In the name of God

Lesson Plan Form: Physiology of Heart

Course Name: Physiology of Heart | **Field and Educational Level: Doctor of General Medicine** | **Term: 2**

First Semester / Second Semester / Summer | **Day and Time of Holding: Depending on the Semester Schedule** | **Venue: Faculty of Medicine**

Number and Type of Credits (Theory/Practical): 0.6 / 0.125 | **Prerequisite Courses**: –

Instructor(s): Dr. Behnaz Mokhtari

Contact Number of the Faculty: 33364664

First Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Familiarization with the Physiology of Cardiac Muscle, Action Potential, and Excitation-Contraction Coupling

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: 1. Describe the physiological anatomy of cardiac muscle. 2. Explain how the action potential is generated. 3. Explain the stages of refractory periods in the heart. 4. Clarify the relationship between electrical stimulation and myocardial contraction (Excitation-contraction coupling). 5. Define the cardiac cycle and name its various phases.	Cognitive	Lecture and encourage students for greater participation	Active participation in class and engagement in discussion	Classroom	2 hours	Video projector (PowerPoint) and whiteboard	Final exam

Second Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Cardiac Cycle and Control of the Heart

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: **1. Describe the different stages of ventricular filling and ejection.** **2. Explain isovolumetric contraction and isovolumetric relaxation.** **3. Draw the pressure-volume loop of the heart and identify the phases of the cardiac cycle on it.** **4 Explain cardiac output and how the heart consumes energy.** **5. Identify the location and function of the heart valves and papillary muscles.** **6. Explain how heart sounds are generated and their relationship to the cardiac pumping action.** **7. Define cardiac output, end-systolic volume, and end-diastolic volume.** **8. Explain the intrinsic regulation of cardiac function (Frank-Starling mechanism).** **9. Describe the impact of the autonomic nervous system on cardiac performance.** **10. Discuss the relationship between preload, afterload, stroke volume, and cardiac output in both normal and pathological conditions.** **11. Explain the effects of various factors, such as ions and temperature changes, on cardiac function.**	**Cognitive**	**Lecture and encourage students for greater participation**	**Active participation in class and engagement in discussion**	**Classroom**	**2 hours**	**Video projector (PowerPoint) and whiteboard**	**Final exam**

Third Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Rhythmic Stimulation of the Heart

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: 1. List the components of the cardiac conduction system and explain how the impulse is transmitted throughout the entire cardiac muscle. 2. Describe the mechanism of self-excitation (pacemaker activity) in the sinoatrial node. 3. Explain the causes of ectopic pacemaker sites in the cardiac muscle.	Cognitive	Lecture and encourage students for greater participation	Active participation in class and engagement in discussion	Classroom	2 hours	Video projector (PowerPoint) and whiteboard	Final exam

Forth Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Normal electrocardiography (ECG)

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: 1. Identify the types of cardiac leads and their axes. 2. Compare the characteristics of waves, segments, and intervals in cardiac leads. 3. Familiarize themselves with the ECG recording device. 4. Understand the correct method for connecting the patient to the device.	Cognitive	Lecture and encourage students for greater participation	Active participation in class and engagement in discussion	Classroom	2 hours	Video projector (PowerPoint) and whiteboard	Final exam

Fifth Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Interpretation of ECG

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: 1. Understand how to calculate heart rate from an ECG. 2. Describe how to estimate the heart axis and interpret it using the ECG. 3. Identify atrial and ventricular hypertrophy from the ECG. 4. Become familiar with common heart blocks and identify them on an ECG. 5. Recognize ECG changes associated with myocardial infarction. 6. Identify miscellaneous factors that affect the ECG	Cognitive	Lecture and encourage students for greater participation	Active participation in class and engagement in discussion	Classroom	2 hours	Video projector (PowerPoint) and whiteboard	Final exam

Sixth Session - Instructor: Dr. Behnaz Mokhtari
General Objective: ECG recording (Practical Physiology)

Specific Objectives	Areas of Objectives	Instructor Activities	Student Activities	Learning Domain	Time	Educational Support Media	Evaluation Method
It is expected that by the end of the session, the student will be able to: 1. Understand the fundamentals of cardiac electrical activity 2. Know how and the stages of action potential propagation in atrial and ventricular muscles 3. Understand the natural depolarization and repolarization waves of the heart 4. Explain the timing and voltage of each wave 5. Be familiar with different types of leads 6. Know the ECG paper and its divisions 7. Understand the method for calibrating the ECG device 8. Correctly place the electrodes 9. Know the reason for using electrocardiographic gel 10. Draw an ECG of one of their peers with their group members 11. Calculate the heart rate 12. Identify and compare the PQ, QT, and QS intervals with normal values	Cognitive Skill-based	Lecture and hands-on work with the device, with a focus on student involvement	Active participation in class and involvement in practical work	Physiology laboratory	2 hours	Video projector (PowerPoint), whiteboard, and ECG recording device	Practical exam for procedural skills and descriptive questions, and MCQs for concepts

- **Policy of the Course Coordinator on Handling Student Absences and Tardiness:** Report to the Education Department
- **Student Evaluation and Grading Breakdown:**

  - **During the Course** (quizzes, assignments, exams, midterms, etc.): Mid-course assignments, grading weight: -----
  - **End of the Course:** MCQ and descriptive exams for theoretical knowledge, and practical exam, grading weight: -----

- **Main Textbook (Reference):** *Medical Physiology* by Guyton, latest edition.