Cardiovascular system

Course specifications

Code: CVS351
Title: Cardiovascular system
Year: Three
Level: Five
No of weeks: Nine

Type of educational unit: Longitudinal course ☐ Integrated block ☑

No of credit hours: 6 (4+1+1)
Pre-requisites for the course: HBI HBII PODI PODII
Course principle coordinator: DR.Tamer Shawky
Course support coordinator: DR. Riham Elfaoual
Members of the Coordinating Committee:

1- DR. Ahmed Morsy.
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3- **DR. Amal abdelhafez**
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Description

This module provides learning opportunities about the mechanisms of operation of the human cardiovascular system. Emphasis is placed on the integration of relevant principles from anatomy, physiology, biochemistry, pathology, pharmacology and microbiology with respect to the behavior of the normal circulation and its responses to the stress of injury and disease. Both expert-directed and student-directed methodologies will be employed in this module and a select set of clinical cases will be used to guide instruction. It also introduces the cardiovascular diseases in terms of their basic pathophysiologic mechanisms; to discuss chest pain and other clinical features in the context of specific diseases; to incorporate pertinent laboratory tests and ancillary studies into clinical problem solving; and to provide a solid background and understanding of the pharmacologic agents and non-pharmacologic interventions used to treat cardiovascular disorders.

Objectives

	NQF Learning Domains And Course Learning Outcomes	**Course Teaching Strategies**	**Course Assessment Methods**
1.0	**Knowledge**		
1.1	Explain the normal structure and function of the cardiovascular system. (SaudiMEDS-1.1)	Lectures & tutorials	Written examinations
1.2	Explain the biochemical, molecular and cellular mechanisms that are essential for maintaining body homeostasis. (SaudiMEDS-1.3)	Lectures & tutorials	Written examinations
1.3	Explain the pathogenesis of various diseases such as genetic, developmental, ischaemic, metabolic, toxic, infectious, autoimmune, neoplastic, degenerative, and traumatic factors, and the ways in which they affect the cardiovascular system. (SaudiMEDS-1.4)	Lectures & tutorials	Written examinations
1.4	Explain the principles of essential clinical	Lectures &	Written examinations

	investigations of patients with cardiovascular problems (SaudiMEDS-1.5)	tutorials	
1.5	Demonstrate a basic knowledge of the pharmacological principles of drugs relevant to clinical practice. (SaudiMEDS-1.6)	Lectures & tutorials	Written examinations
1.6	Describe and explain the basic aspects of common clinical presentations relevant to the cardiovascular system (SaudiMEDS-1.8)	Lectures & tutorials	Written examinations
1.7	Explain the facts and concepts relevant to common clinical conditions including their epidemiology, aetiology, pathophysiology, symptoms and signs, complications, investigations, management and prognosis. (SaudiMEDS-1.9)	Lectures & tutorials	Written examinations
1.8	Describe the principles of epidemiology of common diseases within a defined population and a systematic approach to screening to reduce the incidence and prevalence of those diseases. (SaudiMEDS-9.1)	Lectures & tutorials	Written examinations
1.9	Describe the embryology of the heart and blood vessels.	Lectures & tutorials	Written examinations
1.10	Describe the functions and outline the structure-function relationships of the heart and blood vessels.	Lectures & tutorials	Written examinations
1.12	Describe the important pathological processes which can affect the heart and blood vessels, including genetic abnormalities, ischemia, inflammation, neoplasia, autoimmune attack, and infection.	Lectures & tutorials	Written examinations
1.13	Describe the pathological changes (gross and Histopathological) and outline the impact of these changes on organ function, i.e., pathophysiology.	Lectures & tutorials	Written examinations
1.14	States the Socio, cultural and community issues related diseases of the cardiovascular system.	Lectures & tutorials	Written examinations
2.0	**Cognitive Skills**		
2.1	Discuss the role and impact of nutrition in health and disease.(SaudiMEDS-1.7)	Clinical & Practical sessions	Spotter examination
2.2	Demonstrate the importance of psychosocial, spiritual, religious, and cultural factors in patient management. (SaudiMEDS-6.1)	Clinical & Practical sessions	Spotter examination
2.3	Demonstrate reasoning skills to formulate and prioritize a differential diagnosis. (SaudiMEDS-4.1)	Clinical & Practical sessions	Spotter examination
2. 4	Critically analyze clinical data obtained through history, physical examination, and investigation. (SaudiMEDS-3.4)	Clinical & Practical sessions	Spotter examination
2.5	Depict the possible symptoms and signs of the clinical disorder.	Clinical & Practical sessions	Spotter examination
3.0	**Interpersonal Skills & Responsibility**		

3.1	Select and apply the most appropriate and cost effective diagnostic procedures. (SaudiMEDS- 6.2)	Clinical & Practical sessions	OSPE
3.2	Obtain an accurate and comprehensive medical history. (Saudi MEDS- 3.1)	Clinical & Practical sessions	OSPE
3.3	Perform a complete systematic physical examination. (Saudi MEDS- 3.2)	Clinical & Practical sessions	OSPE
4.0	**Communication, Information Technology, Numerical**		
4.1	List the common congenital and anatomical abnormalities of the heart and blood vessels and describe their dysfunctional consequences.	Seminars	
5.0	**Psychomotor**		
5.1	Manage appropriately patients with acute and chronic medical conditions. (Saudi MEDS- 6.3)	Practical session	OSPE

Content

Topics to be covered in this block:

- Cardiac Development, Structure and Electrophysiology
- Blood Pressure, Hypertension and Heart Failure
- Cardiac Infections and Valvular Defects
- Myocardial Perfusion and Ischemia (IHD/CAD)
- Myocardial and Pericardial disorders; and Community health issues
- General Organization of the CVS and heart
- The cardiac muscle and blood vessels
- Heart and mediastinum
- Developmental anatomy of the CVS.
- Developmental anomalies of the CVS
- Conduction system of the heart and ECG
- Heart pump and cardiac cycle
- Hemodynamics of CVS
- Cardiac output and Venous return
- Regulation of BP& Heart rate-I
- Regulation of BP& Heart rate-II
- Special Circulation
- The ECG
- Drug treatment of cardiovascular problems
- Acute coronary syndrome and heart failure.
- Rheumatic heart and neoplasm
- Diseases of Blood Vessels
- Cardiac enzymes and ischemic heart disease
- Dyslipidemias

Learning strategy

The block will utilize the student-centeredness, integration and the PBL approaches to maximize correlation, learning and retention of the learned knowledge, skills and attitudes. Lectures will be of the interactive type and as few as possible. Certain materials will be studied through practical sessions and some of the important issues related to the cardiovascular system will be learned through clinical scenarios.

Hours	Lecture	Tutorial (PBL)	SKILL LAB	Seminars	Practical session	Other	Total
Contact	9x5	4x2	22		3x2		81
Credit	4	1	1				6

Timetable

Week 1	**(Sunday 18-sept)**	**Registration**
Week 2	**(Sunday 25-sept)**	**An Introduction Cardiovascular System**
Type of activity	Code	Title of activity
Lecture 1	L1	Mediastinum and heart position
Lecture 2	L2	Blood vessels homeostasis Blood PH control
Lecture 3	L3	C.V.S receptors types, structure, function
Lecture 4	L4	Hormonal, neural and electrolytes affecting heart and blood vessels
Lecture 5	L5	Molecular targets for drugs acting in c.v.s
Skill Lab 1	SL 1	Heart delineation & surface anatomy of heart valves
Skill Lab 2	SL 2	Stethoscope parts &usage
Practical session 1	PS1	anatomy of the heart
Practical session 2	PS2	Histology of the of heart

Week 3	**Sunday 2-OCT**	**coronary blood flow and ischemic heart 1**
Type of activity	Code	Title of activity
Lecture 1	L6	External features of the heart and its blood supply Cardiac imaging and coronary angiography
Lecture 2	L7	Medium sized arteries microstructure
Lecture 3	L8	Heart wall histology
Lecture 4	L9	Cardiac cycle phases
Lecture 5	L10	Coronary circulation
PBL1	PBL 1	Case 1: chest pain (brain storming)
Skill lab 1	SL 3	History taking
Skill lab 2	SL 4	Heart inspection and palpation
Practical session 1	PS 3	Interpretation of cardiac enzymes

Week 4	**Sunday 9-OCT**	**coronary blood flow and ischemic heart 2**
Type of activity	Code	Title of activity
Lecture 1	L11	Types of lipoproteins electrophoresis and dyslipidemia Biochemical basis of atherosclerosis and cardiac enzymes
Lecture 2	L12	Pathology of angina and cardiac infarction
Lecture 3	L13	Treatment of IHD
Lecture 4	L14	Treatment of IHD
Lecture 5	L15	Clinical features and diagnostic investigations of IHD
PBL1	PBL2	Reporting of case 1 CHEST PAIN
Skill lab 1	SL 5	C.V.S HISTORY TAKING
Skill lab 2	SL 6	Heart percussion and auscultation
Practical session 2	PS 4	Histopathology of I.H.D

Week 5	**Sunday 16-OCT**	C.V.S development and congenital defects

Type of activity	Code	Title of activity
Lecture 1	L16	Internal structure of the heart Developmental anatomy of the heart
Lecture 2	L17	Normal and abnormal heart sounds (murmur)
Lecture 3	L18	Pathophysiology of congenital heart defects
Lecture 4	L19	Pathophysiology of congenital heart defects
Lecture 5	L20	Clinical features of congenital heart defects
PBL1	PBL3	Brain storming of case 2: RUMBLING
Skill lab1	SL 7	Normal heart sounds simulation
Skill lab 2	SL 8	Systolic murmur simulation
Skill lab 3	SL 9	Diastolic murmur simulation

Week 6	**Sunday 23-OCT**	Rheumatic Heart
Type of activity	Code	Title of activity
Lecture 1	L21	Anatomy of heart valves
Lecture 2	L22	Endocardial histology
Lecture 3	L23	Cross reactivity (streptococcus pyogenus) and endocarditis
Lecture 4	L24	Pathology of degenerative heart disease Pathology of endocarditis
Lecture 5	L25	Prophylaxis and drug therapy of rheumatic heart diseases
PBL1	PBL4	Reporting of case 2 rumbling
Skill lab 1	SL 10	Arterial pulse and heart rate
Skill lab 2	SL 11	Arterial pulse and heart rate
Practical session 2	PS5	Histopathology of rheumatic fever

Week 7	**Sunday 30-OCT**	Heart Failure
Type of activity	Code	Title of activity
Lecture 1	L26	Cardiac excitability and automaticity
Lecture 2	L27	Cardiac contractility
Lecture 3	L28	Cardiac output physiology
Lecture 4	L29	Pathophysiology and clinical features of heart failure
Lecture 5	L30	Drug therapy of heart failure
PBL1	PBL5	Brain storming of case 3: EXCITEMENT
Skill lab 1	SL 12	Arterial (aortic) pressure wave interpretation
Skill lab 2	SL 13	Atrial pressure wave
Skill lab 3	SL 14	Venous (jugular) pressure wave interpretation

Week 8	**Sunday 6-NOV**	Heart conduction and Arrhythmia
Type of activity	Code	Title of activity
Lecture 1	L31	Conductive system and fibrous skeleton of the heart
Lecture 2	L32	Normal and abnormal heart rhythm
Lecture 3	L33	Normal ECG Abnormal ECG
Lecture 4	L34	Antiarrhythmic drugs
Lecture 5	L35	Antiarrhythmic drugs
PBL1	PBL6	REPORTING CASE 3 EXCITEMENT

Skill lab 1	SL 15	Limb and chest leads
Skill lab 2	SL 16	NORMAL ECG
Skill lab 3	SL 17	ABNORMAL ECG

Week 9 Sunday 13-NOV Mid-Semester vacation		
Week 10 Sunday 20-NOV peripheral blood vessels 1		
Type of activity	Code	Title of activity
Lecture 1	L36	Major arteries and veins
Lecture 2	L37	Histology of the blood vessels
Lecture 3	L38	Blood flow and tissue perfusion
Lecture 4	L39	Blood pressure and its control
Lecture 5	L40	Pathology of Hypertension and its complications
PBL1	PBL7	REPORTING case 4 fainting
Skill lab 1	SL 18	Parts of the sphygmomanometer
Skill lab 2	SL 19	How to use sphygmomanometer
Skill lab 3	SL 20	Kortokoff sounds

Week 11 Sunday 27-NOV peripheral blood vessels 2		
Type of activity	Code	Title of activity
Lecture 1	L41	Pathology of atherosclerosis
Lecture 2	L42	Pathology of aneurysm and aortic dissection
Lecture 3	L43	Treatment of hypertension
Lecture 4	L44	Revision
Lecture 5	L45	Revision
PBL1	PBL 8	Reporting of case 4 fainting
Skill lab 1	SL 21	Measuring blood pressure
Skill lab 2	SL 22	Measuring blood pressure
Practical session 1	PS 6	Histopathology of lymphadenitis, and lymphoma
WEEK 12 Sunday 4-DEC Final written exam		

Assessment strategy

Assessment of students will employ a battery of assessment tools that are fit-for-purpose and reliable. Knowledge will be assessed through MCQ-type written exam and computer-based spotter exam. These will be conducted at the middle of the block & at its end. In addition to the mid-block written exam, continuous assessment will be done through the evaluation of performance in PBL sessions and through assignments.

Schedule of assessment tasks for students during the course			
	Assessment task	Week Due	% of Total Assessment
1	PBL evaluation	All weeks	10%
2	Midterm Exam	Week 4	20%
3	PSW	All weeks	10%
4	Spotter exam	End of block	10%
5	Final Written Exam	End of block	40%
6	OSPE/OSCE	End of block	10%

Recommended reading

- Clinical Anatomy for medical students by Snell R, 7th Edition.
- Textbook of Medical Physiology by Guyton & Hall, 12th Edition.
- Lippincott's Illustrated Reviews: Biochemistry by Champ & Harvey, 4th Edition.
- Lippincott's Illustrated Reviews: Pharmacology by Finkel & Clark, 4th Edition.
- Basic Pathology by Kumar & Robbins, 8th Edition.
- Pathologic basis of disease by Robbins and Cotran, 8th Edition.
- Macleod's Clinical Examination by Douglas, Nicol & Robertson, 12th Edition.
- Clinical Medicine by Kumar & Clark, 6th Edition.
- Dale Dubin. Rapid interpretation of EKG, 6th Edition.
- Hampton JR. The ECG in Practice, 4th Edition.
- Ganong W.F. Review of Medical Physiology, 23rd Edition
- Murray, Granner, Mayes and Rodwell. Harper's Illustrated Biochemistry, 28th Edition.
- Katzung B.G. Basic and Clinical Pharmacology, 11th Edition.
- Keith L. Moore & Anne M.R. Agur. Essential Clinical Anatomy, 3rd Edition.
- Review of Pharmacology

Recommended electronic resources

- http://www.americanheart.org
- www.cdc.gov/heartdisease
- www.usfca.edu/fac-staff/ritter/ekg
- http://www.ecglibrary.com/ecghome.html