

## Course Syllabus

1	Course title	Cardiovascular system	
2	Course number	0500331	
3	Credit hours	4 Theory	1 Practical
	Contact hours (theory, practical)	61 Lectures and 9 Labs	
4	Prerequisites/corequisites	--	
5	Program title	Doctor of Medicine	
6	Program code	05	
7	Awarding institution	The University of Jordan	
8	School	School of Medicine	
9	Department	Anatomy & Histology, Physiology, Pathology, Microbiology, Pharmacology, Surgery, and Internal medicine.	
10	Course level	Bachelor	
11	Year of study and semester (s)	Third year/ First Semester	
12	Other department (s) involved in teaching the course	-	
13	Main teaching language	English	
14	Delivery method	<input type="checkbox"/> Face to face learning <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Fully online	
15	Online platforms(s)	<input type="checkbox"/> Moodle <input checked="" type="checkbox"/> Microsoft Teams <input type="checkbox"/> Skype <input type="checkbox"/> Zoom <input type="checkbox"/> Others.....	
16	Issuing/Revision Date	7/11/2023	

**17. Course Coordinator:**

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### 18. Other instructors:

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5	<b>Dr. Nader Araidah</b>	011	Tuesday 10.00 am-16.00 pm	00962778145784	<a href="mailto:n.alaridah@ju.edu.jo">n.alaridah@ju.edu.jo</a>
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9	<b>Dr. Tamara Al-Qudah</b>	Physiology lab	Thursday 9.00 am-12.00 pm		<a href="mailto:tamara.alqudah@ju.edu.jo">tamara.alqudah@ju.edu.jo</a>



## 19. Course Description and Aims:

### A- Course Description:

This course covers the study of the cardiovascular system from the standpoints of anatomic and histologic structure of heart, veins, arteries and capillaries, functions of the cardiovascular system including the physiology of the heart, membrane properties, heart contractility and its mechanisms, electrical conduction and electrocardiography, heart as a pump and cardiac cycle, blood flow and its disorders, cardiac output, blood pressure regulation, cardiac effort, circulatory disorders, heart failure, and cardiac enzymes and their relationship to myo-cardiac infarction. It also covers diseases of the heart and blood vessels including infections, atherosclerosis, hypertension, ischemic heart diseases, congenital heart diseases and treatment of cardiovascular diseases. The course includes also studying the clinical aspects of the cardiovascular system including signs, symptoms, and disease presentation. Experienced people are invited to give lectures or a variety of interactive activities.

### B- Aims:

The aim of this course is to introduce medical students to basic knowledge of the cardiovascular system in the human being. Students will learn about the normal structure and function of the cardiovascular system in Anatomy, Histology, and Physiology lectures. In addition, students will learn about common pathologic conditions affecting the cardiovascular system, and the pharmacologic therapies targeting these conditions. By the end of the course, students will be introduced to different clinical scenarios discussed with cardiovascular specialists and surgeons.

## 20. Program Intended Learning Outcomes (PLOs) (To be used in designing the matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program):

1. Demonstrate basic knowledge of normal human structure and function at molecular, genetic, cellular, tissue, organ, system and whole-body levels in terms of growth, development, and health maintenance. Analyze the basic molecular and cellular mechanisms involved in the causation and treatment of human disease and their influence on clinical presentation and therapy.
2. Collect, interpret, document, and communicate accurately a comprehensive medical history, including the psychological and behavioral factors, and a thorough organ-system-specific physical examination inclusive of the mental status of the patient.

3. Integrate and communicate collected clinical information in the construction of appropriate diagnostic and therapeutic management strategies to identify life-threatening conditions ensuring prompt therapy, referral, and consultation with relevant disciplines and skillfully perform basic medical procedures for general practice on patients with common illness, acute and chronic, taking into account environmental, social, cultural and psychological factors.
4. Demonstrate in-depth knowledge of the epidemiology and biostatistics of common diseases, and analyze the impact of ethnicity, culture, socioeconomic factors and other social factors on health, disease and individual patient's health care.
5. Communicate effectively and professionally, both orally and in writing, with patients, their families, and with other healthcare providers utilizing information technology resources in his/her scholarly activities and professional development with the ability to teach others, and to understand and respect other healthcare professionals' roles, and apply the principles of multidisciplinary teamwork dynamics and collaboration.
6. Apply scientific methods including evidence –based approach to the medical practice including problem identification, data collection, hypothesis formulation, etc., and apply inductive reasoning to problem solving and ensure that clinical reasoning and decision making are guided by sound ethical principles.
7. Demonstrate knowledge of scientific research methods and ethical principles of clinical research and be able to write research proposals or research papers.
8. Demonstrate professionally the skills needed for Quality improvement, lifelong learning, and continuous medical education including the ability to identify and address personal strength and weakness, self-assess knowledge and performance, and develop a self-improvement plan.

**21. Intended Learning outcomes of the course (CLOs): Upon completion of the course, the student will be able to achieve the following intended learning outcomes:**

1. Apply knowledge of cardiovascular physiology to understand and explain the pathophysiology of cardiovascular disorders.
2. Apply anatomical understanding to interpret clinical findings, diagnostic imaging, and surgical interventions related to cardiovascular anatomy.
3. List the commonly used drugs in cardiovascular disorders, compare their mechanism of action, side effects, contraindications and clinical uses.
4. Describe the common pathogenic agents infecting human cardiovascular system.
5. Perform and illustrate cardiovascular assessments, including history taking, physical examination, and measuring blood pressure to evaluate cardiovascular function, as well as interpreting ECG data.

**22. The matrix linking the intended learning outcomes of the course with the intended learning outcomes of the program):**

Program ILOs ILOs of the course	CLO (1)	CLO (2)	CLO (3)	CLO (4)	CLO (5)
PLO (1)	✓	✓		✓	
PLO (2)					
PLO (3)			✓		
PLO (4)					
PLO (5)					
PLO (6)					✓
PLO (7)					
PLO (8)					

### 23. Topic Outline and Schedule:

Week	Lecture	Topic	Student Learning Outcome (SLO)	Descriptors <sup>***</sup>	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
1	1.1	Anatomy Superior mediastinum	-Know the blood supply of the thoracic wall -Define boundaries and subdivisions of the mediastinum -List the contents of superior of mediastinum -Discuss the relation between different structures of the superior mediastinum.	K K K K	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6
	1.2	Anatomy Middle and posterior mediastinum	Identify the contents and relation of posterior mediastinum	K	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6
	1.3	Histology Histology of CVS	-Know the histological structure of heart and different types of the blood vessels	K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A1,2, B3-6
	1.4	Anatomy lab Mediastinum	-Know the blood supply of the thoracic wall -Define boundaries and subdivisions of the mediastinum -List the contents of superior of mediastinum -Discuss the relation between different structures of the superior mediastinum -Identify the contents and relation of posterior mediastinum	K K K K	Face to face		Synchronous Lecturing	Lab midterm written exam + Attendance and participation	28 A1,2, B3-6
	1.5	Cardiac Physiology	-List in sequence the anatomic structures through which blood passes in making a	K	Face to face		Synchronous Lecturing	Written exam	28 A3

		complete circuit of the system. -Compare between systemic circulation and pulmonary circulation in terms of vascular resistance. -Integrate the connection between heart disease and lung disease (corepulmonale).	C C						
1.6	Cardiac Physiology	-Understand the importance of epicardium and its composition especially with Frank-Starling law of the heart. -Delineate cardiac muscle energy sources. -Describe structural differences in the various vessels through which blood circulates. -Name the four cardiac valves and explain the function of each.	K K K K	Face to face		Synchronous Lecturing	Written exam	28 A3	
1.7	Pathology Thrombosis	-Understand the concept of pathological thrombosis and remember factors contributing to its development. -Apply the Virchow's triad factors to identify many potential causes of pathological thrombosis -Interpret the possible fates and clinical consequences of pathological thrombosis	K C C	Face to face		Synchronous Lecturing	Written exam	28 A5	
1.8	Pathology Embolism/ infarction	-Understand the definition of embolism, including the types according to composition and side of circulation -Apply clinical scenarios for the different types of emboli, focusing on the pathogenesis, symptoms, and potential clinical consequences -Understand infarction, and recognize types according to the nature of vascular occlusion and presence or absence of accompanying infection	K C K	Face to face		Synchronous Lecturing	Written exam	28 A5	
1.9	Pathology Veins/ lymphatics	-Understand what are varicose veins and risk factors	K K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/	28 A5	



Week	Lecture	Topic	Student Learning Outcome (SLO)	Descriptors	Learning Methods (Face to Face/Blended/Early)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources
			-Understand the concept of venous thrombophlebitis. - apply understanding in recognizing important clinical patterns like DVT, superior vena cava syndrome. -Recognize lymphedema, lymphangitis, lymphadenitis, and chylous and understand the difference between these disorders and their causes	C K				Discussion session	
	1.10	Pharmacology			Face to face		Synchronous Lecturing	Written exam	28 A6
	1.11	Pharmacology			Face to face		Synchronous Lecturing	Written exam	28 A6
	1.12	Pharmacology			blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A6
2	2.1	Anatomy Pericardium	-Recognize the parts of pericardium and its blood and nerve supply -Identify the different pericardial sinuses -Compare between pericardial and heart pain	K K C	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6
	2.2	Anatomy External heart morphology	List heart borders ,surfaces and sulci	K	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6
	2.3	Anatomy Heart chambers	-Know the different heart chambers -Describe the internal structures of the heart chambers	K K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A1,2, B3-6
	2.4	Anatomy lab External heart morphology	-Show heart borders, surfaces and sulci	S	Face to face		Synchronous Lecturing	Lab written exam/ attendance and participation	28 A1,2, B3-6
	2.5	Cardiac Physiology	-Compare and contrast between cardiac muscle and skeletal muscle fibers: Phases of AP, mitochondrial content, sarcolemma and ion channels, T-Tubules, SR, automaticity, size of myocyte, role of Ca <sup>++</sup> , prone to tetanization, syncytium, gap junction,	C	Face to face		Synchronous Lecturing	Written exam	28 A3

		contractile proteins, regulatory proteins, etc. -Draw the sarcomere of a cardiac muscle cell and identify the normal operating sarcomere length (lrest versus lmax).	S					
2.6	Cardiac Physiology	<p>-Identify the low-resistance pathways between cardiac muscle cells.</p> <p>- Illustrate the key features of the cardiac action potential and describe the ionic events that underlie its behavior.</p> <p>-Draw and label an action potential from a ventricular myocardial cell.</p> <p>-Describe changes in the conductance of various ions involved in the generation of a “fast and slow” type action potential.</p> <p>-Suggest the proper equation in calculating RMP.</p> <p>-Predict the type of AP based on RMP and its importance.</p> <p>- Implement mathematical equations in physiological concepts (Nerst equation). Use equilibrium potential and conductances to calculate RMP.</p> <p>-Use Nerst equation and chord conductance equation to predict RMP</p> <p>-Calculate <math>E_{Na^{+}}</math>, <math>E_{K^{+}}</math>, <math>E_{Cl^{-}}</math>, <math>E_{Ca^{++}}</math></p> <p>-Calculate RMP using relative permeability and conductance. Using chord conductance equation to do so.</p> <p>-Diagram the steps in the excitation-contraction coupling mechanism in cardiac muscle and compare with skeletal muscle.</p>	<p>K</p> <p>K</p> <p>S</p> <p>K</p> <p>C</p> <p>C</p> <p>C</p> <p>C</p> <p>S</p> <p>S</p> <p>S</p>	Face to face	Synchronous Lecturing	Written exam	28 A3	

Week	Lecture	Topic	Student Learning Outcome (SLO)	Descriptors	Learning Methods (Face to Face/Blended/Full)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources																											
2.7	Physiology lab		-Demonstrate the location of limb leads and chest leads. -Calculate the HR from the ECG. -Calculate the mean electrical axis of the QRS complex. Use at least three ways to make those calculations. -Communicate with classmates and teachers verbally and in writing.	S	Face to face		Synchronous Lecturing	Lab written exam/ attendance and participation	28 A3,4																											
				S																																
				S																																
				C																																
				2.8						Pathology Arteriosclerosis		-Recognize the different patterns of arteriosclerosis and their clinical significance -Understand the pathogenesis of atherosclerosis including risk factors, and its histological features	K	Face to face		Synchronous Lecturing	Written exam	28 A5																		
													K																							
													2.9						Pathology Hypertensive vascular disease		-Recognize hypertensive vascular diseases like arteriosclerosis and differentiate causes and histological patterns	K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A5									
																						S														
2.10	Pathology Aneurysms/ dissection		-Define aneurysms, recognize types, causes, and apply to different clinical scenarios -Define arterial dissections, recognize types, causes, and apply to different clinical scenarios		K	Face to face		Synchronous Lecturing	Written exam													28 A5														
					K																															
					2.11																							Pharmacology				Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A6
				2.12						Pharmacology					Face to face		Synchronous Lecturing	Written exam													28 A6					
													2.13	Pharmacology									Face to face		Synchronous Lecturing	Written exam	28 A6									
3	3.1	Anatomy Heart innervation and surface anatomy	-Identify the nerve supply of the heart and how the cardiac pain impulses reach consciousness -Describe the conductive system of the heart			K	Face to face		Synchronous Lecturing												Written exam	28 A1,2, B3-6														
						K																														
					S																															

			-Illustrate the surface anatomy of the heart and the sites of auscultation.						
3.2	Anatomy Heart valves and blood supply		-Define different heart valves -Recognize the mechanism of heart valves -Know the heart blood supply -Apply the knowledge of heart bloods supply to know the location of myocardial infarction	K K K C	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ Discussion session	28 A1,2, B3-6
3.3	Cardiac physiology		- List the characteristics of 'fast' and 'slow' type action potentials. -Define a pacemaker potential and explain how the autonomic nervous system can alter the heart rate. -Describe the normal pathway for excitation of the heart and explain the electrical events associated with transmission of the excitation process. -Include the mechanism responsible for slow transmission through the AV node. -Understand the electrical conduction pathway in the heart.	K K K K K	Face to face		Synchronous Lecturing	Written exam	28 A3
3.4	Cardiac physiology		-Explain the cardiac mechanism responsible for each of the deflections in a typical normal electrocardiogram -Predict the deflection produced in the standard and unipolar limb leads when given the magnitude and orientation of an instantaneous cardiac vector -Predict the logic behind making the conventional connection in the limb leads. -Identify normal and uncomplicated abnormal cardiac mechanisms from the electrocardiogram, -Explain why a bundle branch block may cause a shift in the electrical axis of the heart.	K C C K C	Face to face		Synchronous Lecturing	Written exam	28 A3

Week	Lecture	Topic	Student Learning Outcome (SLO)	Descriptors **	Learning Methods (Face to Face/Blended/ Fully Online)	Platform	Synchronous / Asynchronous Lecturing	Evaluation Methods	Resources	
	3.5	Pathology CVS tumors	Recognize some of the most frequent types of cardiac and vascular tumors.	K		Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities, assignments, and discussion sessions	28 A5
	3.6	Pharmacology				Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments	28 A6
	3.7	Physiology lab	<ul style="list-style-type: none"> <li>-Change the position of electrical leads to analyze the different ECG waves.</li> <li>-Change the speed of the ECG machine and interpret the results</li> <li>-Work with others in a team.</li> <li>-Develop the capacity of life-long self-learning.</li> <li>-Draw and correctly identify the polarity of each of the leads in the hex-axial lead system</li> <li>-Define the mean electrical axis of the heart and list two factors that May cause axis deviation.</li> </ul>	<ul style="list-style-type: none"> <li>C</li> <li>C</li> <li>C</li> <li>C</li> <li>S</li> <li>K</li> </ul>	Face to face		Synchronous Lecturing	Lab written exam/ attendance and participation	28 A3,4	
4	4.1	Anatomy Development of the heart 1	<ul style="list-style-type: none"> <li>-Know the embryological origin of the heart and formation of heart tube</li> <li>-List The parts of primitive heart.</li> <li>-Consolidate the common congenital heart diseases with their clinical presentation and signs</li> <li>-Explain the complication of the congenital heart diseases</li> </ul>	<ul style="list-style-type: none"> <li>K</li> <li>K</li> <li>C</li> <li>K</li> </ul>	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6	
	4.2	Anatomy Development of the heart 2	<ul style="list-style-type: none"> <li>-Prescribe development of atria and ventricles</li> <li>-Describe The process of the internal septum development</li> <li>-Demonstrate the common congenital heart diseases with their clinical presentation and signs</li> <li>-Explain the complication of the congenital heart diseases</li> </ul>	<ul style="list-style-type: none"> <li>C</li> <li>K</li> <li>C</li> <li>K</li> </ul>	Face to face		Synchronous Lecturing	Written exam	28 A1,2, B3-6	
	4.3	Anatomy lab Heart chambers	-Know the different heart chambers	K	Face to face		Synchronous Lecturing	Lab written exam/	28 A1,2, B3-6	

		-Describe the internal structures of the heart chambers	K				attendance and participation	
4.4	Cardiac physiology	-Differentiate between high voltage ECG and low voltage ECG. -Identify three causes of high voltage ECG -Identify three causes of low voltage ECG -Draw Einthoven triangle. -Identify Einthoven law. -Using an ECG, measure the different segments and intervals. PR Interval QRS Complex, QT Interval, ST Interval, ST Segment	K K K K	Face to face		Synchronous Lecturing	Written exam	28 A3
4.5	Cardiac physiology	-Identify and explain the mechanism responsible for producing each Variation. In the pressure pulse recorded from the heart chambers, the aorta, and pulmonary artery. -Identify normal heart sounds and describe the mechanisms responsible for their production. -Describe the function of the cardiac valves. -List the systolic, diastolic, and mean pressures in each of the cardiac chambers and in the great vessels carrying blood to and from the heart, -Diagram the temporal relationship between pressure and volume changes during a single heart beat. -Explain how both mitral stenosis and left ventricular failure may lead to pulmonary edema. -Predict all information you can gain from the PV loop.	K K K K K C	Face to face		Synchronous Lecturing	Written exam	28 A3
4.6	Vascular physiology Vascular hemodynamics 1	-Identify the distribution of blood flow in the systemic circulation to different organs. -Know the hemodynamic principles for blood flow and the factors affecting blood flow.	C K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A3,4
4.7	Vascular physiology Vascular hemodynamics 2	-Contrast the different parameters of arterial blood pressure (SBP, DBP, PP, MAP).	C	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A3,4

			-Apply the above knowledge in different clinical scenarios.	C					
4.8	Vascular physiology Arteries		-Relate the functions of arteries and how structure serves function. -Understand the pathophysiological mechanisms of arterial stiffness. -Evaluate the physiology underlying changes in blood pressure across different segments in the circulation. -Apply the above knowledge in different clinical scenarios.	C K C	Face to face		Synchronous Lecturing	Written exam	28 A3,4
4.9	Vascular physiology Arteries, blood pressure		-Understand the pathophysiological mechanisms of arterial stiffness.  -Recognize changes in pulse pressure contour in different pathological conditions compared to normal.  -Apply the above knowledge in different clinical scenarios.	K K C	Face to face		Synchronous Lecturing	Written exam	28 A3,4
4.10	Physiology lab		-Interpret ECG in cardiac ischemia and electrolytes disturbances. -Differentiate between heart bundle branch block and ventricular hypertrophy using ECG.	C C	Face to face		Synchronous Lecturing	Lab written exam/ attendance and participation	28 A3,4
4.11	Pathology IHD-1		Understand the concept of IHD, including clinical forms, causes, and diagnosis	K	Face to face		Synchronous Lecturing	Written exam	28 A5
4.12	Pathology IHD-2		Understand acute myocardial infarction including definition, histological features, and potential complications.	K	Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A5
4.13	Pathology Valvular disease 1		-Recognize the definition of valve stenosis and regurgitation. Apply different clinical scenarios to interpret possible clinical consequences. -Understand Rheumatic fever, including pathogenesis, clinical phases, diagnostic criteria, and histological findings	K K	Face to face		Synchronous Lecturing	Written exam	28 A5

Week	lecture	topic	SLOs	Descriptors	Learning method	platform	Synchronous/Asynchronous Lecturing	Evaluation methods	Resources
	4.14	Pharmacology			Face to face		Synchronous Lecturing	Written exam	28 A6
	4.15	Pharmacology			Blended	Moodle	Asynchronous Lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A6
5	5.1	Anatomy Development of arteries	-Discuss the development of body arterial system -Demonstrate the common congenital heart diseases with their clinical presentation and signs -Explain the complication of the congenital heart diseases	K C K	Face to face		Synchronous	Written exam	28 A1,2, B3-6
	5.2	Anatomy Development of veins	-Describe the development of body venous system -Demonstrate the common congenital heart diseases with their clinical presentation and signs -Explain the complication of the congenital heart diseases	K C K	Blended	Moodle	Asynchronous	Written exam/ Online activities and assignments/ discussion sessions	28 A1,2, B3-6
	5.3	Anatomy lab Sheep heart dissection	-Identify heart borders, surfaces and sulci -Differentiate heart chambers -Describe the internal structures of the heart chambers -Define different heart valves -Recognize the mechanism of heart valves -Prescribe the heart blood supply	S C K K K S	Face to face		Synchronous	Written exam	28 A1,2, B3-6
	5.4	Cardiac physiology	-Define contractility. -Draw the length-tension relationship for cardiac muscle (Frank-Starling law of the heart) -Explain why decreased ventricular compliance may cause an increase in end diastolic pressure -Explain why an enlarged heart is less efficient than a normal heart in pumping blood -Explain why total pulmonary and systemic blood flow must be equal	K S K K K	Face to face		Synchronous	Written exam	28 A3



			over a time interval of 1 minute. -Understand what limits Q during exercise, Q might increase 5 times normal, and which factor contributes more in increasing Q: H.R or S.V	K						
5.5	Cardiac physiology		-Define: tachycardia, bradycardia, preload, and afterload -Describe the mechanisms our body uses to maintain the cardiac output according to our body needs. -Define the role of preload and afterload in determining stroke volume. -Understand Why athletic individuals have low resting heart rate. -Compare and contrast the two divisions of the autonomic nervous system; sympathetic and parasympathetic.	K K K K C	Face to face		Synchronous	Written exam	28 A3	
5.6	Vascular physiology Arterioles: neural and hormonal control of BP		-Understand the physiology of vascular smooth muscle contraction and the importance of vascular tone. -Relate the structure of the arteriole to its function. -Analyze the importance of arterioles to determine vascular resistance. -Understand the relationship between MAP, TPR, and CO.	K C C K	Blended	Moodle	Asynchronous lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A3,4	
5.7	Vascular physiology Arterioles: local control of blood flow		-Assess the local chemical and physical factors controlling blood flow to the tissues and the mechanism of action. -Understand the concept of vascular autoregulation. -Differentiate between acute and long-term control mechanisms of blood flow to the tissues. -Correlate the remodeling mechanisms to clinical situations that led to such remodeling.	C K C C	Face to face		Synchronous lecturing	Written exam	28 A3,4	
5.8	Vascular physiology		-Understand the process of exchange across the capillary wall for	K	Blended	Moodle	Asynchronous lecturing	Written exam/ Online activities and	28 A3,4	

		Capillaries and lymphatics	different substances, and the factors influencing bulk flow. -Correlate the relationship between velocity of blood flow and cross-sectional area of different vessels. -Evaluate the mechanisms controlling lymph transport within the lymphatic system.	C C				assignments/ discussion sessions	
	5.9	Pathology Valvular disease 2	Understand infective endocarditis, including pathogenesis, clinical phases, diagnostic criteria, and histological findings	K	Face to face		Synchronous lecturing	Written exam	28 A5
	5.10	Pharmacology			Face to face		Synchronous	Written exam	28 A6
	5.11	Microbiology Infective endocarditis	Describe the causative agents, diagnosis and treatment of infective Endocarditis.	K	Face to face		Synchronous	Written exam	28 A7
	5.12	Clinical cardiovascular surgery CABG	Understand the indications for CABG, and the factors determining how to choose a graft.	K	Face to face		Synchronous	Written exam	28 A9, B2
<b>w ee k</b>	<b>Lect ure</b>	<b>Topic</b>	<b>SLOs</b>	<b>Desc ript ors</b>	<b>Learning methods</b>	<b>Platform</b>	<b>Synchronous/ asynchronous lecturing</b>	<b>Evaluation methods</b>	<b>Resource s</b>
6	6.1	Histology lab practical histology and radiology of the heart	-Know the histological structure of heart and different types of the blood vessels -Identify the position of the cardiac chambers and their appearance of the chest radiograph.	K K	Face to face		Synchronous lecturing	Lab written exam/ attendance and participation	28 A1,2, B3-6
	6.2	Cardiac physiology	-Diagram the temporal relationship between pressure and volume changes during a single heart beat (cardiac cycle) -Identify the cardiac reserve and how it is calculated.	S K	Face to face		Synchronous	Written exam	28 A3
	6.3	Cardiac physiology	-Describe the role venous pressure plays in determining cardiac output. -Understand how tachycardia might affect filling time.	K K	Face to face		Synchronous	Written exam	28 A3
	6.4	Vascular physiology Veins	-Understand the physiology underlying considering veins as blood reservoir.	K C	Blended	Moodle	Asynchronous lecturing	Written exam/ Online activities and assignments/	28 A3,4

			-Differentiate between stressed and unstressed volume, and compliance in arteries vs veins. -Interpret the factors influencing venous return. -Apply the above knowledge to clinical scenarios.	C C				discussion sessions	
6.5	Clinical Cardiology: hypertension	-Understand the definition, etiology, classification, staging, diagnosis, and management of hypertension. -Integrate the clinical presentation, laboratory and imaging to apply it in the diagnosis of secondary hypertension.	K C	Blended	Moodle	Asynchronous lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A8	
6.6	Clinical Cardiology			Face to face		Synchronous lecturing	Written exam		
6.7	Microbiology Viral hemorrhagic fever	Understand the structure, characteristics and epidemiology of Viral hemorrhagic fever Viruses and the diseases associated with.	K	Face to face		Synchronous lecturing	Written exam	28 A7	
6.8	Microbiology Myocarditis	Identify the Pathogens associated with myocarditis: epidemiology diagnosis and treatment.	K	Blended	Moodle	Asynchronous lecturing	Written exam/ Online activities and assignments/ discussion sessions	28 A7	
** K: Knowledge, S: Skills, C: Competency									

## 24. Evaluation Methods:

Opportunities to demonstrate achievement of the SLOs are provided through the following assessment methods and requirements:

Evaluation Activity	Mark	Topic(s)	SLOs	Descriptors**	Period (Week)	Platform
Midterm written exam	40	Anatomy and Histology, physiology, pathology, pharmacology	1.1-1.3, 1.5-1.12, 2.1-2.3, 2.5-2.6, 2.8-2.13, 3.1-3.6	K S C	End of third week	Exambuilder
Lab midterm written exam	5	Anatomy and Histology, Pathology	1.4, 2.7	K S	End of third week	Exambuilder
Final written exam	40	Anatomy and Histology, Physiology, pathology, pharmacology, microbiology, clinical.	4.1-4.2, 4.4-4.9, 4.11-4.15, 5.1-5.2, 5.4-5.12, 6.2-6.8	K S C	End of sixth week	Exambuilder
Lab final written exam	10	Anatomy and Histology, Physiology	4.3, 4.10, 5.3, 6.1, 2.4, 3.7	K S C	End of sixth week	Exambuilder
Lab attendance and participation	5	Anatomy and Histology, Physiology	1.4, 2.4, 2.7, 3.7, 4.3, 4.10, 5.3, 6.1	S C	Throughout the course	QR code
Online activities	0	All blended topics		K S S	Throughout the course	Moodle

\*\* K: Knowledge, S: Skills, C: Competency

## 25. Course Requirements

**Students should have electronic device with internet connection, account on Moodle and MS Teams, and lab coat for practical sessions.**

## 26. Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- ✓ Class room Lectures
- ✓ Interactive Videos and Animations
- ✓ Online activities and assignments
- ✓ Laboratory sessions
- ✓ Discussion sessions and forums
- ✓ Game-based learning

## 27. Course Policies:

### A- Attendance policies:

Attendance will be monitored by the course coordinator. Attendance policies will be announced at the beginning of the course.

### B- Absences from exams and handing in assignments on time:

Will be managed according to the University of Jordan regulations. Refer to <http://registration.ju.edu.jo/Documents/daleel.pdf>

### C- Health and safety procedures:

Faculty Members and students must at all times, conform to Health and Safety rules and procedures.

### D- Honesty policy regarding cheating, plagiarism, misbehavior:

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this course and also integrity in your behavior in and out of the classroom. Students violate this policy would be subjected to disciplinary action according to University of Jordan disciplinary policies

### E- Grading policy:

Grade-point average, Rules are preset by the Faculty and Department Councils

### F- Available university services that support achievement in the course:

Availability of comfortable lecture halls, data show, internet service and E learning website <https://elearning.ju.edu.jo/> .

## 28. References:

### A- Required book (s), assigned reading and audio-visuals:

1. Gray's Anatomy for Students: 4<sup>th</sup> edition
2. Junqueira's Basic Histology, Text and Atlas by Anthony L. Mescher, 15<sup>th</sup> edition.
3. Guyton and Hall Textbook of Medical Physiology, 14<sup>th</sup> edition, John E. Hall.
4. Human Physiology: From Cells to Systems, 9th Edition, Lauralee Sherwood.
5. Robbins & Cotran Pathologic Basis of Disease, 11th edition, Kumar, Abbas, Aster.
6. Basic and Clinical Pharmacology, 13th edition, Katzung, Trevor.
7. Jawetz, Melnick & Adelberg's Microbiology.
8. ACC/ AHA guidelines on hypertension.
9. ESC/EACTS guidelines on myocardial revascularization.

### B- Recommended books, materials, and media:

1. Basic and Clinical Pharmacology, 13th edition, Katzung, Trevor
2. CABG: when, why, and how? George Dimeling, MD, et al. Cleveland clinic journal of Medicine, May 2021, 88 (5) 295-303.
3. Color Textbook of Histology, 3rd edition, Gartner and Hiatt.
4. Langman's Medical Embryology 14th Edition
5. Clinically Oriented Anatomy 7<sup>th</sup> edition, Keith Moore.
6. Links for anatomy and Histology:  
[https://youtube.com/playlist?list=PLIDhP5E2cVJ1L\\_wU3XWhlhbRB9XbaDLsu&feature=shared](https://youtube.com/playlist?list=PLIDhP5E2cVJ1L_wU3XWhlhbRB9XbaDLsu&feature=shared)  
<https://youtu.be/qpdEmSRlola?feature=shared>  
<https://www.youtube.com/watch?v=4YBXaWWG3Ns>  
<https://www.youtube.com/watch?v=hNAwT3QDM28>  
<https://pubmed.ncbi.nlm.nih.gov/31277792/>  
<https://youtu.be/5DIUk9IXUaI?feature=shared>  
<https://youtu.be/1BGUtiBp8k8?feature=shared>  
[https://youtu.be/DrgUSGvL\\_4Q?feature=shared](https://youtu.be/DrgUSGvL_4Q?feature=shared)  
<https://www.purposegames.com/game/the-mediastinum-1>  
<https://www.purposegames.com/game/2caa99ea>  
<https://www.purposegames.com/game/anatomy-of-the-human-heart-internal-structures-quiz>



## 29. Additional information:

Name of Course Coordinator: -----**Fatima Ryalat**----- Date:-----7-11-2023----- Signature: -----  
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Head of Department: ----- Signature: -----

Head of Curriculum Committee/Faculty: ----- Signature:

Dean:----- Signature: -----