Course Description Template

University Name: Warith Al-Anbiya

Faculty/Institute: Collage of medicine

Scientific Department: medical education /2nd stage.

Academic or Professional Program Name: Integration System/4th unit.

Final Certificate Name: .....

Academic System: Integration System

Description Preparation Date: 25/8/2025

File Completion Date: 25/8/2025

Signature:

Head of Branch: أ.م.د. ناظم [illegible]

Date: 27/8/2025

Signature:

Vice Dean for Scientific Affairs: Dr. Laith M. Abbas

Date: 28/8/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department: profesor Dr. Ali Al Mousawi

Date: 28.8.2025

Signature:

Dean's approval

الأستاذ الدكتور
علي عبد سعدون الغزي
عميد كلية الطب

Ministry of Higher Education and Scientific Research

Academic Program and Course Description Guide

2025

Course Description Form

1. Course Name:

Unit 4 Hematology unit

2. Course Code:

medu203

3. Semester / Year:

2025-2026

4. Description Preparation Date:

2025

5. Available Attendance Forms:

6. Number of Credit Hours (Total) / Number of Units (Total)

7. Course administrator's name (mention all, if more than one name)

Name: Dr. Sura Al -Shamma
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8. Course Objectives

At the end of this unit students should be able to:

1- Identify the main features of the haemopoietic system , the sites of haemopoiesis and the basic histology of the bone marrow ,spleen and the lymph nodes.
2- Understand the basic function of cellular blood elements and especially how they contribute to other systems of the body.
3- Understand the main mechanisms regulating the production of cellular blood elements and the consequences of excessive destruction of them.
4- Understand the different forms of anemia, their pathophysiology and laboratory investigation.
5- Be able to interpret in conjugate with clinical knowledge the results of laboratory investigations.
6- Understand the main forms of neoplasms involving the haemopoietic system and their main features.
7- Understand the concept of the coagulation system and the procoagulant and the anticoagulant features of each component of the system as well as the different disorders and their main clinical and laboratory features.

8- Identify the ABO and the Rh system of the blood grouping, the concept of blood donation and criteria of donors selection, the main components of blood used in transfusion and the main complications of blood transfusion.
9- Understand the main types of lymphoma (Hodgkin and non-Hodgkin) and their main morphological features.

9. Teaching and Learning Strategies

1. Theoretical lectures
2. Practical training and skill lab
3. Seminars and group discussion
4. PBL

10. Course Structure

A.curriculum map

weeks	discipline	objectives	hours	Practical sessions	hours
1	histology	1. Histological features of bone marrow. 2. Sites, steps and regulation of hemopoiesis,	1		
	physiology	1. Erythropoiesis, its steps, and the regulation mechanism. 2. Structure and Function of the erythrocytes. 3. Hemoglobin structure and function and the oxygen haemoglobin dissociation curve. 4. Life span and destruction of the erythrocytes.	1		

	Pathology	1- Definition and Classification of anemia based on the RBC indices. 2- Differential diagnosis of hypochromic anemia, . 3- Causes of IDA. 4- folate and B12 requirement, absorption and metabolism and causes of deficiency. 5- Role of folate and B12 in DNA synthesis and the pathogenesis of megaloblastic anemia. 6- laboratory evaluation of megaloblastic anemia. 7- Other causes of macrocytic anemia. 8- Types of thalassemia and pathophysiology. 9- Laboratory findings in thalassemia. 10- Sickle cell anemia, definition, etiology, pathophysiology. 11- Types of crises in sickle cell anemia 12- Laboratory evaluation of sickle cell diseases. 13- Definition and types of hemolysis. 14- Intravascular versus extravascular hemolysis. 15- Classification of hemolytic anemia. 16- Laboratory evaluation of hemolytic anemia.	6	1- interpretation of CBC in patients with RBC disorders 2- Interpretation of results of hemoglobin electrophoresis results.	2 2
	biochemistry	• Metabolic pathways of the RBC metabolism (Embden Meyerhof pathway and Pentose phosphate pathway) • The role of G6PD in protecting the cells from oxidative damage. • Essential iron compounds (explain haem and iron storage proteins) • - Iron metabolism: explain the following steps of iron metabolism and their effects on iron status • Dietary iron and iron absorption • Iron transport, storage and utilization • Iron excretion and sources of loss • Laboratory assessment of iron status: what are the necessary tests in the investigation of • iron deficiency states and iron overload: • Serum iron: causes of variation and importance of measurements Serum ferritin: what are the causes	3		

			of changes in serum ferritin and what is the importance of this test Serum transferrin, total iron-binding capacity, and iron saturation: what are their importance and the causes of changes in their levels. • Serum transferrin receptor role in assessing iron status • Iron deficiency: explain the main causes and laboratory changes in iron status. • Iron overload: explain the causes and diagnostic tests • Hereditary haemochromatosis: brief explanation of its pathogenesis • Iron poisoning: explains its effect on life and indication of intervention.			
	pharmacology	1- Pharmacology of drugs used in Iron deficiency anemia. 2- Pharmacology of Drugs used in treatment of megaloblastic anemia. 3- Pharmacology of drugs used in Iron chelating therapy. 4- Drugs used in treatment of SCA.	1		
	Clinical resource	Clinical features and diagnostic approach to anemia (general and specific). Clinical features of thalassemia and sickle cell anemia. Clinical features of different forms of hemolytic anemia.	1		
week2	Physiology	1- Process of myelopoiesis, stages of myeloid maturation in the bone marrow. 2- Life span and types of WBC. 3- Function of WBC (phagocytic cells and defense mechanism against infection).	1		
	pathology	1- Definition of CML. 2- Pathogenesis of CML. 3- Role of the Philadelphia chromosome and the bcr-abl gene in Leukemia. Phases of CML. 4- Definition and etiology and classification of acute leukaemia 5- Incidence, age distribution, clinical manifestation of acute myeloid leukemia and acute lymphoblastic leukemia.	5	interpretation of CBC in patients with WBC disorders	2

		6- Definition of neutropenia, neutrophillia , lymphocytosis and lymphopenia. 7- Definition of lymphoma and differences between leukemia and lymphoma. 8- classification of (MPN) 9- Polycythemia definition, types, Molecular abnormality, clinical features and laboratory findings. 10- Essential thrombocythemia, primary myelofibrosis . 11- Criteria for donar selection. 12- pre-donation tests and questionnaire. 13- blood components and their storage, half-life and indications for transfusion.			
	pharmacology	1- The role of imintinab in CML 2- pharmacology of drugs used in treatment of acute leukemia. treatment of ALL Treatment of AML.	2		
	Biochemistry	Explain the plasma proteins commonly measured for the diagnosis and monitoring of specific diseases - The acute-phase response: what are changes that characterize the body response to infection, inflammation, or trauma - Plasma proteins that change during the acute-phase response: explain their importance and changes that are occurring in following proteins during diseases ○ C-reactive protein + ESR ○ α1-Antitrypsin + Clinical consequences of the genetic polymorphism of AAT ○ Caeruloplasmin ○ α1-Acid glycoprotein ○ Fibrinogen ○ Ferritin ○ Haptoglobin ○ Albumin + Hypoalbuminemia and its causes ○ Transferrin ○ Pre-albumin	1		

Week3	physiology	1- Components of the hemostatic system. 2- The procoagulant and the anticoagulant role of blood vessles. 3- Platelet structure, regulation of production and the mechanism of platelet plug formation. 4- The coagulation cascades. The initiation and the amplification of the coagulation cascade. 5- Coagulation inhibitors and the fibrinolytic system.	2			
	pathology	1- Differences between primary and secondary haemostasis. 2- Bleeding caused by vascular diseases. 3- Thrombocytopenia, definition and causes. 4- ITP, types, pathogenesis, clinical manifestation, and laboratory evaluation. 5- Bleeding due to platelet dysfunction, causes and laboratory findings. 6- hemophilia types, and laboratory findings. 7- Acquired coagulation disorders. types and laboratory evaluation. 8- Acquired coagulation factor defects. 9- Vitamin K deficiency. 10- Hemostatic abnormalities in liver disease. 11- Disseminated intravascular coagulation, etiology, pathogenesis and laboratory findings. 12- ABO and Rh blood group systems. 13- complications of blood transfusion 14- Rh hemolytic disease of the newborn.	5	Interpretation of the results of screening tests in different types of bleeding disorders	2	
	pharmacology	1- Drugs used in treatment of ITP 2- Pharmacology of tranexamic acid. 3- Pharmacology of aminocaproic acid.	1			
Week4	histology	Histology of lymphatic system. and the lymphoreticular system. - Comparison between blood and Lymph capillaries.	2	Histological features of the lymph node, spleen	2	

		a) Lymphatic Collecting Vessels and their types b) Right lymphatic duct and Thoracic duct(it beginning course and relation drainage) c) Lymphatic organs(primary and secondary) their differences d) Thymus (location, function, hormones and histological features) e) Spleen((location, function, hormones and histological features) f) Lymphatic nodules: MALT, Peyers patches and TONSIL g) Lymph nodes(functions and histological features) . Lymphatic cells(Lymphocytes, Macrophages , Reticular cells and Dendritic cells) their microscopic appearance and function			
	Anatomy	1- Components of the lymphatic system. 2- Plan of the lymphatic system. 3- Lymphatic drainage of the upper limbs and lower limbs. 4- Plan of lymphatic drainage of head and neck. 5- Lymphatic drainage of the thorax. 6- Lymphatic drainage of the abdomen. 7- Lymphatic drainage in the pelvis.	2		
	Pathology	1- Hodgkin lymphoma (HL) - Classification - Morphological features of Reed-Sternberg cell -Pathological features of different types of HL - Outline of Staging and prognosis 2- Non-Hodgkin lymphoma (NHL) -Outline of WHO classification - Pathological, Immunohistochemical, and certain	4	Gross and morphological features of different forms of lymphoma	2

		molecular characteristics of the most common types of NHL. 2- Definition, clinical findings, laboratory features and staging of CLL. Definition of paraproteinaemia and their main causes. Multiple myeloma, clinical features and laboratory findings.				
	Clinical resources	1- clinical presentations of lymphoma and management 2-Multiple myeloma presentation, diagnosis, treatment, prognosis 3- Waldenstrom's macroglobulinaemia manifestations, diagnosis, treatment, differential diagnosis	1			
	pharmacology	Chemotherapeutic agents used in treatment of lymphoma. Cytotoxic drugs regimen used. Rituximab For the above mechanism of action, pharmacokinetics and pharmacodynamics, adverse reactions	1			

B. **Clinical skill theme**

Week	Clinical skill session	Clinical skill objectives
1	History Taking	Ensure competency of history taking and clinical reasoning of common symptoms related to the haematological system and diagnostic approach.
2	hematological Examination	Ensure competency of examination and interpretation of clinical signs related to the haematological system.
4	Hematological examination	Ensure competency of examination of peripheral lymph nodes and the spleen.

C. **Small Group PBL Tutorials:**

Every week, students study a problem in a small group in the presence of a tutor. Students meet with the tutor on Sunday (first session) and Thursday (second session) every week.

In the first PBL tutorial session, students:

a) Read and interpret the case scenario (triggers) and define technical terms.
b) Identify the key issues of the problem.
c) Brainstorm, ask questions and generate hypotheses (possible causes and consequences).
d) Indicate additional information, procedures, required to sort through the hypotheses and what you except information.
e) Identify their learning needs i.e. objectives.

In between the first and second sessions, students follow a self-directed learning approach, using the relevant learning resources in studying the identified learning needs.
In the second PBL tutorial session, students:
- Present the newly gathered knowledge.
- Relate it to the context of the problem.
- Integrate the physical, biological and behavioral components in every problem.
- Evaluate their tutorial performance

Summary of the Unit Problems

Week	Case presentation	summary
Week1	I always feel tired	A 65 year-old woman living in Karbala complained of generalized tiredness, palpitation and shortness of breath after minor exercise of few months' duration. She is a vegetarian and very selective in her diet. She lost 8 Kg in body weight over the last 6 months. Her blood hemoglobin level was very low. She reported abnormal changes in her bowel motion.
Week 2	Mohammad is tired	44 year old male feeling tiredness from last couple of months was refused to be accepted as donor in a blood bank due to his anemia and was asked to see his doctor. His doctor advised him for blood test when he found him having splenomegaly on physical examination. Blood tests were suggestive of chronic myeloid leukemia and he was referred to hematologist who discussed with him the possibility of confirming diagnosis by bone marrow chromosomal and genetic tests in the future and told him about imatinib mesylate, a new effective drug in treatment of chronic myeloid leukemia. He is also told about another option for treatment "allogenic stem cell transplant ".Ultimately CML diagnosis was confirmed by detecting the Philadelphia chromosome (characteristic chromosomal abnormality) by routine cytogenetics, fluorescent in situ hybridization, and PCR for the bcr-abl fusion gene.

Week 3	Zainab with rash and easy bruising	Zainab, 28 year engineer complained of skin rash and easy bruising from last three weeks. On physical examination and relevant hematological tests she was found thrombocytopenic and responded quite well to IV IgG and prednisone therapy initially, but had two relapses later along with side effects of prednisone. She underwent splenectomy and was doing quite well at one year follow up.
Week 4	Salim with swelling in the neck	A 62-year old male presented to his local GP with painless right cervical swelling from last six weeks, which persisted after his throat infection resolved. On examination a few enlarged discrete rubbery lymph nodes were found in right cervical and left inguinal region. Biopsy, flow cytometry, molecular tests and CT scan confirmed the diagnosis of diffuse large B cell lymphoma stage III. His IPI risk group was high intermediate. After chemotherapy he was doing well at one year follow up.

Summary of the Unit Mini-PBLs

Week	Case presentation	summary
Week 1	Thalassemia major	A 4 year old girl presented to Karbala pediatric hospetal with weakness and loss of appetite. On examination she was found underweight, anemic and had hepatosplenomegaly. The following are the results of blood investigations: Hb= 7g/dl, Reticulocyte count=10% Peripheral smear is severely microcytic and hypochromic Total serum iron was normal Skull X-ray revealed maxillofacial deformities and expanded marrow space.
Week 1	Megaloblastic anemia	Noor Ahmed, a 36-year-old female, came to hospital complaining of chronic fatigue, shortness of breath upon exertion and a recent 7 Kg weight loss. Physical examination: her conjunctivae were pale and sclera was icteric, her tongue was red, sore and fissured. Neurological examination revealed decreased

		vibratory sensation of fingers and toes. She was hospitalized for thorough investigation of anemia.
Week 2	Acute leukemia	A 12-year-old boy presented with complaint of easy fatigability. His mother told you that he has noticed that his gums bleed when he brushes his teeth. Physical exam failed to identify any specific abnormalities. The complete blood count (CBC) revealed: Hemoglobin (Hb) - 9.5 g/dL WBC- 90,000/mm3 , Platelets- 30,000/mm3. A chest x-ray demonstrates a large mediastinal mass.
Week 2	Polycythemia Rubra Vera	A 52 year old male presented with history of headache, blurring of vision with pain in the calf muscles as he walks along distance, he was a heavy smoker for the past 20 years but he quit on smoking 6 months ago. On examination his face was plethoric, his blood pressure was 16/10 mm Hg and the spleen margin was felt below the costal margin. CBC showed the following results:- PCV 52% Hb 16.8 g/dl WBC 20 X 109/L Platelet count 490 X 109/L Abdominal ultrasound confirms the spleen enlargement.
	Acute infection and inflammatory proteins	Noor is a 35 year old female with fever and shortness of breath of 3 days duration , she also complains of cough and sputum with yellowish discoloration , upon physical examination body temperature was 38.5 ^{0}C , pulse was 110/min and the respiratory rate was 25 /min , the doctor send her for investigation including CXR, CBC , ESR, C-reactive protein, plasma D-Dimer and fibrinogen level CXR revealed a lobar opacity of the right lung consistent with lobar pneumonia CBC showed HB 9 g/dl , MCV 72fl , MCH 23pg WBC 20.000 X10^{9}/l, with 80% of the cells being neutrophils , occasional myelocytes was seen in the blood film, platelets 490.000 X10^{9}/l ESR 65 mm/Hour

		CRP was 42 mg/dl Serum Ferritin was 50 ng/ml The patient was given Antibiotic therapy to which she responded well, the signs and symptoms starts to subside and the patient condition improved.
Week 3	Rh incompatibility (Erythroblastosis fetalis)	Baby girl, layla, was born uneventful at term. The prenatal course had been normal. The mother, aged 29, had had three previous pregnancies. There were two successive abortions in the last year. She was extremely pale at birth , with ecchymosis over the face, trunk and extremities. The baby was edematous and the placenta was twice the normal size. Respiratory movements were irregular. The liver edge was smooth and firm, and extended below the umbilicus. Diagnosis of erythroblastosis fetalis was made and blood specimens were taken for examination. The laboratory reports showed Hb 3 gm/dL, Bilirubin 30mg/dL, Peripheral blood showed reticulocytosis and many erythroblasts. Direct Coomb's test was positive. The blood group of the mother was AB negative and the father O positive. The infant was immediately given an intravenous transfusion of sixty cc. of matched un citrated blood. Despite this treatment, death occurred within one hour after birth.
Week 3	Hemophilia A	Salim , a 7-year-old boy, was referred to a pediatrician by a dentist. The dentist , prior to extracting a tooth , elicited a history of easy bruising in the boy as well as a history of a brother who died at age one from an intracranial hemorrhage after falling from a crib. In addition, Salim has had several instances of severe bruising following minor trauma and progressively worsening arthritis of both knee joints. Salim has two older sisters aged (10, 13 years), who are normal and have no history of bleeding problems. Interestingly, Salim's maternal grandfather died at age 29 of a bleeding complication following an appendectomy. Salim's maternal

		grandmother remarried, and Salim's mother had three half-brothers are all alive and well.
Week 4	Multiple myeloma	A 68-year-old male complaining of increasing backache and fatigue from last 3 months was found to have tenderness over his lower back at his admission in hospital. On digital rectal examination prostate was not palpable. Lab studies revealed Hemoglobin 8.4 g/dL, ESR 90 mm/ hr. The serum creatinine and urea levels were 3.9 mg/dL & 64 mg/dL respectively. Urine reveal ++ proteinuria. Spine radiograph showed lytic lesions in thoracic and lumber vertebrae.
Week 4	Chronic lymphocytic leukaemia	65 year old male without any medical complaint discovered accidently while performing a routine health check to have an absolute lymphocytosis , he consulted a doctor who ordered for certain investigations and the results showed that the patient have CLL at stage A.

11. Course Evaluation

Course Evaluation

تقييم المادة الدراسية

Evaluation of the students in this unit will consist of the following:

END OF UNIT SUMMATIVE ASSESSMENT

The exam will cover:
Unit 4: hematology
Dates & timetables will be announced later.
The exam will comprise the followings:
Written paper: MCQ + lab materials
OSCE

ASSESSMENT OF THE PBL SESSION

PBL assessment form is provided in **Appendix**

PORTFOLIO:

Detailed content of portfolio will be delivered to the students separately.

MASTERY SKILLS:

Separate exams for the mastery skills will be assigned.

portant note: students fail to pass the mastery skill exam with complete competency will not be all exam.

12. Learning and Teaching Resources

1- Essential hematology (A.V. Hoffbrand).
2- Textbook of Medical Physiology (essential) Guyton & Hill
3- Faculty lectures.
4- Practical sessions by the faculty members

Appendix : PBL assessment form

	PBL1	knowledge	Critical thinking /reasoning	Communication skill and participation	Attitude and collaborative work
unsatisfactory	1	• Has no recall of previous knowledge	• Identify problems(events) in the case	• Not participating spontaneously most of the time	• Negative influence • Interrupts others • does not respect others views • Does not help the group to identify the learning objectives
marginal	2	• Has limited recall of previous knowledge	• Prioterize patient problems • Differentiate important information from others	• Rarely asks questions. • Limited participation in discussions	• rarely participates in identify the learning objectives • takes up tasks only one asked by others
satisfactory	3	• Apply previous knowledge to the problem	• Give explanations to the patient problems	• Occasionally ask questions. • Occasionally present ideas clearly	• Sometimes participates in identify the learning objectives • Volunteer to perform tasks
good	4	• Recognizes integration of knowledge and its application to the case	• Can identify interrelationship between different concepts with guidance • Can identify learning objectives with guidance	• Regularly asks questions that stimulate discussions. • Often present ideas and help in clarifying ideas	• always participates in identify the learning objectives

excellent	5	• Can recognize knowledge gap	• Can identify interrelationship between different concepts without guidance • Can identify learning objectives without guidance	• Leads discussion most of the time • Present clear ideas • Give summaries on the subject	• Help and encourage the engagement of other members. • Explain difficult concepts to others willingly