

King Saud University
College of Science
Biochemistry Department

Course title and code: Blood Biochemistry (BCH 471)

Credit hours: 3 (2 + 1)

Objective: The students get important knowledge from this course about physical properties and functions of blood. Cellular and non-cellular components of blood. Structure and function of hemoglobin. Metabolism of erythrocytes and its abnormalities (e.g. jaundice). Types of anemia, biochemical basis of each. Types and functions of leucocytes. Coagulation and its interrelationship to platelets. Blood formation and its disorders. Types of plasma proteins and their variation in different diseases.

Reference Books:

- **Blood: Physiology and Pathophysiology.** Chris Pallister, Butterworth/Heinemann. 1994
- **Principles of Biochemistry: Mammalian Biochemistry.** Smith, E.L., R.L. Hill, I.R. Lehman, R.J. Lefkowitz, P. Handler, and A. White, 1983. Seventh edition. McGraw-Hill Book Company, Lond
- **Essential Hematology.** Victor A Hoffbrand, Paul Moss, J Pettit; Essentials Series Blackwell Science, New York; 2008

Topics	Contact hours
Introduction: Tissue Chemistry and Biological Fluid	1
Blood: Function of blood, general composition and physical properties of blood, blood components (Plasma, blood cells and blood cell counts). Hematocrit: erythrocyte sedimentation rate and its significance.	2
Blood plasma: Description, contents, functions and biosynthesis. Plasma proteins: types (albumin, α_1 , α_2 , β_1 , β_2 , γ -globulins and fibrinogen). Plasma enzymes and plasma lipoproteins. Plasma enzymes as an indicators of diseases	3
White blood cells: types, and structure, function and abnormalities, leukemia and other neoplasia.	2
Red blood cells: Erythrocytes, erythropoiesis, erythrocytes description in term of size, structure and content. Erythrocytes in membrane: structures, membrane in disease, erythrocytes metabolism, metabolic pathways and their roles for RBC. Importance of glutathione; G6PDH	5

deficiency and other enzyme deficiency and other enzyme deficiencies affecting red cell metabolism.	
Hemoglobin: structure and function allosteric protein. O ₂ binding and effect of different factors on oxygen binding, biosynthesis of hemoglobin and types of hemoglobin.	2
Erythrocyte hemolysis: Life span of RBC. Erythrocytes destruction. Heme degradation and bilirubin formation: conjugation and excretion of bilirubin. Jaundice and its types	2
Anemia: Erythrocytes abnormalities, definition and types. Acquired and genetic anemia; iron deficiency anemia; aplastic anemia; sickle cell anemia; thalassemia; polycythemia.	3
Blood groups: Description, types, and Rh Antigen. Blood transfusion in term of suitability of blood group	1
Platelets and blood Coagulation: introduction. Blood coagulation process. Formation of clot. Intrinsic pathway. Extrinsic pathway. Elimination of clot. Clotting that does not occur in vascular system Disorders of blood clotting. Vitamin K deficiency; hemophilia	4
Blood Laboratories Indices: Packed cell volume, ESR, MCH, MCHC and Hb	1

Assessment Tasks for Students During the Semester

Assessment task	Week Due	Marks
1 st continuous assessment	5	10
2 nd continuous assessment	10	15
Assignment and quizzes	Along the semester	5
Practical	Along the semester	30
Final exam	At end of the semester	40