

Dow University of Health Sciences



HEMATOLOGY MODULE

8 weeks, 9 credit hours

First Year MBBS

Curriculum committee, Dow University of Health Sciences

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) 6 Weeks		Foundation Sub Module Genetics, Microbiology, Bioethics 2 Weeks	HEM1- Hematology 1 Blood, Immunity, Inflammation, Tissue repair & Neoplasia 8 Week	
		LCM1- Locomotion Bones, Joints, Nerves & Muscles, 8 weeks		RSP1- Respiratory System 4 weeks	CVS1- Cardiovascular System 4 weeks	
	II	NEU1- Nervous System 8 weeks		HNN1- Head & Neck & Special 4 weeks	END1- Endocrinology 4 weeks	
		GIL 1-GIT and Liver 8 weeks		EXC1- Renal and Excretory System 4 weeks	REP1- Reproductive System 4 weeks	
Second Spiral	III	IDD 1- Infectious diseases 4 weeks	HEM2- Hematology 4 weeks		RSP2- Respiratory System 4 weeks	CVS2- Cardiovascular System 4 weeks
		GIL 2-GIT and Liver (including Nutritional Disorders) 8weeks		EXC2- Renal & Excretory System 4 weeks	END2- Endocrinology 4 weeks	
	IV	Half of the class will cover Ophthalmology in first 3 weeks of teaching session and the other half will cover ENT modules during this period. The other half of batch will cover Eye/ENT in later half of				
		OPH / ENT 3 week		ORT2 Orthopedics / Trauma, 6 weeks		REP2- Reproductive System 8 Weeks
		OPH / ENT 3 weeks	PMR- Rheumatology & Rehabilitation 2 weeks	DPS- Dermatology Plastic Surgery / Burns 2 weeks	GEN Genetics 1 week	NEU2- Neurosciences and Psychiatry 8 weeks
Third Spiral	V	Half of the class will cover Medicine & Allied and the other half will cover Surgery & Allied modules in first half of teaching year. The two halves will be exchanged in later half of teaching session				
		Clinical Rotation 9:30 onwards (Ambulatory, Emergency, Intensive care) In Medicine, Pediatrics, Cardiology and Neurology units 8:30 to 9:30 pm <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 onwards (Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres) In Surgery, Gynecology & Obstetrics, Orthopedics and Neurosurgery. 8:30 to 9:30 pm <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. Describe the significance of MHC molecules.
15. Discuss briefly immunodeficiency states.
16. Define neoplasia, its nomenclature, classification & epidemiology.
17. Differentiate between benign & malignant tumors.
18. Describe the pathogenesis of tumors.
19. Discuss the pharmacology of different carcinogenic agents & cancer chemotherapy.
20. Enumerate hematologic malignancy & host tumor immunity.
21. Recognize the importance of Community medicine in disease transmission & investigation.
22. Recognize the importance of behavioral sciences regarding human development and behavior.
23. Recognize the importance of biostatistics for conducting research.
24. Identify importance of Epidemiology
25. Differentiate between different study designs

MODULE CONTENTS:

ANATOMY

1. **HEM 1 Ane-1** Embryological development of blood elements..... Hematogenesis
2. **HEM 1 Anh 2** Histology of blood
3. **HEM 1 Anh 3** Introduction To Lymphoid Tissue And Immune System, Histology of Lymph Node
4. **HEM 1 Anh 4** Histology Of Thymus
5. **HEM 1 Anh 5** Histology Of Lymph Node &Thymus (Practical)
6. **HEM 1 Anh 6** Histology Of Spleen
7. **HEM 1 Anh 7** Histology Of Tonsils
8. **HEM 1 Anh 8** Histology Of Spleen And Tonsils (Practical)

PHYSIOLOGY

1. **HEM 1 Phy 1** Composition of blood: cellular components
2. **HEM 1 Phy 2** Maturation of RBC's. Regulation of erythropoiesis
3. **HEM 1 Phy 3** Hemoglobin formation function degradation & iron metabolism
4. **HEM 1 Phy 4** Peripheral blood film (Practical)
5. **HEM 1 Phy 5** classification of anemia and significance of red cell indices
6. **HEM 1 Phy 6** Hemolysis and hemolytic anemia
7. **HEM 1 Phy 7** Plasma Protein
8. **HEM 1 Phy 8** Hemostasis and Role of thrombocytes
9. **HEM 1 Phy 9** Clotting cascade and bleeding disorders
10. **HEM 1 Phy 10** Fibrinolytic mechanism
11. **HEM 1 Phy 11** Prevention of coagulation in vitro & invivo
12. **HEM 1 Phy 12** Bleeding time & clotting time (Practical)
13. **HEM 1 Phy 13** blood groups AbO/Rh system/ erythroblastosis fetalis
14. **HEM 1 Phy 14** Blood grouping and cross matching (Tutorial)
15. **HEM 1 Phy 15** Genesis and general characteristics of white blood cells
16. **HEM 1 Phy 16** Functions of WBC and monocyte macrophage cell system (R.E.S).
17. **HEM 1 Phy 17** Types And Functions Of Lymphocytes
18. **HEM 1 Phy 18** Cellular & humoral immunity & compliment system
19. **HEM 1 Phy 19** DLC (Practical)

BIOCHEMISTRY

1. **HEM 1 Bio 1** Composition of blood, plasma components and proteins
2. **HEM 1 Bio 2** Structure & functions of Hb, oxygen dissociation curve
3. **HEM 1 Bio 3** Role of hematinic: Iron metabolism
4. **HEM 1 Bio 4** Role of hematinic: Vit. B 12/Folic acid/ B6
5. **HEM 1 Bio 5** Abnormalities of Hb synthesis & (porphyria)
6. **HEM 1 Bio 6** Bilirubin metabolism : Heme Degradation and related disorders and hyperbilirubinemia
7. **HEM 1 Bio 7** Hemoglobinopathies and Thalassemia
8. **HEM 1 Bio 8** Vitamin K and its disorders
9. **HEM 1 Bio 9** Hemoglobin electrophoresis (Practical)
10. **HEM 1 Bio 10** Structure of Immunoglobulins

PATHOLOGY

1. **HEM 1 Pth 1** Anemia of diminished erythropoeisis(iron deficiency Anemia)
2. **HEM 1 Pth 2** Anemia of diminished erythropoeisis(megaloblastic/aplastic Anemia)
3. **HEM 1 Pth 3** Anemia of Blood loss
4. **HEM 1 Pth 4** Hemolytic Anemia
5. **HEM 1 Pth 5** Thalassemia syndrome
6. **HEM 1 Pth 6** Bone Marrow changes with ages & disease (Lab)
7. **HEM 1 Pth 7** Bleeding Disorders
8. **HEM 1 Pth 8** Coagulation Disorders
9. **HEM 1 Pth 9** Acute Inflammation
10. **HEM 1 Pth 10** Chronic Inflammation & systemic effects (Non- specific & granulomatous)
11. **HEM 1 Pth 11** Mediators of Inflammation & Morphological patterns
12. **HEM 1 Pth 12** Tissue Repair & regeneration
13. **HEM 1 Pth 13** Micro cytic & Macro cytic Anemia ((Lab)
14. **HEM 1 Pth 14** Acute & chronic inflammation (Lab)
15. **HEM 1 Pth 15** Introduction to Immunopathology (Innate and acquired immunity, complement system, C reactive protein)
16. **HEM 1 Pth 16** Antibody mediated immunity
17. **HEM 1 Pth 17** Cell mediated Immunity
18. **HEM 1 Pth 18** Hypersensitivity 1-2
19. **HEM 1 Pth 19** Hypersensitivity 3-4
20. **HEM 1 Pth 20** Overview of Autoimmune diseases
21. **HEM 1 Pth 21** Immunodeficiency disorders
22. **HEM 1 Pth 22** Healing & Repair (Lab)
23. **HEM 1 Pth 23** Introduction to Neoplasia: Nomenclature of tumors + terminologies

24. **HEM 1 Pth 24** Classification of tumors, difference between benign and malignant tumors
25. **HEM 1 Pth 25** Characteristic features of tumors and Epidemiology of cancers
26. **HEM 1 Pth 26** Molecular Basis of Cancer
27. **HEM 1 Pth 27** Carcinogenesis: Carcinogenic Agents and Their Cellular Interactions
28. **HEM 1 Pth 28** Clinical aspects of neoplasia (grading, staging and lab diagnosis)
29. **HEM 1 Pth 29** Host defence against tumors-tumor immunity
30. **HEM 1 Pth 30** Neoplasia (Lab)

PHARMACOLOGY

1. **HEM 1 Pha 1** Overview of drugs used in Anemia's
2. **HEM 1 Pha 2** Coagulants & Anticoagulant
3. **HEM 1 Pha 3** Modalities of cancer therapy (Overview)

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

BEHAVIORAL SCIENCES

1. **HEM 1 Beh 1** Child Development
2. **HEM 1 Beh 2** puberty adolescent
3. **HEM 1 Beh 3** Learning and behaviour 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** Screening
5. **HEM 1 Com 5** Study Design with measures of association
6. **HEM 1 Com 6** Introduction to biostatistics & measures of central tendency and dispersion
7. **HEM 1 Com 7** Normal distribution curve
8. **HEM 1 Com 8** Standard Error and Estimation of 95% confidence interval

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

<u>SUMMATIVE ASSESMENT</u>	<u>WEIGHTAGE</u>
ANNUAL EXAM	70%
MODULE EXAM INTERNAL EVALUATION	30%

CREDIT HOURS

CREDIT HOURS	
Hematology 1	9

Discipline	Credit Hours
Anatomy	0.53
Biochemistry	0.874
Physiology	1.718
Pathology	2.905
Pharmacology	0.25
Community Medicine	0.75
Behavioral Sciences	0.375
Medicine	0.281
CBL	0.468
Skill Lab	0.125
Self Study	1.117

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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Approved by:
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