

In the name of God

Lesson Plan Form: **Physiology of Blood Circulation**

Course Name: **Physiology of Blood Circulation**

First Semester / Second Semester / Summer

Number and Type of Credits (Theory/Practical): **1.2 / 0.1**

Field and Educational Level: **Doctor of General Medicine**

Day and Time of Holding: **Depending on the Semester Schedule**

Term: **2**

Venue: **Faculty of Medicine**

Instructor(s): **Dr. Behnaz Mokhtari**

Contact Number of the Faculty: **+984133364664**

First Session - Instructor: Dr. Behnaz Mokhtari

General Objective: General Circulation and the Physics of Blood Pressure, Flow, and Vascular Resistance

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 systemic and pulmonary circulation pathways. 2. Explain the branching and vascular structure from the aorta to the venae cavae, and discuss their differences. 3. Describe the interrelationships among vascular resistance, blood pressure, and blood flow using Ohm's law and Poiseuille's equation. 4. Explain the types of blood flow within the vascular system and describe how they can be distinguished from one another. 5. Explain the factors affecting blood viscosity and their influence on vascular resistance and blood flow in different vessels.	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: Vascular Compliance and Vascular Functions

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. Define vascular compliance and explain the difference between veins and arteries. 2. Describe the mechanism of delayed (stress-relaxation) compliance in blood vessels. 3. Calculate pulse pressure and mean arterial pressure, and discuss pulse pressure changes in different diseases. 4. Explain the methods used to measure blood pressure in humans. 5. Define central venous pressure and describe its effect on cardiac function. 6. Explain the factors affecting venous return to the heart.	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: Material Exchange and the Lymphatic System

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 structure of capillaries. 2. Explain capillary filtration. 3. List the factors affecting capillary filtration. 4. Describe Starling's equilibrium in capillary exchange and identify the factors contributing to edema formation. 5. Define the lymphatic system and name its constituent components. 6. List the functions of the lymphatic system.	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: Control of Blood Flow

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. Explain the local control of blood flow in tissues. 2. Describe the metabolic and myogenic mechanisms in the autoregulation of vascular blood flow. 3. Define reactive and active hyperemia. 4. Explain neural and hormonal control of blood flow. 5. List the vasoconstrictive and vasodilatory factors.	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: Control of Blood Pressure

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 factors affecting blood pressure and explain the effect of each. 2. Describe the role of the brain vasomotor center and the autonomic nervous system (sympathetic and parasympathetic) on vascular diameter and blood pressure. 3. Explain the role of the nervous system in rapid blood pressure control. 4. Describe blood pressure regulation via baroreceptors. 5. Explain blood pressure control through chemoreceptors. 6. Discuss the role of atrial and pulmonary artery reflexes in blood pressure regulation. 7. Describe the mechanism and importance of the central nervous system response to ischemia in blood pressure control. 8. Describe the components of the renin-angiotensin system and its role in blood pressure regulation. 9. Explain the role of the kidney in long-term control of extracellular fluid volume and blood pressure. 10. List the types of hypertension.	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: Regulation of Cardiac Output and Venous Return

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. Explain the role of the Frank–Starling mechanism in controlling cardiac output. 2. Describe the factors affecting the increase and decrease of the heart's pumping capacity. 3. Outline the role of the nervous system in regulating cardiac output. 4. Illustrate the effect of various factors on the cardiac output curve. 5. Define mean circulatory filling pressure. 6. Draw the venous return curve and explain the effect of different factors on it. 7. Write the formula for venous return.	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

Seventh Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Coronary Circulation

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 physiologic anatomy of the coronary vessels. 2. Compare the effect of cardiac activity on coronary blood flow in the right and left ventricles. 3. Explain the factors affecting coronary circulation. 4. Describe the chemical regulation of coronary blood flow. 5. Explain the neural regulation of coronary blood flow.	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

Eighth Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Blood flow to skeletal muscle and cardiac activity during muscular exercise

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. Explain the pattern of blood flow in skeletal muscle during muscle contraction. 2. Describe the regulation of skeletal muscle blood flow during activity. 3. Compare the effect of the sympathetic nervous system on skeletal muscle vessels at rest and during activity. 4. Discuss the importance of increased cardiac output and arterial pressure during muscular activity on muscle blood flow.	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

Ninth Session - Instructor: Dr. Behnaz Mokhtari

General Objective: Circulatory Shock

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. Explain the physiological causes of shock. 2. List the stages of shock development. 3. Describe the types of circulatory shock. 4. Outline the changes occurring in the heart and vascular system following circulatory shock. 5. Explain the physiological basis of shock treatment. 6. Describe circulatory arrest.	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

- **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: 2
 - **End of the Course:** MCQ and descriptive exams for theoretical knowledge, and practical exam, grading weight: 18
- **Main Textbook (Reference):** *Medical Physiology* by Guyton, latest edition.