

In the Name of God

Course Title and Code: Blood Physiology – Code 117

Program & Degree: Medicine – Doctor of Medicine (M.D.) Semester: First

Offered Semester: First and Second

Weekly Schedule: Saturday 12:00–14:00

Location: Faculty of Medicine

Number and Type of Credits (Theoretical / Practical): 0.4 (0.3 theory and 0.1 practical)

Theoretical Prerequisite Courses: None

Course Instructor: Dr. Elham Karimi-Sales

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Session 1

General Objective: Physiology of hematopoietic tissues and stages of blood formation, red blood cells, hemoglobin, and its role in gas transport.

Specific Objectives	Learning Domain	Instructor Activity	Student Activity	Learning Environment	Duration	Evaluation Method	Teaching Aids
At the end of this session, the student is expected to be able to: -Identify the components of blood and its plasma. -Describe the differences between plasma and serum. -Recognize the sites and cycle of red blood cell production. -Describe the process of hemoglobin synthesis and degradation. -Explain the role of erythropoietin, vitamin B12, and folic acid in red blood cell production and maturation. -Identify the types of anemia and describe their effects on the cardiovascular system. -Identify the types of polycythemia and describe their effects on the cardiovascular system.	Cognitive (Knowledge)	-Lecture with encouragement of student participation -Active participation and class discussion	Active participation	Classroom	90 minutes	Final exam MCQ	Video projector (PowerPoint) Whiteboard

Session 2

General Objective: White Blood Cells Physiology

Specific Objectives	Learning Domain	Instructor Activity	Student Activity	Learning Environment	Duration	Evaluation Method	Teaching Aids
At the end of this session, the student is expected to be able to: -Identify the types of white blood cells. -Describe the production sites, characteristics, and lifespan of white blood cells. -Identify the reticuloendothelial system. -Explain the defensive properties of neutrophils and macrophages. -Describe the mechanism of inflammation. -Recognize the function of basophils. -Recognize the function of eosinophils. -Define leukopenia and leukocytosis.	Cognitive (Knowledge)	-Lecture with encouragement of student participation -Active participation and class discussion	Active participation	Classroom	90 minutes	Final exam MCQ	Video projector (PowerPoint) Whiteboard

Session 3

General Objective: Platelets, Hemostasis, and Blood Coagulation

Specific Objectives	Learning Domain	Instructor Activity	Student Activity	Learning Environment	Duration	Evaluation Method	Teaching Aids
At the end of this session, the student is expected to be able to: -Understand the production, characteristics, and lifespan of platelets. -Describe the events of hemostasis (vascular spasm, platelet plug formation, and blood coagulation). -Explain the mechanism of blood coagulation (intrinsic and extrinsic pathways). -Identify conditions that cause excessive bleeding in humans (hemophilia and thrombocytopenia). -Recognize thromboembolic conditions in humans.	Cognitive (Knowledge)	-Lecture with encouragement of student participation -Active participation and class discussion	Active participation	Classroom	90 minutes	Final exam MCQ	Video projector (PowerPoint) Whiteboard

Session 1 – Practical Blood Physiology

General Objective: Determination of bleeding time, clotting time, and red blood cell membrane resistance

Specific Objectives	Learning Domain	Instructor Activity	Student Activity	Learning Environment	Duration	Evaluation Method	Teaching Aids
At the end of this session, the student is expected to be able to: -Understand the principle of the bleeding and clotting time tests. -Perform bleeding and clotting time tests in groups. -State the normal values for each test. -Explain the causes of increased or decreased test results. -Identify potential sources of error in measurement methods. -Describe the clinical applications of each test. -Understand the principle of the hemolysis test. -Perform the red cell membrane resistance test in groups. -Interpret test results.	-Cognitive (Knowledge) and Psychomotor	-Lecture with encouragement of student participation -practical work	-Active participation -Experimental performance calculations and	Physiology Laboratory	90 minutes	Practical exam for psychomotor domain; MCQ and written exam for cognitive domain	Video projector (PowerPoint) Whiteboard Required equipment for experiments

Session 2 – Practical Blood Physiology

General Objective: Determination of hematocrit, hemoglobin concentration, and erythrocyte sedimentation rate (ESR)

Specific Objectives	Learning Domain	Instructor Activity	Student Activity	Learning Environment	Duration	Evaluation Method	Teaching Aids
At the end of this session, the student is expected to be able to: -Identify the devices and equipment used in these experiments. -Explain the principles of each test. -State the normal values and measurement units for each test. -Describe the applications and clinical indications for each test. -Explain at least four causes for increased or decreased results in each test. -Learn the setup and operation of the spectrophotometer. -Perform hematocrit, hemoglobin, and ESR tests with group members. -Identify the components of Drabkin's reagent and explain its purpose.	-Cognitive (Knowledge) and Psychomotor	-Lecture with encouragement of student participation -practical work	-Active participation -Experimental performance calculations and	Physiology Laboratory	90 minutes	Practical exam for psychomotor domain; MCQ and written exam for cognitive domain	Video projector (PowerPoint) Whiteboard Required equipment for experiments

-Apply the necessary precautions when working with Drabkin's solution.							
-Understand the mechanism of action of the anticoagulant sodium citrate solution.							
-Interpret test results.							

Course Policies

- **Absence and Tardiness:** According to regulations, students cannot miss any session except for justified absences (up to 4/17 of total class hours).
- **Assessment and Grading:**
 - Theoretical exam: 18 points (MCQs); Practical exam: 2 points.
 - Additional points (beyond the total of 20) may be granted for regular attendance, active class participation, and completion of optional assignments.

References:

Theoretical Course:

- *Guyton and Hall Textbook of Medical Physiology* (latest edition)
- *Ganong's Review of Medical Physiology* (latest edition)

Practical Course:

- *Practical Physiology* (authored by the Department of Physiology faculty, available in the department laboratory)