

Dow University of Health Sciences



HEMATOLOGY MODULE

9 weeks, 9 credit hours

Semester 1

First Year MBBS

5 YEAR CURRICULAR ORGANIZATION

Spiral	year	Modules				
First Spiral	I	FND1- Foundation Cell, Genetics & Cell Death (Basics of Anatomy, Physiology, Biochemistry, Gen. Pathology, Gen. Pharmacology, Community Medicine & Behavioral Sciences, 9 Weeks		HEM1- Blood Module Immunity, Inflammation, Tissue repair, Antimicrobials & Neoplasia 9Week		
		LCM1- Locomotion Bones, Joints, Nerves & Muscles, 9weeks		RSP1- Respiratory System 6 weeks	CVS1- Cardiovascular System 4 weeks	
		NEU1- Nervous System 8 weeks		HNN1- Head & Neck & Special 6 weeks	END1- Endocrinology 5weeks	
		GIL 1-GIT and Liver 8 weeks		EXC1- Renal and Excretory System 5 weeks	REP1- Reproductive System 5 weeks	
Second Spiral	II	IDD 1- Infectious diseases 5 weeks	HEM2- Hematology 5 weeks		RSP2- Respiratory System 5 weeks	CVS2- Cardiovascular System 5 weeks
		GIL 2-GIT and Liver (including Nutritional Disorders) 8weeks		EXC2- Renal & Excretory System 5 weeks	END2- Endocrinology 5 weeks	
		ORT2- Orthopedics, Rheumatology, Trauma 7 weeks	REP2- Reproductive System 8 Weeks	PMR-Physical Medicine & Rehabilitation DPS-Dermatology Plastic Surgery / Burns GEN-Genetics 6 weeks		
		NEU2- Neurosciences and Psychiatry 8 weeks		OPH / ENT* 4 weeks	ENT/OPH * 4 weeks	
Third Spiral	III	Clinical Rotation 9:30 to 1:00 (with Ambulatory, Emergency, Intensive care) In Medicine, Pediatrics, Cardiology and Neurology units <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice a week ▪ Ward tutorial twice a week ▪ Student research presentation once a week 		Clinical Rotation 9:30 to 1:00 (Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres) In Surgery, Gynae & Obstetrics, Orthopedics and Neurosurgery. <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice a week ▪ Ward tutorial twice a week ▪ Student research presentation once a week 		
		PARALLEL THEMES: The following themes are not part of any individual module but shall run concurrently:Communication Skills, Clinical Skills, Writing and Presentation Skills, Article Writing, Ethics				

RATIONALE

Knowledge of blood, immunity and inflammation is essential, as blood is responsible for the supply of micro-nutrients and Oxygen delivery to the tissues, maintenance of homeostasis, body responses and defense mechanisms against injurious agents and various diseases encountered in daily life.

TERMINAL OBJECTIVES

Medical graduate after completion of 5 years training program should be able to:

- Describe the composition of blood in relation to its biochemistry and physiology
- Classify different types of anemia on the basis of its pathophysiology
- Recognize ABO/RH blood grouping system
- Practice history taking of a patient presented with blood disorders
- Explain hemostasis and thrombolysis
- Describe pathophysiology of bleeding and coagulation disorders & identify their different types.
- Describe the pharmacology of drugs used in anemia and bleeding disorders
- Describe immunology on the basis of its pathophysiology
- Differentiate between Acute & chronic inflammation and the pathophysiology involved in the process.
- Describe the mechanism of Tissue Repair & regeneration
- Differentiate between different types of Hypersensitivity reactions
- Describe the mechanism of Autoimmune and immunodeficiency disorders
- Define Neoplasia and describe its related pathophysiology
- Describe the basis of diagnosis of cancers and its therapy

MODULE OBJECTIVES

1. Describe the structure of hematopoietic tissues and mechanism of hematopoiesis.
1. Justify the role of basic structure of Hemoglobin for being essential for RBCs normal function.
2. Classify anemia & differentiate its types on the basis of pathophysiology.
3. Explain the mechanism of corpuscular and extra corpuscular Hemolytic anemia.
4. Explain the mechanism of qualitative and quantitative disorders of R.B.C (Hyperbilirubinemia).
5. Describe the mechanism of hemostasis, with role of platelets in hemostasis and coagulation.
6. Describe the different blood groups and associated clinical correlates
7. Interpret the process of transfusion with requirements in different blood groups.
8. Define Inflammation and the mechanism of phagocytosis.
9. Describe the mechanism of inflammatory process and host responses to inflammation.
10. Describe the mechanism of tissue regeneration & repair.
11. Differentiate the mechanism of cellular and humoral immunity, hypersensitivity and immunological disorders.
12. Enumerate the consequences and patho-physiology of allergic and immune responses.
13. Describe Antigen –Antibody reactions.
14. Discuss briefly immunodeficiency states.
15. Define neoplasia, its nomenclature, classification & epidemiology.
16. Differentiate between benign & malignant tumors.
17. Describe the pathogenesis of tumors.
18. Discuss the pharmacology of different carcinogenic agents & cancer chemotherapy.
19. Enumerate hematologic malignancy & host tumor immunity.
20. Recognize the importance of Community medicine in disease transmission & investigation.
21. Recognize the importance of behavioral sciences regarding human development and behavior.
22. Recognize the importance of biostatistics for conducting research.
23. Identify importance of Epidemiology
24. Differentiate between different study designs

MODULE CONTENTS:

ANATOMY

1. **HEM 1 ANE 1** Embryological development of blood elements... Hematogenesis.
2. **HEM 1 ANH 2** Introduction to Lymphoid Tissue and Immune System, Histology of Lymph Node and Thymus.
3. **HEM 1 ANH 3** Histology of Lymph Node & Thymus (Practical).
4. **HEM 1 ANH 4** Histology of Spleen and Tonsils.
5. **HEM 1 ANH 5** Histology of Spleen and Tonsils (Practical).

PHYSIOLOGY

1. **HEM 1 PHY 1** Composition of blood: cellular components.
2. **HEM 1 PHY 2** Erythropoiesis.
3. **HEM 1 PHY 3** Factors affecting Erythropoiesis
4. **HEM 1 PHY 4** Hemoglobin formation, Types, Fate & Iron metabolism.
5. **HEM 1 PHY 5** Classification of anemia and significance of red cell indices.
6. **HEM 1 PHY 6** Types of Anemia 1
7. **HEM 1 PHY 7** Types of Anemia 2
8. **HEM 1 PHY 8** Polycythemia.
9. **HEM 1 PHY 9** Hemostasis and Role of thrombocytes.
10. **HEM 1 PHY 10** Hemostasis, Coagulation pathway.
11. **HEM 1 PHY 11** Bleeding and clotting disorders
12. **HEM 1 PHY 12** Hemostasis, Fibrinolytic mechanism
13. **HEM 1 PHY 13** Prevention of coagulation in vitro & in vivo.
14. **HEM 1 PHY 14** Genesis, classification & morphology of white blood cells.
15. **HEM 1 PHY 15** Functions of WBCs.
16. **HEM 1 PHY 16** Inflammation, role of neutrophils and macrophages.
17. **HEM 1 PHY 17** Immunity & its classification
18. **HEM 1 PHY 18** Mechanism of action of antibodies against invading agents
19. **HEM 1 PHY 19** Humoral immunity & Complement system.
20. **HEM 1 PHY 20** Cell Mediated Immunity.
21. **HEM 1 PHY 21** Allergy & Hypersensitivity.
22. **HEM 1 PHY 22** Blood group ABO & Rh system.
23. **HEM 1 PHY 23** Blood transfusion & complications.
24. **HEM 1 PHY 24** Hemoglobin Genesis and Classification

TUTORIAL

25. **HEM 1 PHY 25** Anemia: types and classification

26. **HEM 1 PHY 26** Coagulation Pathway
27. **HEM 1 PHY 27** Introduction to immunity and its classification
28. **HEM 1 PHY 28** Hypersensitivity
29. **HEM 1 PHY 29** Transfusion Reactions

PRACTICAL

30. **HEM 1 PHY 30** To determine erythrocyte sedimentation rate (ESR).
31. **HEM 1 PHY 31** Determination of hemoglobin (Hb%).
32. **HEM 1 PHY 32** To determine packed cell volume (PCV)/Hematocrit.
33. **HEM 1 PHY 33** To determine the bleeding time.
34. **HEM 1 PHY 34** To determine the clotting time.
35. **HEM 1 PHY 35** To determine differential leukocyte count (DLC).
36. **HEM 1 PHY 36** To determine the blood group of a human subject

BIOCHEMISTRY

1. **HEM 1 BIO 1** Composition of blood, plasma components and proteins.
2. **HEM 1 BIO 2** Synthesis, Structure & functions of Hb, oxygen dissociation curve.
3. **HEM 1 BIO 3** Role of hematinic: Iron metabolism.
4. **HEM 1 BIO 4** Role of hematinics: Vit. B 12/Folic acid/ B6.
5. **HEM 1 BIO 5** Plasma Protein Electrophoresis. (Tutorial)
6. **HEM 1 BIO 6** Abnormalities of Hb synthesis, Porphyria and its different types, variants of Haemoglobin.
7. **HEM 1 BIO 7** Heme Degradation.
8. **HEM 1 BIO 8** Porphyria and its types .(Tutorial)..
9. **HEM 1 BIO 9** Vitamin K and its disorders.
10. **HEM 1 BIO 10** Hemoglobinopathies and Thalassemia.
11. **HEM 1 BIO 11** Hemoglobin Electrophoresis.(Tutorial).
12. **HEM 1 BIO 12** Immunoglobulins.

PATHOLOGY

1. **HEM 1 PTH 1** Edema and Effusion, Hyperemia and Congestion.
2. **HEM 1 PTH 2** Hemostasis, Haemorrhagic, Thrombotic Disorder 1.
3. **HEM 1 PTH 3** Hemostasis, Haemorrhagic, Thrombotic Disorder 2.
4. **HEM 1 PTH 4** Embolism.
5. **HEM 1 PTH 5** Infarction shock.
6. **HEM 1 PTH 6** Mendelian Disorder 1.

7. **HEM 1 PTH 7** Mendelian Disorder 2.
8. **HEM 1 PTH 8** Acute inflammation.
9. **HEM 1 PTH 9** Mediators of inflammation and morphological patterns.
10. **HEM 1 PTH 10** Chronic Inflammation & systemic effects of Granulomas.
11. **HEM 1 PTH 11** Tissue Repair & regeneration 1.
12. **HEM 1 PTH 12** Tissue Repair & regeneration 2.
13. **HEM 1 PTH 13** Introduction to Immunopathology (Innate and Acquired Immunity).
14. **HEM 1 PTH 14** Complement system and its role in immunity.
15. **HEM 1 PTH 15** Antibody mediated immune response.
16. **HEM 1 PTH 16** Cell mediated Immunity.
17. **HEM 1 PTH 17** Hypersensitivity 1-2
18. **HEM 1 PTH 18** Hypersensitivity 3-4
19. **HEM 1 PTH 19** Introduction to Neoplasia, Nomenclature and Terminologies.
20. **HEM 1 PTH 20** Classification of Tumors, difference between Benign and Malignant Tumor
21. **HEM 1 PTH 21** Characteristic features of Tumor and Epidemiology of cancers.
22. **HEM 1 PTH 22** Molecular basis of Cancer1
23. **HEM 1 PTH 23** Molecular basis of Cancer2
24. **HEM 1 PTH 24** Carcinogenic agents and their cellular interaction

TUTORIAL/PRACTICAL

25. **HEM 1 PTH 25** Bone marrow Changes with ages and disease (Hemopoiesis, Aplastic Anemia)
26. **HEM 1 PTH 26** Microcytic Anemias
27. **HEM 1 PTH 27** Macrocytic Anemias
28. **HEM 1 PTH 28** Acute and chronic inflammation practical
29. **HEM 1 PTH 29** Healing And Repair
30. **HEM 1 PTH 30** Hypersensitivity Reactions.
31. **HEM 1 PTH 31** Neoplasia practical

MEDICINE

1. **HEM 1 MED 1** History and clinical findings in an anemic patient.
2. **HEM 1 MED 2** History, Examination and Management of a patient with bleeding Disorder.
3. **HEM 1 MED 3** History and Approach to a patient with Lymphadenopathy and Splenomegaly.
4. **HEM 1 MED 4** Introduction to Autoimmune Disease.

BEHAVIORAL SCIENCES

1. **HEM 1 BEH 1** Child Development.
2. **HEM 1 BEH 2** Puberty adolescent.
3. **HEM 1 BEH 3** Learning and behavior changes.
4. **HEM 1 BEH 4** Metacognition for web.

COMMUNITY MEDICINE

1. **HEM 1 COM 1** Introduction to epidemiology.
2. **HEM 1 COM 2** Dynamics of disease transmission.
3. **HEM 1 COM 3** Outbreak investigation.
4. **HEM 1 COM 4** Study Design with measures of association.
5. **HEM 1 COM 5** Introduction to bio-statistics & measures of central tendency and dispersion.
6. **HEM 1 COM 6** Screening.

LEARNING OBJECTIVE OF SKILL LAB CURRICULUM

1. I/M Injection

Introduction/ Rationale

It is one of the commonest ways of administering medications parenterally.

Learning Objectives

After the session the student should be able to:

- ❖ Demonstrate and perform the procedure proficiently.

2. Venipuncture:

Introduction/ Rationale

Venipuncture is the process of obtaining intravenous access for the purpose of intravenous therapy and obtaining a sample of venous blood. Because of its importance and potential hazards for the pt. every doctor should be proficient in this basic procedure.

Learning Objective

At the end of the session the student should be able to:

- ❖ Enlist the equipment needed for the procedure.
- ❖ Demonstrate the skill proficiently.

3. I/V Cannulation:

Introduction (Rationale):

This is one of the most important skills for giving parenteral medications and fluids to patients.

Learning Objectives:

At the end of the session students should be able to:

- ❖ Identify the correct sites for I/V cannulation
- ❖ Demonstrate correct method of I/V Cannulation

CASE BASED LEARNING

1. CBL 1

- Correlate the changes in structure and function of the different types of Hemoglobin in health and in disease states.
- Correlate different Hb electrophoresis pattern
- Relate normal and abnormal haemostatic mechanisms with the coagulation cascade
- Relate blood and blood components transfusion and transfusional reactions

2. CBL 2

- Learn the clinical approach to bleeding disorders, specifically platelets disorders versus coagulation disorders
- Discuss and differentiate between extrinsic and intrinsic pathways

3. CBL 3

- Interpret the report of Complete Blood Count.
- Identify abnormalities in a Complete Blood Count.
- Describe different types and causes of anemia.
- Understand Iron deficiency anemia.

4. CBL 4

- Define Lymphadenopathy
- Identify different causes of lymphadenopathy
- Describe the mechanism of lymphadenopathy
- Explain different types of lymphnodes

5. CBL 5

- Describe different types of hyper-sensitivity reactions
- List the examples of different hyper sensitivity reactions
- Understand the mechanism of anaphylaxis

The contents are subjected to be altered according to requirement of Academic calendar.

ASSESSMENT PLAN

	WEIGHTAGE
ANNUAL EXAM	80%
MODULE EXAM INTERNAL EVALUATION	
THEORY	10%
PRACTICAL	10%

CONTACT HOURS

Discipline	Contact Hours
Anatomy	6 Hours
Physiology	42 Hours
Biochemistry	13.5 Hours
Pathology	34.5 Hours
Community Medicine	6 Hours
Behavioral Sciences	4 Hours
Medicine	4 Hours
CBL	7.5 Hours
Skill Lab	4.5 Hours

CREDIT HOURS

HEMATOLOGY1 MODULE

Hem 1

6 + 3

BOOKS

ANATOMY

- **CLINICALLY ORIENTED ANATOMY**
KEITH.L.MOORE, Arthur F. Dalley, Anne M.R. Agur
7th or Latest EDITION
- **GRAY'S ANATOMY FOR STUDENTS**
Drake & Vogl & Mitchell
3rd or Latest EDITION
- **CLINICAL ANATOMY BY REGIONS (REFERENCE BOOK)**
Richard S. SNELL
9th EDITION
- **LAST'S ANATOMY: REGIONAL & APPLIED (REFERENCE BOOK)**
Chummy S. Sinnatamby
12th or Latest EDITION
- **ATLAS OF HUMAN ANATOMY**
FRANK H.NETTER
6th EDITION

EMBRYOLOGY

- **LANGMAN'S MEDICAL EMBRYOLOGY**
T.W.SADLER
13th EDITION
- **THE DEVELOPING HUMAN CLINICALLY ORIENTED EMBRYOLOGY (REFERENCE BOOK)**
MOORE & PERSAUD & TORCHIA
10th EDITION

HISTOLOGY

- **MEDICAL HISTOLOGY**
[LAIQ HUSSAIN SIDDIQUI](#)
5TH or Latest EDITION
- **WHEATERS FUNCTIONAL HISTOLOGY**
[BARBARA YOUNG](#)
5th EDITION
- **BASIC HISTOLOGY(TEXT AND ATLAS) (REFERENCE BOOK)**
[LUIZ JUNQUEIRA, JOSE CARNEIRO](#)
11th or Latest EDITION

PHYSIOLOGY

- **GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY**
[GUYTON AND HALL](#)
13th EDITION
 - [GANONGS REVIEW OF MEDICAL PHYSIOLOGY](#)
25TH EDITION

BIOCHEMISTRY

- **LIPPINCOTT'S ILLUSTRATED REVIEWS SERIES**
[DENISE R. FERRIER](#)
6th EDITION
- **HARPERS ILLUSTRATED BIOCHEMISTRY (REFERENCE BOOK)**
[VICTOR RODWELL, DAVID BENDER, KATHLEEN M. BOTHAM, PETER J. KENNELLY, P. ANTHONY WEIL](#)
28th EDITION

PATHOLOGY

- **ROBBINS BASIC PATHOLOGY**
[KUMAR & ABBAS](#)
9TH EDITION
- **ROBBINS & COTRAN PATHOLOGIC BASIS OF DISEASE (REFERENCE BOOK)**
[KUMAR & ABBAS & ASTER](#)
9th EDITION

COMMUNITY MEDICINE

- **PUBLIC HEALTH AND COMMUNITY MEDICINE**
[SHAH, ILYAS, ANSARI](#)
7th EDITION

PHARMACOLOGY

- **LIPPINCOTT'S ILLUSTRATED REVIEW PHARMACOLOGY**
[KAREN WHALEN](#)
6th or Latest Edition
- **BASIC AND CLINICAL PHARMACOLOGY (REFERENCE BOOK)**
[BERTRAM G. KATZUNG](#)
11th EDITION

MICROBIOLOGY

- **REVIEW OF MEDICAL MICROBIOLOGY AND IMMUNOLOGY**
[WARREN LEWINSON](#)
14th EDITION
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For Query:

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