



SYLLABUS

Course Code	Course Num.	Course Name	Credit Hours	Lec.	Lab.	Tut.	Private study	Pre-requisites	Course Level	Teaching Language
BIO	417	Hematology	3	2	2	0	3-5	BIO 314	7	English

A. Course Description

The Hematology course will cover the diagnosis and management of blood cell disorders, anatomy and physiology of hematopoiesis, routine specialized hematology tests, analysis, classification, and monitoring of blood cell abnormalities.

B. Course Outcomes

At the end of this course the student will be able to:

1. Describe the characteristics of normal bone marrow and normal circulating blood.
2. Describe the functions of hemoglobin, white blood cells, red blood cells and platelets.
3. Discuss hemoglobin electrophoresis and abnormal hemoglobin.
4. Describe the maturation of red blood cells, white blood cell and platelets.
5. Recognize and identify abnormalities in red blood cell morphology and RBC precursors.
6. Recognize and identify the causes of an abnormal result in any or all of the parameters of the CBC. (a) RBC b) WBC c) Hemoglobin d) Hematocrit e) Indices f) Differential WBC count).
7. Discuss the etiology, morphological classification, and clinical laboratory findings of the different anemias:(a) Aplastic anemia b) Sideroblastic anemia c) Megaloblastic anemia d) Hemolytic anemias e) Deficiency anemias).
8. Discuss the etiology, morphology of cells, and clinical laboratory findings of some the different leukemias.
9. Discuss the etiology, morphology of cells, , and clinical laboratory findings of the following hematological disorders: like a) Infectious mononucleosis b) Lupus erythematosus c) Lymphomas.
10. Demonstrate an understanding of the role and the main disciplines of Biomedical Science in the day to day operation of a haematology laboratory.

C. References:

Required Textbook

- *Dacie and Lewis Practical Haematology*' SM Lewis, BJ Bain, I Bates 10th Edition, 2012, Churchill Livingstone Elsevier. ISBN 9780702034077
- Kandice Kottke-Marchant. *Laboratory Hematology Practice 1st Ed* (2012). ISBN-13: 978-1405162180.



Other references:

- *Essential Haematology*' Hoffbrand A.V. Moss P.A.H. & Pettit J.E. 5th Edition, 2007, Blackwell. Publishing
- *Principles of Laboratory Instruments*' Schoef L.E. & Williams R.H. 1993 Mosby - ISBN 08016749-1.
- *Haematology Clinical Principles and Applications 4th edition* by B.F.Rodak, note that 3rd edition.
- *www, direct science.com.*

Course Website: Google Classroom Webpage: <http://www.imamm.org/>

D. Topics Outline

D1. Theoretical Topics

1. Introduction: Definition of Hematology, what is blood, Blood composition. The scope of Haematology.
2. The Erythrocytes, Red Blood Corpuscles (RBCs), Haemopoieses, RBCs cell lines in bone marrow.
3. Normal Blood, RBCs indices.
4. Hemoglobin, Haemoglobinopathy.
5. Aspect of Anaemia, Types of anaemia.
6. Iron deficiency anemia & other hypochromic microcytic anemias.
7. Megaloblastic anemia.
8. Hemolytic Anemias I- Introductions & Classification:
9. Hemolytic Anemias II- Structural hemoglobinopathies.
10. Hemolytic Anemias III-Thalassemia.
11. Hemolytic Anemias IV- Membrane abnormalities.
12. Hemolytic Anemias V- Enzymopathies.
13. Hemolytic Anemias VI- Immune Hemolytic Anemias.
14. Aplastic Anemia.
15. Anemia of chronic disorders.
16. Malaria.
17. Summary of red cell morphologic abnormalities.
18. White Blood Cells (WBCs), Types of WBCs, Formation of WBCs.
19. Normal WBCs, Myeloproliferative disorders.
20. White cells and their benign disorders.
21. Leukemias-introductions & classification:
22. Acute leukemia.
23. Chronic myeloid leukemias.



24. Chronic Lymphocytic leukemias.
25. Myelodysplastic syndromes & other preleukemic conditions.
26. Physiology of coagulation & Hemostasis.
27. Bleeding disorders - Introduction & Classification.
28. Congenital bleeding disorders.
29. Acquired bleeding disorders.
30. Congenital platelet disorders.
31. Acquired platelet disorders.
32. Thrombophilic disorders & Their diagnosis.
33. (Thrombocytopenia- thrombocytosis).

D2. Laboratories:

1. Introduction to Laboratory Reagents and Equipment Safety and Q.C + Anticoagulants.
2. Hemocytometry: Red cell and white cell counting. Normal, abnormal red cell morphology & introduction to normal WBCs. The principle of Romanowsky stains. Peripheral smear preparation & staining by Romanowsky staining and procedures for examining a stained blood film. The morphological features of a Romanowsky stained red cell and nucleated red cell.
3. Hemoglobin Measurement, Standardization, Hematocrit measurement by micro tube & Wintrobe techniques. Calculation of Red indices.
4. WBCs differential cell count. CBC, Differential & peripheral smear examination. Automated complete Blood picture.
5. The life cycle and destruction of a red cell. An osmotic fragility determination and discuss its application. Erythrocyte Sedimentation Rate.
6. Red cell abnormalities: Iron deficiency/Megaloblastic & Aplastic Anemia. Red cell abnormalities: Hemolytic anemia- Sickle cell test by different methods.
7. The structure of normal hemoglobin molecule, include HbA, HbA2 and HbF. Hemoglobin Electrophoresis I. Hemoglobin Electrophoresis II.
8. Reticulocyte preparation & counting. Peripheral examination for malaria parasite.
9. Platelets count methods. Bleeding Time & coagulation time. Prothrombin Time.
10. Activated Partial Thromboplastin Time. Test for Fibrinogen.

E. Office Hours

Office hours give students the opportunity to ask in-depth questions and to explore points of confusion or interest that cannot be fully addressed in class.

F. Exams & Grading System

The semi-official dates of the exams for this course are:



- **Midterm 1:** 6th or 7th week.
- **Midterm 2:** 11th or 12th week.
- **Quizzes & Homework:** During the semester.
- **Lab Exam:** 15th week.
- **Final Exam:** 16th week.

Your course grade will be based on your semester work as follows:

Midterm 1: 15 %	Midterm 2: 15 %	Final Exam: 40 %	Final Lab Exam: 20%
Quizzes, Homework, Attendance & Participation: 10 %			

The grading distribution:

A⁺	A	B⁺	B	C⁺	C	D⁺	D	F
[95, 100]	[90, 95)	[85, 90)	[80, 85)	[75, 80)	[70, 75)	[65, 70)	[60, 65)	[0, 60)

G. Student Attendance/Absence

Only three situations will be considered as possible excused absences:

- Occurrence of a birth or death in the immediate family will be excused. (“Immediate family” is defined by the University as spouse, grandparents, parents, brother, or sister).
- Severe illness in which a student is under the care of a doctor and physically unable to attend class will be excused. Students are not excused for a doctor's appointment. Do not make appointments that conflict with rehearsals. Notes from the University Health Center will be accepted.

[Executive Rules for Study Regulations and Exams](#)

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