Copyright 2016,Wolters Kluwer.
3. Clinically Oriented Anatomy, By: Keith L. Moore
4. Gray's anatomy for students.
5. Grant's Atlas of Anatomy, Grant J.C.B., Williams & Wilkins.
6. Langman's Medical Embryology.
7. The developing human, Clinically oriented embryology by Keith Moore.
8. Oxford Handbook of Medical sciences, second edition 2006.
9. First aid for USMLE step1.

Medical Biochemisty:

1. B1: Integrated medical sciences,
2. B2: Lippincott's Illustrated Reviews, integrated systems,
3. B3: First aid for the basic science, Organs systems,

Physiology:

1. R1: Aaronson et al. (2013). The cardiovascular system at a Glance. (4th edition).
2. R2: Patton and Thibodeau (2014). The human body in health and disease. (6th edition).
3. R3: Guyton and Hall (2006). Textbook of medical Physiology. (11th edition).
4. R4 Lippincott illustrated reviews: integrated system, Workers kluwer, 2015. pp.163-173.

Parasitology:

1. Integrated medical sciences.
2. Lippincott's Illustrated Reviews, integrated systems.

3. First aid for USMLE step1.
4. Garcia, Lynne Shore, and David A. Bruckner. Diagnostic Medical Parasitology. New York: Elsevier, 2016.
5. Mims' Medical Microbiology and Immunology, Richard Goering Hazel Dockrell Mark Zuckerman Peter Chiodini. 6th Edition, Elsevier, 2019.
6.Cases in human parasitology by Judith S. Heelen. 1st edition 2004.

Microbiology:

1. First Aid for the USMLE Step 1 2018, 28th Edition [Tao Le, Vikas Bhushan, Matthew Sochat) ISBN-13: 978-1260116120, ISBN-10: 1260116123.
2. Lippincott illustrated reviews: Integrated systems. Leeper-Woodford SK, Adkison LR. Wolters Kluwer. 2016.
3. Elsevier's integrated review. Immunology & Microbiology. Actor JK. Elsevier Saunders.2nd edition. 2012.
4. Integrated Medicinal Sciences. The Essentials. Perera S, Anderson S, Leung H, Gama R. Wiley. 2007

Pharmacology

1- Elsevier's integrated review of pharmacology. Second edition. Chapter 8 (CVS)

2-Lippincott Illustrated Review: integrated systems

Pathology:
1- Elsevier's Integrated Pathology, Thomas C. King, 2007, Mosby, p167-195.

Facilities required for learning

1- White boards.
2- Cadavers.
3- Microscopes
4- Closed circuit Monitors in labs.
5- Data show for power point presentations.
6- Computer club in the faculty with net access.
7- Libraries with available textbooks for gathering of information.
8- Kits for measuring lipid profile and comments on various lab reports.

Lectures outlines

Lecture (1)
Anatomy of the mediastinum, the pericardium and the heart

Learning objectives

After the lecture, students should be able to:

- Describe the normal anatomy of the mediastinum.
- Describe the normal anatomy of the pericardium and the heart.
- Describe the surface landmarks of the heart and its valves.
- Interpret the normal anatomical structures on plain X ray radiograph of the chest.
- Interpret the normal anatomy of the heart on plain X ray radiograph of the chest.
- Interpret some clinical findings in relation to developmental basis (pericardial sinuses)
- Interpret anatomical facts with its major clinical applications (bare area of the pericardium and pericardiocentesis).

Lecture (2)
Development and congenital anomalies of the heart

Learning objectives

After the lecture, students should be able to:

-Describe the steps of development cardiac septa: interatrial, atrio-ventricular interventricular &truncoconal
- Describe the steps of development of pericardium.
- Describe the different congenital anomalies of the heart and mention the mechanism of occurrence.
- Interpret some clinical findings in relation to developmental basis.

Lecture (3)

Basic structure of the heart

Learning objectives

After the lecture, students should be able to:

-List the different parts of cardiovascular system.

- Mention the general structure of the heart.
- Describe the basic structure of blood vessels (Tunica intimae, media and adventitia).
- Describe the types of blood capillaries (with special references to endothelium, smooth muscle fibers and vascular C.T.).
- List the specialized arteries (cerebral, pulmonary, coronary and umbilical).
- Mention special sensory structures of arteries.

-Compare between the structures of (large arteries, medium sized, small arterioles) and (large veins, medium sized and small venules).

-Differentiate between the specialized arteries (cerebral, pulmonary, coronary and umbilical).

-How the structure of the heart and blood vessels adapt their functions.

Lecture (4)

Electrophysiology of cardiac muscle and origin of the heart beat

Learning objectives

After the lecture, students should be able to:

- Define excitability and know action potentials in the cardiac muscle, the cause of long action potential and plateau and describe the ionic basis of each phase of the action potential, and the characteristics of the action potential in different regions of the heart, including the pacemaker potential. Describe the extrasystole and its mechanism.
- Define rhythmicity and know the rhythmicity in different parts of the cardiac muscles and factors affecting it, describe vagal tone and vagal escape.

Lecture (5)

Cardiac muscle excitation–contraction coupling

Learning objectives

After the lecture, students should be able to:

- Define cardiac pressure-volume relationships (contractility), describe the excitation-contraction coupling pressure, identify the regulation of cardiac contractility (frank-starling law, staircase phenomenon, homometric regulation) and describe the influence of heart rate.

Lecture (6)

The anatomy of the blood supply and nerve supply of the heart

Learning objectives

After the lecture, students should be able to:

-Describe course, relations and branches of the coronary blood vessels and cardiac veins.

- Describe course, relations and branches of main nerves supplying the heart.

- Interpret anatomical facts with its major clinical applications (coronary bypass grafting, cardiac catheter).

Lecture (7)

Conduction system in the heart

Learning objectives

After the lecture, students should be able to:

-Describe the conductive system, initiation and propagation of cardiac impulse, conduction mechanism, pathways and conduction defects.

Lecture (8)

The electrocardiogram

Learning objectives

After the lecture, students should be able to:

- Describe electrocardiogram (leads, normal wave, intervals, voltage and cardiac axis).

Lecture (9)

Abnormal ECG and arrhythmia

Learning objectives

After the lecture, students should be able to:

- Illustrate the abnormalities seen in ECG (rate, rhythm, conduction, myocardial lesion, and ECG changes

Lecture (10)

Cardiac cycle

Learning objectives

After the lecture, students should be able to:

-Identify the cardiac cycle and its phases. Correlate cycle events with heart sounds, murmurs and ECG.

Lecture (11)

Jugular curve and radial curve and heart sound

Learning objectives

After the lecture, students should be able to:

- Define arterial pulse wave (pulse pressure curve) and its significance.
- Describe the jugular venous pulse and its significance.
- Identify heart sound (normal and abnormal, characters and causes).

Lecture (12)

Rheumatic fever

Learning objectives

After the lecture, students should be able to:

- Identify the causative organism of rheumatic fever (Post Streptococcus pyogenes infection).
- Understand the mechanism and pathophysiology of the disease.
- Recognize the role of molecular mimicry and type II hypersensitivity.
- State the diagnosis of the disease.
- Learn the most important preventive measures.

Lecture (13)
Infective Endocarditis

Learning objectives

After the lecture, students should be able to:

- Identify the most common causative organisms of infective carditis.
- Learn about HACEK organisms and bacteria responsible for "culture negative" endocarditis.
- List the high risk diseases associated with occurrence of IE.
- Understand the pathogenesis of IE.
- Recognize the different diagnostic methods of IE.

Lecture (14)
Carditis

Learning objectives

After the lecture, students should be able to:

- Define rheumatic fever and discuss its etiology, pathogenesis, pathology and complications.
- Enumerate pathological types of pericarditis and its causes.
- Outline the clinical features and complications of pericarditis. Outline the main types of endocarditis.
- Summarise the clinical features, pathogenesis and appearance of vegetation in each of these types.
- Define myocarditis and cardiomyopathy and enumerate their types.

Lecture (15)
Viral Myocarditis

Learning objectives

After the lecture, students should be able to:

-Learn about the most common viruses causing myocarditis (Coxackie B virus, Echovirus, & Adenovirus)
- Describe the clinical significance of viral myocarditis
- State the laboratory diagnosis of the causative viruses.

Lecture (16)

Valvular and congenital heart diseases

Learning objectives

After the lecture, students should be able to:

- Classify the causes of valvular heart disease.
- Describe the morphology and pathological consequences of stenosis and incompetence of the different valves.
- List causes and types of congenital heart diseases. Describe the effects of the common types of adult congenital heart disease including ASD, VSD, coarctation of the aorta and tetralogy of fallot.

Lecture (17)

Cardiac Involvement with Parasitic Infections

Learning objectives

After the lecture, students should be able to:

- Define myocarditis / Pancarditis and pericarditis
- List the most common parasites causing myocarditis/ Pancarditis (*Trypanosoma cruzi, Trypanosoma brucei rhodesiense and Trypanosoma brucei gambiense. Toxoplasma gondii, Taenia solium and Trichinella spiralis*) or pericarditis (Entamoeba histolytica, Echinococcus granulosus)
- Identify life cycle of each parasite.
- Recall the infective and diagnostic stages of each parasite.
- Demonstrate the pathological lesions in the heart caused by each parasite
- Explain host-parasite relationships (pathogenesis and main clinical presentations of each parasite).
- Describe laboratory diagnosis, imaging and pathologic studies of some disease related to the most common parasites and Recall prevention of them.

Lecture (18)

Heart rate and cardiovascular reflexes

Learning objectives

After the lecture, students should be able to:

- State the vasosensitive areas (baroreceptors, chemoreceptors and their role in regulation of circulation), heart rate and its regulation.
- Describe the effect of exercise and posture on CVS.

Lecture (19)
Cardiac output and cardiac reserve

Learning objectives

After the lecture, students should be able to:

- Describe cardiac output and state components controlling it. Define various related terms, including stroke volume, cardiac index, end diastolic and end systolic volumes. Explain the importance of cardiac reserve, mechanisms and limitations, and heart failure (pathophysiology, causes and consequences).

Lecture (20)
Antiarrhythmic drugs

Learning objectives

After the lecture, students should be able to:

-Classify antiarrhythmic drugs and describe the indications and adverse effects of the commonly used drugs.

Lecture (21)
Heart failure

Learning objectives

After the lecture, students should be able to:

-Define heart failure, enumerate its types and mention their mechanism.

- Enumerate causes of right and left sided heart failure.

-Define corpulmonale and enumerate its causes.

Lecture (22)

Drugs used to treat heart failure

Learning objectives

After the lecture, students should be able to:

List the drugs used to treat heart failure and describe the pharmacology of the drugs used to treat heart failure.

Lecture (23)

The development and anatomy of the great vessels

Learning objectives

After the lecture, students should be able to:

-Describe the different stages of development and congenital malformations of aortic arches.

- Describe the different stages of development and congenital malformations of vitelline& umbilical arteries.

- Describe the different stages of development and congenital malformations of venous system.

- Describe course, relations and branches of aorta, pulmonary trunk, superior vena cava and inferior and azygos venous system.

- Interpret some clinical findings in relation to developmental basis.

Lecture (24)

The structure of the Blood vessels

Learning objectives

After the lecture, students should be able to:

-Describe the microscopic appearance of general structure of blood vessels.

- Recognize the different parts of the blood vessel wall.

- Discuss the normal structure of endothelial cells.

- List the types of arteries and veins.

- Compare between different types of arteries and veins.

- Compare between different layers of arterial walls and the corresponding one of the venous wall.
- Interpret histological facts with clinical applications (atherosclerosis, phlebitis, arterial aneurysm, and varicose veins)

Lecture (25)

The structure of the blood capillaries, specialized arteries and sensory structures of blood vessels

Learning objectives

After the lecture, students should be able to:

-Describe the general structure of blood capillaries.
- Mention different types of blood capillaries (Continuous,fenestrated, and sinusoidal capillaries).
- Recognize the different types of special arteries.
- Discuss the normal sensory structure of blood vessels (carotid sinuses& carotid and aortic bodies).
-Compare between different three types of blood capillaries
-How the structure of the blood capillaries adapt its functions
- How the structure of the different special arteries adapt their functions
-Interpret histological facts with clinical applications, (coronary atherosclerosis, edema)

Lecture (26)

Haemodynamics

Learning objectives

After the lecture, students should be able to:

-Define blood flow, mention factors determining blood flow (resistance) through the blood vessel, and describe the physical characters of blood flow, mechanism of murmurs.
- Determine relationships between pressure, resistance and flow.
- Describe different mechanisms involved in blood flow regulation.

Lecture (27)

Blood pressure and flow in the arteries and Arterioles

Learning objectives

After the lecture, students should be able to:

-Describe innervation of blood vessels, vasomotor tone, its mechanism, factors influence the diameter of arterioles.

- Describe arterial blood pressure (physiological variations, factors determine ABP, renin angiotensin system), know the arterial blood pressure control mechanisms (rapidly acting, intermediate, and long-term mechanisms, describe different types, mechanism and pathophysiology of hypertension.

Lecture (28)

Regulation of the vasculature by the endothelium

Learning objectives

After the lecture, students should be able to:

- Describe Endothelium-derived relaxing factors and Endothelium-derived constricting factors.

-Describe other factors affecting vascular tone.

Lecture (29)

Atherosclerosis

Learning objectives

After the lecture, students should be able to:

- Define the term atherosclerosis and list the risk factors for its development and mention its pathogenesis.

- Describe the morphological changes that occur in vessel wall in the various stages of development of atheroma.

-Outline the common complications of atheroma.

Lecture (30)
Hypertension

Learning objectives

After the lecture, students should be able to:

- Define systemic hypertension, enumerate its causes and mention its types.
- Describe the effects of systemic hypertension, particularly on the vessels, heart, kidney and brain and list causes of death in patients affected with systemic hypertension.
- Define secondary hypertension and list its causes.

Lecture (31)
Antihypertensive drugs

Learning objectives

After the lecture, students should be able to:

- Classify antihypertensive drugs and describes the mechanism and adverse effects of the commonly used drugs

Lecture (32)
Plasma lipoproteins and cholesterol (hyperlipidemia)

Learning objectives

After the lecture, students should be able to:

- Define and list different types of lipoproteins.
- Explain the rationale of plasma lipoproteins formation and describe their transport in blood.
- Describe the structure of cholesterol and list its sources, precursors, functions, and derivatives.
- Outlines the key types of dyslipoproteinemia, their common causes and complication.

Lecture (33)
Treatment of hyperlipidemia

Learning objectives

After the lecture, students should be able to:

-List the drugs used to treat hyperlipidemia and describe the indications and adverse effects of the used drugs.

Lecture (34)

The microcirculation and the venous system

Learning objectives

After the lecture, students should be able to:

-Describe capillary blood flow and pressure and factors affecting/regulating them, capillary fragility, pulsation. Illustrate how the water move across the capillary wall.

-demonstrate the mechanisms of pulmonary and systemic oedema.

- Define venous pressure, factors that influence it.

Lecture (35)

The coronary circulations and vascular smooth muscle excitation–contraction coupling

Learning objectives

After the lecture, students should be able to:

- Describe coronary blood flow and factors affecting it.

-Illustrate vascular smooth muscle excitation-contraction coupling, define constricting mechanisms and vasodilator mechanisms. Describe ischemic heart disease (character of pain, mechanism of pain, ECG changes).

Lecture (36)

Cardiac enzymes and other proteins markers

Learning objectives

After the lecture, students should be able to:

- List the main cardiac markers (SGOT, LDH, Troponin and CPK) and their isoenzymes.
- Explain the importance of these markers in diagnosis and monitoring of cardiac disease.
- Describe the test precautions in estimating SGOT, LDH, and CPK.

Lecture (37)

Ischemic heart disease

Learning objectives

After the lecture, students should be able to:

-List the risk factors for ischaemic heart disease and enumerate cause and effects of coronary occlusion.

- Discuss sites, macroscopic changes and relate these to histological changes of myocardial infarction.
- List the possible complications of myocardial infarction.

Lecture (38)

Drugs used to treat angina pectoris

Learning objectives

After the lecture, students should be able to:

- List the drugs used to treat angina pectoris and describe the pharmacology of the drugs used to treat angina.

- Describe the different collagen diseases affecting arteries and morphological changes that occurs in vessel wall in the various collagen diseases affecting arteries.

Lecture (39)

Vasculitis, aneurysm and varicose vein

Learning objectives

After the lecture, students should be able to:

- Describe the different collagen diseases affecting arteries and morphological changes that occurs in vessel wall in the various collagen diseases affecting arteries.
- Define aneurysm and outline simple classification.
- Define varicose veins and enumerates its common sites.

Lecture (40)

Shock and haemorrhage

Learning objectives

After the lecture, students should be able to:

- Describe haemorrhage and the compensatory reactions during haemorrhage (Immediate compensation, medium, long-term compensation).
-Describe circulatory shock (definition, classifications, mechanisms, and stages), types, mechanism, and stages of shock.

Lecture (41)

Cardiovascular reflexes and cardiovascular effects of exercise

Learning objectives

After the lecture, students should be able to:

-Describe the Intrinsic and extrinsic reflexes, central and autonomic control of CVS.

-Describe the effect of exercise and posture on CVS.

CVS-213 mid-block exam Blueprint			
	Title of lectures	**Department**	**End-block**
1.	**Anatomy of the mediastinum, pericardium and the heart.**	**Anatomy**	**2**
2	**Anatomy of the blood supply and nerve supply of the heart.**	**Anatomy**	2
3	**Basic structure of the heart**	**Histology**	**1**
4	**Electrophysiology of cardiac muscle and origin of the heartbeat**	**Physiology**	**2**
5	**Cardiac muscle excitation– contraction coupling**	**Physiology**	**1**
6	**Conduction system in the heart.**	**Physiology**	**2**
7	**The electrocardiogram**	**Physiology**	**1**
8	**ECG and arrhythmia**	**Physiology**	**2**
9	**Cardiac cycle**	**Physiology**	**1**
10	**Jugular curve and radial curve and heart sound**	**Physiology**	**1**
11	**Heart rate and cardiovascular reflexes**	**Physiology**	**1**
12	**Cardiac output and cardiac reserve**	**Physiology**	**2**
13	**Rheumatic fever**	**micro**	**1**
14	**Infective Endocarditis**	**micro**	**1**
15	**Viral Myocarditis**	**micro**	**1**
16	**Cardiac involvement with Parasitic infections**	**Para**	**1**
17	**Carditis**	**pathology**	**2**
18	**Valvular and congenital heart diseases**	**pathology**	**1**

19	Antiarrhythmic drugs	Pharmacology	2
20	Drugs used in the treatment of heart failure	Pharmacology	1
	Total		27

CVS-213 Final Exam Blueprint			
	Title of lectures	Department	Final exam
1.	Anatomy of the mediastinum, pericardium & the heart	Anatomy	1
2	Development and congenital anomalies of the heart	Anatomy	1
3	Anatomy of blood supply & nerve supply of the heart	Anatomy	1
4	The anatomy and development of the great vessels.	Anatomy	2
5	Basic structure of the heart	Histology	1
6	Blood vessels	Histology	1
7	The structure of the blood capillaries, specialized arteries and sensory structures of blood vessels	Histology	2
8	Electrophysiology of cardiac muscle & origin of the heartbeat	Physiology	1
9	Cardiac muscle excitation– contraction coupling	Physiology	1
10	Conduction system in the heart.	Physiology	1
11	The electrocardiogram	Physiology	1
12	ECG and arrhythmia	Physiology	1
13	Cardiac cycle	Physiology	2
14	Jugular curve and radial curve and heart sound	Physiology	1
15	Heart rate and cardiovascular reflexes	Physiology	1
16	Cardiac output and cardiac reserve	Physiology	1
17	Heart failure	Physiology	1
18	Hemodynamics	Physiology	1
19	Blood pressure and flow in the arteries and arterioles	Physiology	2
20	Regulation of the vasculature by the endothelium	Physiology	1
21	The microcirculation and the venous system	Physiology	1

22	The coronary Circulations and Vascular smooth muscle excitation– contraction coupling	Physiology	1
23	Shock and hemorrhage	Physiology	2
24	Cardiovascular reflexes & CV effects of exercise	Physiology	1

25	Rheumatic fever	Micro	1
26	Infective Endocarditis	Micro	1
27	Viral Myocarditis	Micro	1
28	Cardiac involvement with Parasitic infections	Para	1
29	Carditis	Pathology	1
30	Valvular and congenital heart diseases	Pathology	1
31	Atherosclerosis	Pathology	1
32	Hypertension	Pathology	1
33	Ischemic heart disease	Pathology	2
34	Vasculitis, aneurysm and varicose vein.	Pathology	1
35	Antiarrhythmic drugs	Pharmacology	1
36	Drugs used in the treatment of heart failure	Pharmacology	1
37	Antihypertensive drugs	Pharmacology	2
38	Treatment of hyperlipidemia	Pharmacology	2
39	Drugs used to treat angina pectoris	Pharmacology	2
40	Plasma lipoproteins and cholesterol (hyperlipidemia)	Biochemistry	3
41	Cardiac enzymes and other proteins markers.	Biochemistry	3
	Total		54

CVS-213 Practical exam Blueprint

	Title of Practical	Department	Marks
1	Practical skills in the anatomy of the heart (1)	Anatomy	3
2	Anatomy of the great vessels	Anatomy	3
3	Histology of the Heart and blood vessels.	Histology	3
4	Histology of the blood vessels	Histology	3
5	ECG Practical skills	Physiology	3
6	Abnormal ECG Practical skills	Physiology	3
7	Arterial pulsation and measurement of arterial blood pressure	Physiology	3
8	Lab Diagnosis of the Rheumatic Fever and infective Endocarditis	microbiology	4
9	Pathology of the CVS	Pathology	4
10	Prescriptions and drug samples for hypertension	Pharmacology	4
11	Prescriptions and drug samples for angina and CHF	Pharmacology	4
12	Lipid profile and cardiac biomarkers:	Biochemistry	3
	Total		40

Total Marks and hours – CVS 213 block

Lecture	Anatomy	Physiology	Biochemistry	Histology	Pathology	Pharmacolog	Parasitology	Microbiology	Total
Lecture (Hours)	8	21	4	3	8	7	1	3	55
Total Marks	9	32	6	5	10	11	2	6	81
Mid-Block	4	12	-	1	3	3	1	3	27
Final Block	5	20	6	4	7	8	1	3	54
Final mcq	5	7	-	4	7	-	1	3	27
Final written	-	13	6	-	-	8	-	-	27
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Final mcq	9	8	-	5	10	--	2	6	40
Final written	--	24	6	--	--	11	--	--	41

Practical

دور اول

Subject	Physiology	Pathology	Pharma	Anatomy	Histology	micro	Biochemistry	total
hours	8	4	4	6	4	2	2	30
marks	11	5	5	8	5	3	3	40

Practical
دور تاني

Subject	Physiology	Pathology	Pharma	Anatomy	Histology	micro	Biochemistry	total
hours	8	4	4	6	4	2	2	30
marks	14	7	7	11	7	4	4	54