خطة المساق الدراسي
COURSE PLAN

FIRST: COURSE IDENTIFICATION — أولاً: تعريف المساق

College & Department			**الكلية والقسم**
College	**Medicine**	**الطب**	**الكلية**
Department	**Basic Medical Sciences**	**العلوم الطبية الأساسية**	**القسم**
Academic Year	**Second**	**الثانية**	**السنة الدراسية**
Academic Semester	**Second**	**الثاني**	**الفصل الدراسي**
Course details			**تفاصيل المساق**
Course Title	**Blood and Lymphatic System (BLS).**	**الجهاز الليمفاوي والـدم**	**اسم المساق**
Course Code	**BMS 234**	**BMS 234**	**رمز المساق**
Course Type	**Obligatory (Theory and Practical)**	**اجباري (نظري و عملي)**	**نوع المساق**
Credit Hours	**4**	**4**	**الساعات المعتمدة**
Pre-requisite	**None**	**لا يوجد**	**المتطلب السابق**
☒ وجاهي ☐ الكتروني كامل ☐ مدمج			**آلية تدريس المساق**
Teaching Method	☒ **Face-to-Face** ☐ **Online** ☐ **Blended**		
Instructor Contact Information			**المدرس**
Name	**Multi-disciplinary staff members.** **Course coordinator:** **Dr. Khawla Dhamen Al-Hamideh**	**تدريس مشترك؛** **منسق المساق:** **د. خولة ضامن نايف الحمايدة**	**اسم المدرس**
Office No.	**103**	**الطابق الاول مكتب رقم 103**	**رقم المكتب**
Tel (Ext)	**-**		**الرقم الداخلي**
E-mail	**Kawladamen@bau.edu.jo**	**Kawladamen@bau.edu.jo**	**البريد الالكتروني**
Office Hours	**Sunday, Monday, Wednesday 10-12**	**احد اثنين خميس 10-12**	**الساعات المكتبية**

وقت المحاضرة Class Times	وقت البدء Start Time	وقت النهاية End Time	اليوم Day	المبنى Building	رقم القاعة Room No.
8:00-12:00 **12:00-15:00**	**8:00** **12:00**	**12:00** **15:00**	**Sunday, Monday, Tuesday Wednesday & Thursday**	**Faculty of Medicine**	**Auditorium 301 & 302&501**

Course Materials	مصادر المساق
Textbook	**الكتاب المقرر**

ANATOMY:

1. Principles of Human Anatomy. By G.J. Tortora, Latest edition.

2. Clinical Anatomy for Medical Students. By R.S. Snell, Latest edition.

3. Basic Histology, by L. Carlos Junqueira. Latest edition.

4. Before we are born. By K.L. Moore and T.V.N. Persaud, Latest edition.

BIOCHEMISTRY:

5. Biochemistry by Campbell & Farrell, latest edition

6. Lippincott's Illustrated Reviews "Biochemistry", latest edition

PHYSIOLOGY:

7. Textbook of Medical Physiology, by Guyton and Hall, 10th edition, 2000.

8. Review of Medical Physiology, by William F. Ganong, 20th edition, 2001

PATHOLOGY:

9. Basic Pathology, by Kumar, Cotran and Robbins, Latest edition.

PHARMACOLOGY:

10. Lipincott's Illustrated Reviews: Pharmacology, Latest edition.

MICROBIOLOGY:

11. Cynthia N. Cornelissen and Marcia M. Hobbs. Lippincott Illustrated Reviews: Microbiology. 4th edition. 2020. Wolters Kluwer Publisher.

12. Nafees Ahmed, J. Andrew Al-Apaugh, W. Lawrence Drew, et al. : Sherris Medical Microbiology. 7th edution. 2018. McGrow Hill Education.

COMMUNITY MEDICINE:

13. Supplementary Departmental handouts.

SECOND: COURSE OVERVIEW/DESCRIPTION ثانياً: معلومات المساق

Course description وصف المساق

This course covers the cellular elements of lymph, blood and the histology of both central and peripheral lymphatic systems, including bone marrow, thymus, spleen and lymph nodes. It also covers the production of blood cells, the physiology of tissue fluids, lymph and plasma including the functions of these fluids and cells, bleeding, coagulation, chemistry of blood and lymph together with the structure of hemoglobin, its functions and hemoglobinopathies, plasma proteins, immunological properties of plasma globulins, complement, immunological mechanisms, the diseases that affect blood and the lymphatic system including disturbances of red blood cells, various types of anemia; disturbances of white blood cells including their numbers and functions; leukemia's and lymphomas; disturbances of bleeding and coagulation; diseases of the spleen and thymus; therapeutics of blood and lymphatic diseases. The course also covers the clinical aspects of hematologic and lymphoreticular diseases.

Course Objectives أهداف المساق

By the end of this course, students should be able to مع نهاية هذا المساق يجب أن يكون الطالب قادراً على

CO1.	Describe the constituents of blood, their origin and function.	الهدف 1:
CO2.	Discuss the structure and function of the lymphoreticular system.	الهدف 2:
CO3.	Understand the basic classification systems of anemias, their laboratory and clinical features, public health aspects, and their management.	الهدف 3:
CO4.	Understand the of types of Hemoglobinopathies	الهدف 4:
CO5.	Understand the classification of neoplastic diseases of hematopoietic cells, methods for their diagnosis and their natural history and general guidelines for their management.	الهدف 5:
CO6.	Describe the regulatory mechanisms of normal hemostasis, abnormalities that lead to bleeding disorders, pathologic aspects that cause thrombotic disorders and how are these conditions treated?	الهدف 6:

CO7.	Describe blood borne pathogens with emphasis on morphological characterization and diagnosis.		الهدف 7:

Program Intended Learning Outcomes (PILO):				مخرجات التعلم المستهدفة للبرنامج
Knowledge & understanding	PILO1	Show understanding of various human body systems in terms of structure, function, and regulation, and normal anatomical, biochemical, cellular, genetic, and molecular mechanisms in human body and their disruptions during disease status.	م ب1:	المعرفة والفهم
Professional Skills	PILO2	Collect history and perform physical examination and apply clinical knowledge and skills in disease diagnosis and management through rational planning in requesting necessary, updated, and accurate diagnostic procedures.	م ب2:	المهارات
	PILO3	Demonstrate and apply sufficient knowledge of drugs and pharmacotherapy concepts for rational drug use in clinical: therapeutic and preventive settings.	م ب3:	
	PILO4	Understand and apply the concepts and application of community and preventive medicine.	م ب4:	
	PILO5	Build an efficient and healthy doctor-patient and doctor-community relationship.	م ب5:	
Competences	PILO6	Recognise and apply the basic concepts and principles in scientific research, emphasizing research ethics and the practice of evidence-based medicine.	م ب6:	الكفايات
	PILO7	Appreciate and apply the principles of medical and sustainable professional development.	م ب7:	
	PILO8	Respect and adhere to ethical principles in all aspects of education, training, and work.	م ب8:	

Course Intended Learning Outcomes (CILO)				مخرجات التعلم المستهدفة للمساق
Successful completion of the course should lead to the following outcomes:				في نهاية المساق بنجاح يجب أن يكتسب الطالب المخرجات التالية:
Knowledge & understanding	CILO1	The structures of various blood and lymphatic system, their development, and their histology.	م م 1:	المعرفة والفهم
	CILO2	The nature, functions, physiologic roles and mechanisms of action of blood components.	م م 2:	
	CILO3	The use of some tests and drugs in diagnosis and treatment of blood and lymphatic disorders	م م 3:	
	CILO4	Pathogenesis, morphological changes and complications of diseases affecting the blood and lymphatic system.	م م 4:	

Professional Skills	CILO5	The student should be able to differentiate the different blood and lymphatic disorders.	م م 5:	المهارات
Competences	CILO6	The student should be able to differentiate the different investigations required for each blood and lymphatic disorder.	م م 6:	الكفايات

Mapping Course Learning Outcomes CILOs to Program Learning Outcomes PILOs							موائمة مخرجات التعلم للمساق CILOs مع مخرجات التعلم للبرنامج PILOs
	PILO1	PILO2	PILO3	PILO4	PILO5	PILO6	PILO.....
CILO1	☒	☐	☐	☐	☐	☐	☐
CILO2	☒	☒	☐	☐	☐	☐	☐
CILO3	☐	☒	☒	☐	☐	☐	☐
CILO4	☒	☒	☐	☐	☐	☐	☐
CILO5	☒	☒	☐	☐	☐	☐	☐
CILO6	☒	☒	☐	☐	☐	☐	☐

Topic Outline/Schedule (Syllabus)

مخطط المساق (الموضوعات)

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
1.	Introduction to Hematopoietic system (Course coordinator)	-	-	-	On-line	-	-
	Lymph circulation and drainage (Anatomy 1)	1-4	1	1	Power point &/or Videos &/or Handout	1,5-2	50 min
	Lymphoid Organs and tissue (Anatomy 2)	1-4	1	1	Power point &/or Videos &/or Handout	1,5-2	50 min
	Blood: composition, function, blood volume & viscosity (Physiology 1)	7,8	2	1, 2	Power point &/or Videos &/or Handout	1,5-2	50 min
	RBCs: Characteristics & functions (Physiology 2)	7,8	2	1, 2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Formed blood elements Peripheral blood Formed blood elements Bone Marrow I (Anatomy 3)	1-4	1	1	Power point &/or Videos &/or Handout	1,5-2	50 min

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
	Bone Marrow II (Erythropoiesis, Myelopoiesis&Thrombopoiesis) (Anatomy 4)	**1-4**	**1**	**1**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Anatomy Lab	**1-4**	**1,6**	**1**	**Power point &/or Videos &/or Handout**	**3.5-4**	**1 hr**
2.	**WBCs (Physiology3)**	**7,8**	**2**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
3.	**Heme Metabolism Metabolism of Porphyrins and Heme in hemoglobin (Biochemistry1)**	**5,6**	**3**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Blood groups (Physiology 4)	**7,8**	**2**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Anemias: classification and strategies for diagnosis (Physiology 5)	**7,8**	**2**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
	Hemolytic anemia's I (Pathology 1)	9	4	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Hemolytic anemia's II And Hemoglobinopathies (Pathology 2)	9	4,5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Nutritional Anemia's (Megaloblastic and iron deficiency) (Biochemistry 2)	5,6	3	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Physiology Lab	7,8	2,6	1,	Power point &/or Videos &/or Handout	3.5-4	1hr
	Drugs used in anemia's (Pharmacology 1)	10	3	2,3	Power point &/or Videos &/or Handout	1,5-2	50 min
	Epidemiology, risk factors and prevention of Anemia (Community Medicine)	13	6	1	Power point &/or Videos &/or Handout	1,5-2	50 min
	Acute Leukemia's (Pathology 3)	9	4,5	1,2	Power point &/or Videos &/or	1,5-2	50 min

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
					Handout		
	Salmonella typhi, enteric fever and Brucella (Microbiology 1)	11,12	5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Chronic Myeloproliferative and myelodisplastic syndromes (Pathology 4)	9	4,5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Microbiology Lab	11,12	5,6	1,2	Power point &/or Videos &/or Handout	3.5-4	50 min
	Plasma proteins MOLECULAR BASIS OF HEMOGLOBIN DISORDERS (Biochemistry 3)	5,6	3	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
3	Yersinia pestis and plague (Microbiology 2)	11,12	5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Lymph Node Enlargement: Non-Hodgkin Lymphomas and Hodgkin Disease (Pathology 5)	9	4,5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
	Plasmodium and Babesiosis (Microbiology 3)	**11,12**	**5**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Anti-neoplastic drugs (Pharmacology 2)	**10**	**3**	**2,3**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	General overview of hemostatic process (Physiology 6)	**7,8**	**4**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Physiology of blood coagulation (Physiology 7)	**7,8**	**4**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Epstein Barr Virus (EBV) and Parvovirus B 19 (Microbiology 4)	**11,12**	**5**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Congenital Bleeding disorders (Pathology 7)	**9**	**4,5**	**1,2**	**Power point &/or Videos &/or Handout**	**1,5-2**	**50 min**
	Inherited disorders of platelets function (Pathology 8)	**9**	**4,5**	**1,2**	**Power point &/or Videos &/or**	**1,5-2**	**50 min**

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
					Handout		
3	Q-Fever and other rickettsia (Microbiology 5)	11,12	5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	A. molecular diagnostics of hemoglobin disorders B. Examples on molecular basis of Hemophilia and Thrombophilia (Biochemistry 4)	5,6	6	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Idiopathic thrombocytopenic purpura (ITP) and thrombotic thrombocytopenic purpura (TTP)and DIC (Pathology 9)	9	4,5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Drugs used in coagulation disorders (Pharmacology 3)	10	3	2,3	Power point &/or Videos &/or Handout	1,5-2	50 min
	Pathology Lab	9	4,5	1	Power point &/or Videos &/or Handout	3.5-4	1hr

الأسبوع Week	مواضيع المساق / الفعاليات Course Topics/Events	القراءات (المراجع) Readings (Reference) رقم	رمز مخرجات المساق CILO	رمز مخرجات البرنامج PILO	أنشطة التدريس والتعلم Teaching & Learning Activity	العلامة Mark	الوقت /الموعد Duration/ Deadlines
	Plasma cell tumors and monoclonal gammopathies (Pathology 10)	9	4,5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	Trypanosomiasis, visceral leishmaniasis and Filariasis (Microbiology 6)	11,12	5	1,2	Power point &/or Videos &/or Handout	1,5-2	50 min
	• التقييم التجميعي • Final exam (Summative Assessment)				الامتحان النهائي (التقييم التجميعي) Summative Assessment		Week 5

Week	May use the Week number more than once	من الممكن استخدام رقم الأسبوع اكثر من مرة	الأسبوع
Course Topics/Events	The topic that is the focus of this part of the class in subjects' format	المحتوى التعليمي المعطى في المحاضرة على شكل مواضيع	مواضيع المساق / الفعاليات
CILO	The learning objective of this specific topic; what you want the students to achieve.	الهدف التعليمي لهذا الموضوع المحدد؛ ما الذي تريد أن يحققه الطلاب.	مخرجات التعلم للمحاضرة
Teaching & Learning Activity	Power point material, Videos, White board, overhead projector, handout, pc projector, written assignment, flip chart, objects used to illustrate something etc.	وسائل التعليم المستخدمة، مادة عرض مصورة، مقاطع مصورة، مجسمات السبورة البيضاء، جهاز عرض علوي، نشرة ، جهاز عرض كمبيوتر ، مهمة كتابية ، لوح ورقي ، أشياء مستخدمة لتوضيح شيء ما وما إلى ذلك.	أنشطة التدريس والتعلم
Time	Duration of this part of the class.	مدة هذا الجزء النشاط من المحاضرة.	الوقت

Mark	Mark weight for each topic as a part of total (100)	علامة كل مخرج وهي جزء من العلامة الكلية (100)	العلامة

No	Title of Lectures	Learning Objectives
	Introduction to Hematopoietic system (Course coordinator)	Understand the general outline of the module. Be familiar with the modalities of teaching throughout the course.
1	Formed blood elements Peripheral blood Formed blood elements Bone Marrow I (Anatomy 1)	List blood components. Classify formed elements of blood. Discuss the scientific basis of the above classification. Describe the basic structure of erythrocytes and criteria of their identification. List the components of cellular granulocytes. Name organs responsible for hematopoiesis in the fetus. List the developmental stages of hematopoiesis both prenatally and postnatally.
2	Bone Marrow II (Erythropoiesis, Myelopoiesis&Thrombopoiesis) (Anatomy 2)	Outline the major steps of post-natal development of blood formed elements (erythropoiesis, granulopoiesis, monocytopoiesis and megakaryopoiesis. Identify characteristic features of these cells.

3	**Blood: composition, function, blood volume & viscosity (Physiology 1)**	**Describe the composition of blood. Understand the functions of blood. Understand factors affecting viscosity of blood. Understand the principle of linear blood flow.**
4	**RBCs: Characteristics and functions (Physiology 2)**	**Describe RBCs structure & its structure-function relationship. Understand the different functions of RBCs. Understand structure-function relationship of RBCs cell Identify the physiological factors that affect RBCs count. Understand the life span of RBCs & its relationship to blood donation**
5	**Lymph circulation and drainage (Anatomy 3)**	**Understand the origin and composition of lymph. Explain the circulation of lymph in the body.**
6	**Lymphoid Organs and tissue (Anatomy 4)**	**Describe the gross anatomy and histology of the following lymphoid organs: Spleen, tonsils, thymus, lymph nodes and mucosa associated**
7	**WBCs (Physiology3)**	**Recognize the different structural types of WBCs & their physiological functions. Define the life span & the physiological implication of WBC Differentiate between marginating& circulating pools of WBCs Understand the principle behind the total, relative & absolute WBCs count. Understand how to apply this knowledge in clinical practice.**

8	**Heme Metabolism** **Metabolism of Porphyrins and Heme in hemoglobin (Biochemistry1)**	**Understand the importance of iron and its forms in heme.** **Describe mechanism and sites of heme destruction.** **List substances produced by heme destruction and their fate in the body.** **Understand the basic abnormalities that may result in heme catabolism.** **Describe synthesis of porphyrins and regulation** **Describe heme synthesis and regulation** **Know types and causes of erythropioticporphyrias** **Describe Degradation of heme and jaundice formation**
9	**Blood groups** **(Physiology 4)**	**Understand the principles of ABO blood group system.** **Understand the principles of Rh blood group system / blood transfusion.** **Understand the principles of the HLA system.**
10	**Anemias: classification and strategies for diagnosis** **(Physiology 5)**	**Name and describe the maturational sequence of erythroid cells in the bone marrow using the terms: proerythroblast, erythroblast, normoblast and reticulocyte.** **Discuss aplastic anemia with emphasis on its etiology, diagnostic criteria, clinical features and management.** **Discuss the role of erythropoietin in hematopoiesis with emphasis on its site of production and target cells.** **Classify anemias according to mean corpuscular volume (MCV) and give three examples of each type.**
11	**Hemolytic anemia's I** **(Pathology 1)**	**Describe parameters used to detect hemolysis.** **Classify hemolytic anemias.** **Describe immune processes leading to hemolysis with reference to diseases associated with hemolysis.**

		Discuss the most frequent enzyme defects leading to hemolysis with emphasis on their clinical and laboratory findings. **Identify: spherocyte, schistocyte, nucleated RBCs, Heinz bodies, elliptocyte and Howell-Jolly bodies.**
12	**Hemolytic anemia's II And Hemoglobinopathies** **(Pathology 2)**	**List the types of hemoglobin present in normal blood and what's the percentage of each type?** **For thalassemia syndromes describe the following:** **Basic genetic defect** **Red cell morphology** **Clinical manifestations and complications** **Diagnostic procedures**
13	**Nutritional Anemia's (Megaloblastic and iron deficiency)** **(Biochemistry 2)**	**For each of Iron, vitamin B12 and folic acid, describe:** **1. Dietary sources** **2. Absorption** **3. Body stores** **4. Transport mechanisms and metabolic sequences of deficiency** **5. Clinical and laboratory findings** **6. Describe the normal mechanism of regulation of iron in the body.**
14	**Drugs used in anemia's** **(Pharmacology 1)**	**List the major forms of iron used in the therapy of anemias.** **List the anemias for which iron supplementation is indicated and those for which it is contraindicated.** **Describe the acute and chronic toxicity of iron describes the major hazards involved in the use of folic acid as sole therapy for megaloblastic anemia.**

15	Epidemiology, risk factors and prevention of Anemia (Community Medicine)	Understand Mortality and morbidity distribution of anemia (globally and locally). Identify non-modifiable and modifiable anemia risk factors. Describe the major nutritional risk factors in the determination of anemia. Describe the different approaches in Anemia prevention.
16	Acute Leukemia's (Pathology 3)	Understand the classification of acute leukemia's with emphasis on the French American British (FAB) system. Define the term "blast". Describe the normal phenotypic changes seen in differentiating B and T lymphocytes with reference to similar changes seen in acute lymphoblastic leukemia. Describe the clinical presentations, complications. Explain how the following tests are used in diagnosing acute leukemia's: i. Myeloperoxidase ii. Nonspecific esterase iii. TDT List six chromosomal abnormalities associated with acute leukemia's.
17	Salmonella typhi, enteric fever and Brucella (Microbiology 1)	For each organism: 1. Describe the morphology and the structure. 2. Describe growth and toxins 3. Explain pathogenesis and clinical disease 4. Explain mode of transmissions. 5. Explain the clinical manifestations.

		6. Be familiar with the laboratory diagnosis. **7. Be familiar with treatment and prevention.**
18	**Chronic Myeloproliferative and myelodisplastic syndromes** **(Pathology 4)**	**Understand the clinical manifestations, laboratory findings and complications of Chronic Myeloproliferative and myelodisplastic syndromes** **Describe the morphologic characteristics of Chronic Myeloproliferative and myelodisplastic syndromes**
19	**Plasma proteins** **MOLECULAR BASIS OF HEMOGLOBIN DISORDERS** **(Biochemistry 3)**	**Explain albumin role as a carrier of bile acids and in transport of bilirubin, steroids and fatty acids.** **Describe the electrophoresis pattern for plasma proteins and its value as a diagnostic tool.** **Know what is Hb S and its clinical correlation** **Know what is Hb C and its clinical correlation** **Know molecular basis of beta thalassemia & types including Hb E** **Know molecular basis of Thalassemia Intermedia** **Know molecular basis of alpha thalassemia & types** **Know what is hemoglobin Lepore and its clinical correlation** **Know the molecular basis of delta-beta thalassemia** **Know the molecular basis of High Persistence of Fetal Hemoglobin**
20	**Yersinia pestis and plague** **(Microbiology 2)**	**Describe the general microbiological properties and differences from other yersinia.** **Understand cultural techniques, epidemiology and pathophysiology.** **Describe the clinical presentation, specimen collection for culture, treatment and prevention.**

21	Lymph Node Enlargement: Non-Hodgkin Lymphomas (mature B-cell neoplasm) (Pathology 5)	Understand the general characteristics of NHL, with reference to pathogenesis, classification and procedures used to diagnose them. Describe the grading systems of NHL. Compare the histopathologic, immunologic and clinical features of NHL. List three chromosomal translocations associated with NHL; describe the oncogenes associated with them. Describe the appearance of Reed-Sternberg cells and identify the significance of their presence.
22	Lymph Node Enlargement: Hodgkin Disease (Pathology 6)	Define the meaning of "background" appearance of Hodgkin's disease and how it is used in diagnosis and classification of this disease. Describe the staging system of Hodgkin disease. List the four types Hodgkin's disease; describe their clinical presentations, general guidelines for patient evaluation and management
23	Plasmodium and Babesiosis (Microbiology 3)	Describe the following: 1. Microbiological properties, classification and diseases. 2. Microscopic differences between species, life cycle epidemiology, and pathophysiology. 3. Clinical presentation, specimen collection, diagnosis, treatment, and prevention.
24		Recognize the general principles of cancer therapy. Understand the three main lines of cancer therapy.

	Anti-neoplastic drugs **(Pharmacology 2)**	**Understand methods of administration of cytotoxic drugs and the rules for combination therapy.** **Understand the terms: adjuvant therapy, growth fraction and cell cycle.** **Understand the mode of drug action either phase-specific or non-specific.** **Classify cytotoxic drugs and explain their mechanism of action.** **Recognize the major adverse effects of cytotoxic drugs.** **List the common drugs, which have an immunosuppressive effect.**
25	**General overview of hemostatic process** **(Physiology 6)**	**Understand the process and stages (cascade) of blood coagulation and its significance.** **List and understand the role of factors involved in blood coagulation.** **Understand the role of serine proteases in the cascade of blood coagulation.**
26	**Physiology of blood coagulation** **(Physiology 7)**	**Understand the intrinsic and extrinsic Pathways of blood clot** **Understand the cause of excessive bleeding / basis of unusual excessive bleeding** **Understand bleeding time, clotting time and prothrombine time**

27	**Epstein Barr Virus (EBV) and Parvovirus B 19** **(Microbiology 4)**	**Describe the following:** **1. Microbiological properties and diseases.** **2. Multiplication strategies, epidemiology, and patho-physiology.** **3. Clinical presentation, specimen collection, laboratory diagnosis, treatment, and prevention.**
28	**Congenital Bleeding disorders** **(Pathology 7)**	**For each of von Willebrand disease, hemophilia A & B describe: heritance, etiology, clinical presentations & laboratory findings.**
29	**Inherited disorders of platelets function** **(Pathology 8)**	**List the surface glycoproteins of platelets and define their roles.** **Describe the pathogenesis and laboratory findings of Bernard-Solier disease and thrombasthenia.**
30	**Q-Fever and other rickettsia** **(Microbiology 5)**	**Describe the following:** **1. Microbiological properties, classification and diseases.** **2. Microscopic differences between species, multiplication cycle, epidemiology, and pathophysiology.** **3. Clinical presentation, specimen collection, diagnosis, treatment, and prevention.**
31	**A. molecular diagnostics of hemoglobin disorders** **B. Examples on molecular basis of**	**For part A, the student should be able to:** **Be able to identify different hemoglobin types by hemoglobin electrophoresis** **Interpret hemoglobin electrogram to diagnose of hemoglobin disorders**

	Hemophilia and Thrombophilia (Biochemistry 4)	**Understand some examples on Molecular diagnosis of hemoglobin disorders; RFLP, PCR----- For part B , the student should be able to: Understand how mutation of factor IX gene causes two different types of hemophilia Understand how mutation in the 3' UTR of thrombin gene causes Hereditary thrombophilia Correlate Pulmonary embolism of maternal death during pregnancy or in the period following delivery and thrombophilia**
32	**Idiopathic thrombocytopenic purpura (ITP) and thrombotic thrombocytopenic purpura (TTP)and DIC (Pathology 9)**	**Describe the etiology, pathogenesis, clinical findings, laboratory results and patient management of adult and pediatric ITP. Identify the mechanism of neonatal and post transfusion thrombocytopenia. Describe the clinical findings and laboratory results of TTP. Understand the correct usage & significance of abnormalities of coagulation parameters.For disseminated intravascular coagulation (DIC) describe etiology , clinical presentations and laboratory findings**
33	**Drugs used in coagulation disorders (Pharmacology 3)**	**Compare the antiplatelet drugs. List three different drugs used to treat disorders of excessive bleeding. Compare the oral anticoagulants with heparin in terms of their pharmacokinetics, mechanisms, and toxicities. Compare the thrombolytic preparations**

34	**Plasma cell tumors and monoclonal gammopathies** **(Pathology 10)**	**Understand the clinical manifestations, laboratory findings and complications of plasma cell tumors.** **Define:** **1. Bence Jones proteins** **2. Monoclonal spike** **3. M proteins** **4. Heavy chain disease.** **5. Waldenstrom'smacroglobulinemia.**
35	**Trypanosomiasis, visceral leishmaniasis and Filariasis** **(Microbiology 6)**	**For each of Trypanosomiasis, leishmaniasis and filariasis,** **Describe the following:** **1. Microbiological properties.** **2. Classification and diseases.** **3. Microscopic differences between species.** **4. Life cycle epidemiology and specimen collection.** **5. Pathophysiology and clinical presentation.** **6. Diagnosis, treatment, and prevention.**
	Final Exam (Theory + Practicals) 65 %	

PRACTICAL LABORATORY SESSIONS		
No	**Title**	**Objectives**
1	**Anatomy and Histology of lymphoid organs and tissue** **Histology of blood elements** **(Anatomy)**	**1. Identify the anatomical location and characteristics of the lymphoid organ and tissue** **2. Identify the distribution of lymph ganglia (groups)** **3. lymph vessels histology and distribution** **4. Thoracic duct** **5. Review criteria for identifying neutrophils.** **6. Examine a blood smear under the light microscope applying the above criteria to decide which cell is a neutrophil.** **7. Repeat the same process above in identifying other blood cells: basophils, acidophils, lymphocytes, platelets and RBCs.** **8. Review criteria and distinguishing histological features for identifying a lymph node.** **9. Examine a cross section of lymph node under the light microscope applying the above criteria.** **10. Repeat the same process above in identifying and examining cross sections of the spleen, thymus, tonsils and Mucosa Associated Lymphoid Tissues (MALT).**
2	**RBCs & WBCs count Hb, PCV, RBCs, WBCs, differential blood grouping , bleeding and clotting time**	**1. Learn the value of basic techniques in doing RBCs & WBCs count Hb, PCV, RBCs, WBCs, differential blood grouping , bleeding and clotting time Understand how to calculate RBCs values & their clinical significance**

	(Physiology)	**2. Learn the basic techniques of WBCs and differential count.** **3. Understand total leukocytic count, the differential leukocytic count & their clinical significance.**
3	**Anemias and acute leukemia's** **(Pathology)**	**Identify the morphologic abnormalities of peripheral blood and bone marrow in:** **1. Iron deficiency anemia** **2. Megaloblastic anemia** **3. Thalassemias** **4. Sickle cell anemia** **5. Micoangiopathic hemolytic anemia** **6. G6PD hemolytic anemia** **7. Autoimmune hemolytic anemia** **8. Hereditary spherocytosis** **9. Lymphoblasts** **10. Myeloblasts** **11. Promyelocytes** **12. Prolymphocytes** **13. Auer rods** **14. Identify the diagnostic microscopic changes of:** **15. Acute myeloid leukemia** **16. Acute lymphoblastic leukemia**
4	**Blood culture techniques**	**1. Describe aseptic techniques used in blood culture.** **2. Describe types of systems involved in the blood culture.**

	(Microbiology)	**3. Describe different types and constitutes of blood culture bottles.** **4. Describe cultural and incubational environments.** **5. Isolation and identification of Salmonella typhi from blood sample** **6. Widal Test**

ASSESSMANT TOOLS				أساليب التقييم
Write assessment tools that will be used to test students' ability to understand the course material and gain the skills and competencies stated in learning outcomes				أكتب أساليب التقييم التي سيتم استخدامها لتقييم قدرة الطلبة على استيعاب مواد المساق واكتساب المهارات والكفايات المنصوص عليها في مخرجات التعلم
وسيلة التقييم ASSESSMENT TOOLS	النوع (تكويني أو تجميعي) Type (Informative and Summative)	رمز مخرجات المساق المستهدفة CILO	العلامة Grade	النسبة % Percentage
☐ المشاركة(Participation)				
☐ تقرير(Report)				
☐ المقالات المختصرة (Essays)				
☐ واجبات(assignments)				
☐ الاختبارات الشفوية(Oral exams)				
☐ دراسة الحالة (Case study exams)				
☐ امتحانات قصيرة(Quizzes)				
✓ التجارب العملية (Experiments)	Summative	1-4, 6	15	15%
☐ مشاريع (Project)				
☐ زيارات ميدانية(Field Trip)				
☐ أخرى (يرجى التحديد) Other (specify)				
✓ امتحان منتصف الفصل(Mid Exam)	Summative	1-6	35	35%
✓ الامتحان النهائي(Final Exam)	Summative	1-6	50	50%
المجموع(TOTAL MARKS)	100		100	100

Informative	A set of formal and informal assessment procedures that teachers conduct during the learning process in order to modify teaching and learning activities to improve student achievement.	مجموعة من إجراءات التقييم الرسمية وغير الرسمية التي يجريها المعلمون أثناء عملية التعلم من أجل تعديل أنشطة التعليم والتعلم لتحسين تحصيل الطلاب.	التكويني
Summative	A set of formal assessment procedures that teachers conduct after the learning process in order to measure student achievement.	مجموعة من إجراءات التقييم الرسمية التي يجريها المعلمون بعد عملية التعلم من أجل قياس تحصيل الطلاب.	التجميعي
Assessment Tools	Technique or method of evaluating information to determine how much a Student knows and whether this knowledge aligns with the intended learning outcomes of a theory or framework.	تقنية أو طريقة لتقييم المعلومات لتحديد مدى معرفة الطالب وما إذا كانت هذه المعرفة تتوافق مع نتائج التعلم لنظرية أو إطار عمل.	وسيلة التقييم

THIRD: COURSE POLICIES AND INSTRUCTIONS

ثالثاً: التعليمات والإرشادات

Attendance rules

الحضور والمواظبة

Attendance and participation are critical, and the regular university norms will apply. A student is not permitted to be absent for more than 15% of the total number of credit hours given to any course. Each class's attendance will be tracked. A 10% absence will result in a first written notice. If a student misses 15% of the class, the course is dropped, and the student is not entitled to sit for the final exam. If a student has any special circumstances (medical or personal), he or she is advised to discuss this with the instructor, and documented evidence will be requested to remove any absences from his or her attendance records.	يعتبر حضور الطلبة للمحاضرات ومشاركتهم بها في غاية الأهمية، وسيتم تطبيق القواعد المعمول بها في الجامعة بهذا الخصوص. يتم تسجيل حضور الطلبة في كل محاضرة. وصول نسبة غياب الطالب إلى 10% ستتسبب في تلقيه إنذاراً أولياً خطياً. في حال وصول نسبة الغيابات إلى 15%، يتم حرمان الطالب من المساق ولن يسمح للطالب بالتقدم للامتحان النهائي في المساق. في حال تعرض الطالب إلى أي ظروف قاهرة (مرض أو ظروف شخصية)، يجدر بالطالب التواصل مع المدرس ومناقشة هذا الظرف وإظهار دليل خطي يبرر الظرف ليتم الغاء الغياب من سجل الغياب.

GRADING SYSTEM
نظام التقديرات

التقدير Grade	النقاط Points	المدى Range
A	أ	
A-	أ-	
B+	ب+	
B	ب	
B-	ب-	
C+	ج+	
C	ج	
C-	ج-	
D+	د+	
D	د	
D-	د-	
F	هـ	

Policies and instructions

السياسات والإرشادات

• Students must read and follow the internal bylaws of BAU in relation to student conduct bylaws. • Students with special needs are highly recommended to register their cases with a valid doctor's report in the student affairs department. • Students with special needs shall be subject to special care in coordination with the head of department as per internationally recognized and benchmarked considerations and services. • The student must seek permission before making any interventions on the subject of the lecture. • The student must listen to and respect the opinions of others. • The student should not obstruct the course of the lecture. • Students should not hesitate to ask questions to the instructor. • Students should not use their mobile phones during the lecture. • Students are strongly encouraged to contact their instructor if they have course-related questions during office hours. • Students are recommended to contact their instructor using the LMS. • Cheating and Plagiarism are prohibited.	• يجب على الطالب أن يقوم بقراءة واتباع اللوائح الداخلية الخاصة بجامعة البلقاء التطبيقية المتعلقة بلوائح سلوك الطلبة. • ينصح الطلبة من ذوي الاحتياجات الخاصة أن يقوموا بتسجيل حالاتهم لدى شؤون الطلبة من خلال تقرير طبي حسب الأصول وساري المفعول. • يخضع الطلبة من ذوي الاحتياجات الخاصة إلى رعاية خاصة وذلك بالتنسيق مع رئيس القسم وفقاً للمعايير الخاصة بذلك والمعترف بها دولياً. • على الطالب الاستئذان قبل القيام بأي مداخلات على موضوع المحاضرة. • على الطالب الاستماع واحترام الرأي الآخر. • على الطالب عدم إعاقة سير المحاضرة. • على الطلاب عدم التردد في طرح الأسئلة على مدرس المادة والتواصل مع المدرس خلال الساعات المكتبية او من خلال نظام التعليم الالكتروني. • على الطلاب عدم استخدام الهاتف النقال أثناء المحاضرة. • على الطلاب عدم التردد في التواصل مع المدرس خلال الساعات المكتبية او من خلال نظام التعليم الالكتروني. • غير مسموح الغش والانتحال على الاطلاق.

منسق المساق Course Coordinator:	Khawla Dhamen Al-Hamaideh	رئيس القسم Department Head:	
رقم قرار القسم Department Decision		تاريخ القرار: Date of Decision:	
التوقيع Signature:		التوقيع Signature:	
التاريخ Date:		التاريخ Date	