	Spiral II	
MODULE TITLE	Blood- 2	
INTRODUCTION	In this module, students will get an opportunity to learn about the causes, manifestations, diagnoses and treatment of common blood-related conditions. Due emphasis will be given on prevention. Modern day conditions, highly relevant to Pakistan, like Dengue will be dealt with along with endemic diseases like Malaria.	
RATIONALE	In third world countries like Pakistan, blood-borne diseases are not only common, but they are also one of the leading causes of preventable death. Nutritional deficiency anemia is rampant in this region and Thalassemia is not unheard of. Upcoming doctors need to be cognizant of the gravity of the situation and have the necessary clinical skills to diagnose common conditions and justify plans for management and prevention.	
TARGET STUDENTS	Third year M.B.B.S., 2022	
DURATION	5 weeks	
MODULE OUTCOMES	 By the end of the module, students should be able to: justify initial plans of management and prevention of common blood disorders based on knowledge of Pathology, Pharmacology and Community Medicine. discuss legal aspects related to Blood 	
DEPARTMENTS	 Community Medicine Forensic Medicine & Toxicology Pathology & Microbiology Pharmacology 	
OBJECTIVES	By the end of the module, students will be able to:	

Blood- 2 Module Study Guide- MBBS Year-3, 2022

LECTURES

COMMUNITY MEDICINE

1. Nutritional Anemia

- Define Anemia
- Classify Anemia
- List the causes of nutritional anemia
- Explain the consequences of nutritional anemia
- Discuss prevention and control of nutritional anemia

2. Immunity, Vaccines and Cold Chain

- Define Immunity
- Explain the difference between Vaccination and Immunization
- Describe Live and Killed Vaccines
- Discuss the adverse reactions following immunization
- Explain Cold Chain and its importance

3. Expanded Programme of Immunization

- Explain the objective of EPI Programme
- Describe immunization
- Discuss the ongoing EPI programme in Pakistan

4. Cancer epidemiology and prevention

- Define cancer and its epidemiology
- Classify cancers
- Discuss different carcinogens
- Explain levels of prevention of cancer
- 5. Malaria and prevention
 - Explain the epidemiology of Malaria
 - Discuss the risk factors of Malaria
 - List the types of Malarial Parasite
 - Name the Vector of Malaria
 - Discuss the complications of Malaria

Blood- 2 Module Study Guide- MBBS Year-3, 2022

- Discuss the Prevention and Control of Malaria
- Describe National Control Programme of Pakistan

6. Dengue fever and prevention

- Explain the epidemiology of Dengue
- Discuss risk factors of Dengue
- List the Vectors of Dengue
- Discuss the complications of Dengue fever
- Discuss the prevention and control of Dengue

7. Prevalence of Thalassemia & Sickle cell disease

- Describe Thalassemia
- Classify different types of Thalassemia
- Describe Sickle cell disease
- List the different types of Sickle cell diseases
- Discuss the prevalence of Thalassemia and Sickle cell diseases in Pakistan

FORENSIC MEDICINE

1. Biological Stains (Blood)

- List the tests used to identify blood in a stain
- Identify the tests used for determination of origin (species), age, source (Arterial or venous), blood groups and sexing of blood stain
- Differentiate between ante-mortem and postmortem blood stains
- Explain the role of blood stain pattern analysis in forensic medicine
- Describe the tests for blood stains (Physical, Microscopic, Chemical, Biological, Spectroscopic)

2. Biological Stains (Seminal Stains)

- Describe the composition of semen
- List the criteria for normal sperm count as per WHO
- Discuss the medico legal importance of seminal stains
- Enumerate the various methods of collection of seminal material and determination of motility of sperms
- Describe the physical, chemical, microscopic, electrophoretic, and immunological tests for the

Blood- 2 Module Study Guide- MBBS Year-3, 2022

examination of seminal stains.

• Explain the role of seminal stains in determination of blood groups

3. Analytic Techniques

- Explain the methods, principles and uses of the following analytic techniques:
- I. Thin Layer Chromatography
- II. Gas Chromatography
- III. High Pressure Liquid Chromatography
- IV. Spectrophotometry
- V. Stass Otto process

4. Laws in relation to medical man – I

- Describe Medical ethics, its background (Hippocratic Oath) and its significance
- Explain the principles of Bioethics
- List the duties of doctor as advised by international code of medical ethics
- Discuss the regulatory council {Pakistan Medical Commission (PMC)}, its composition, functions and its role in Medical and Dental education

5. Laws in relation to medical man – II

- List privileges & obligations of registered medical practitioner
- Describe Professional misconduct (Infamous conduct)
- Explain the types of Consent and its role in relation to Medical Examination and
- List the criteria for giving valid consent
- Describe doctrine of informed consent (Rule of full disclosure)
- Discuss the deviations/exemptions of consent

6. Laws in relation to medical man-III

- Describe Professional negligence
- List the types of negligence
- Explain the following terms with examples:
 - i. Res- Ipsa- Loquotar
 - ii. Novus Actus Interveniens
 - iii. Vicarious Liability

7. Laws in relation to medical man – IV

- Summarize 5 D'S for plaintiff's success
- Briefly discuss the following:

Blood- 2 Module Study Guide- MBBS Year-3, 2022

- i. Compensation for Medical Negligence
- ii. Defenses for defendant doctor
- iii. Defenses for reducing damages
- List the salient features of Transplantation of Human Organs & Tissues Act 2010
- Explain Euthanasia, its types and ethical issues related to it

8. Hepatic Poisons- Alcohol

- Enumerate the sources of alcohol and various concentrations of alcohol which effect human behavior with medico legal imp
- Explain the absorption, metabolism and excretion of alcohol
- Describe the signs and symptoms of alcohol intoxication
- Discuss the procedure of examination of a drunkard by a Medico legal officer
- Describe the preservation of specimens and Lab tests for alcohol detection
- Briefly discuss chronic alcoholism, and withdrawal syndromes, and Antabuse therapy
- Enumerate the postmortem findings of alcoholism
- Discuss Methyl Alcohol intoxication, its complications and postmortem findings

PATHOL<mark>OGY & MICROBIO</mark>LOGY

1. Classification of anemia

- Define anemia
- Describe the morphologic characteristics and reference range of red cell indices
- Classify anemia according to underlying mechanism and morphology
- Discuss the effects of acute and chronic blood loss

2. Anemia of diminished erythropoiesis I

- List the types of anemia associated with red cell underproduction
- Discuss the causes of megaloblastic anemia
- Describe the peripheral blood findings/morphology in megaloblastic anemia
- Define pernicious anemia
- Discuss metabolism and its biochemical functions of vitamin B12
- Describe the pathogenesis, morphology and clinical features of pernicious anemia
- List the causes of folate deficiency
- Discuss the metabolic processes related to folic acid
- List the chronic illnesses associated with anemia of chronic diseases

Jinnah Sindh Medical University Blood- 2 Module Study Guide- MBBS Year-3, 2022

- Briefly discuss the mechanism involved in anemia of chronic diseases
- Briefly discuss the basis of anemia in renal failure, hepatocellular disease & endocrine disease

3. Anemia of diminished erythropoiesis II

- Define aplastic anemia, pure red cell aplasia, myelophthisic anemia, polycythemia
- List the causes of pure red cell aplasia & myelophthisic anemia
- Describe the normal iron metabolism
- Discuss the etiology of iron deficiency anemia
- Describe the pathogenesis & clinical features of iron deficiency anemia
- Discuss the morphological findings in bone marrow and peripheral blood smear
- Discuss the major causes of aplastic anemia
- Describe the pathophysiology of aplastic anemia
- Briefly discuss the morphology & clinical features of aplastic anemia
- Discuss the causes of both the types of polycythemia

4. Hemolytic anemia I

- Describe extravascular & intravascular hemolysis
- Briefly discuss morphology of hemolytic anemia
- Define hereditary spherocytosis
- Describe the pathogenesis, morphology & clinical features of hereditary spherocytosis
- Discuss the causes & pathogenesis of G6PD deficiency
- Briefly discuss the ABO incompatibility and Rh- immunization

5. Hemolytic anemia II

- Define sickle cell disease, immunohemolytic anemia and paroxysmal nocturnal hemoglobinuria (PNH)
- Describe the pathogenesis, morphology & clinical features of sickle cell disease
- Discuss the pathogenesis, manifestations & diagnosis of PNH
- Classify immunohemolytic anemia
- Discuss direct & indirect Coombs antiglobulin test
- Discuss the causes of hemolytic anemia resulting from trauma to red cells

6. Thalassemia syndrome

• Define thalassemia syndrome

Blood- 2 Module Study Guide- MBBS Year-3, 2022

- Classify thalassemia
- Discuss the pathogenesis, the clinical syndromes, diagnosis & types of beta thalassemia
- Discuss the morphology of beta thalassemia major/minor
- Discuss the pathogenesis & types of alpha thalassemia

7. Overview and classification of WBC disorders (Non-neoplastic)

- Briefly discuss pathogenesis, causes, morphology and clinical features in neutropenia and leukocytosis.
- List the causes of neutrophilia, eosinophilia, basophilia, monocytosis, lymphocytosis.
- Summarize lymphadenitis (acute and chronic nonspecific lymphadenitis patterns)

8. Neoplastic disorders of WBC (Acute leukemia)

- Discuss etiologic and pathogenetic factors of white cell neoplasms.
- Define acute leukemia, acute lymphoblastic leukemia, and acute myeloblastic leukemia
- Describe the pathogenesis, morphology, clinical presentation, and prognosis of acute lymphoblastic and acute myeloblastic leukemia

9. Non-Hodgkin lymphoma

- List the WHO classification of Non-Hodgkin Lymphomas
- Discuss pathogenesis, morphology, clinical features of Small lymphocytic lymphoma (chronic lymphocytic leukemia), Follicular Lymphoma, Diffuse Large B-Cell Lymphoma, Burkitt Lymphoma, Mantle Cell Lymphoma, Hairy Cell Leukemia

10. Hodgkin lymphoma

- Discuss pathogenesis, morphology, and clinical presentation of Hodgkin Lymphoma (HL)
- List subtypes of HL.
- Differentiate between Hodgkin Lymphoma (HL) and Non-Hodgkin Lymphomas (NHL)
- Enumerate the clinical staging of Hodgkin and Non-Hodgkin Lymphomas (Ann Arbor Classification)
- Discuss the pathogenesis, morphology, and clinical presentation of Hodgkin Lymphoma

11. Myeloproliferative disorders (MPD) and Myelodysplastic Syndrome (MDS)

- Define MPD and MDS
- Describe pathogenesis, morphological findings, clinical features of Chronic Myelogenous Leukemia, Polycythemia Vera, Essential Thrombocytosis, Primary Myelofibrosis, MDS

12. Bleeding disorders I (Platelet disorders)

- List the causes of thrombocytopenia
- Briefly discuss the bleeding disorders caused by vessel wall abnormalities
- Describe clinical presentation, morphological findings in Immune Throbocytopenic Purpura (ITP)
- Differentiate between acute and chronic ITP
- Briefly discuss Bernard-Soulier syndrome & Glanzmann thrombasthenia
- Summarize drug-induced Thrombocytopenia
- 13. Bleeding disorders II (DIC, Thrombotic Thrombocytopenic Purpura, Hemolytic Uremic Syndrome)
 - Discuss etiology, pathogenesis, & clinical presentation of Thrombotic Thrombocytopenic
 Purpura and Hemolytic Uremic Syndrome
 - Define DIC
 - Describe the etiology and pathogenesis of DIC

14. Coagulation disorders

- Explain the factor VIII- Von Willebrand (vWF) Complex
- Discuss the types and clinical presentation of Von Willebrand disease
- Describe the genetic defects, clinical features, and lab findings in Hemophilia A & B

15. Transfusion

• Discuss complications of transfusion

16. Pathogens causing sepsis

- List the organisms causing sepsis & the clinical findings of staphylococcal infections
- Describe the important properties and species of staphylococcus
- Discuss diseases caused by staphylococcus
- Describe the transmission and pathogenesis of staphylococcus
- Discuss laboratory diagnosis, treatment and prevention of staphylococcus infections

17. Gram negative rods: (Zoonotic organisms)

• Discuss the important properties, pathogenesis, clinical findings, laboratory diagnosis and prevention of Francisella, Yersinia, Pasteurella, Bartonella, Brucella

18. Rickettsiae

- Describe the important properties of Rickettsiae
- Discuss diseases caused by Rickettsiae
- Describe the transmission and pathogenesis of Rickettsiae
- List the clinical findings of Rickettsial infections
- Discuss laboratory diagnosis, treatment and prevention of Rickettsiae

19. Typhoid fever and its diagnosis

- Discuss the causative agent in typhoid fever
- Discuss the importance of blood culture in the diagnosis of Typhoid fever

20. Arboviruses

• Discuss in detail Dengue, Yellow fever, Chikungunya, and Ebola fever

21. HIV I

- Discuss the important properties of HIV
- Summarize replicative cycle of HIV
- Describe transmission, and epidemiology of HIV
- Discuss pathogenesis related of HIV/ AIDS

22. HIV II

- Discuss the clinical findings of HIV/ AIDS
- Discuss the laboratory diagnosis, immunity related to AIDS
- Discuss the treatment and prevention of HIV and AIDS

23. Blood and tissue protozoa I

- Discuss the basic terminologies related to parasitology
- Discuss the important properties of plasmodium, its pathogenesis and epidemiology
- Describe the clinical findings and laboratory diagnosis of Malaria
- Describe the treatment and prevention of malaria

24. Blood and tissue protozoa II

- Discuss the important properties of Leishmania and toxoplasma
- Describe the pathogenesis, clinical findings of Leishmaniasis and toxoplasma

Blood- 2 Module Study Guide- MBBS Year-3, 2022

• Discuss laboratory diagnosis, treatment and prevention of Leishmaniasis and toxoplasma

25. Tissue nematodes I (Wuchereria, Onchocerca, Loa Loa, Dracunculus)

- Discuss the important properties of tissue nematodes; Wuchereria, Onchocerca, Loa Loa, and Dracunculus
- Describe the pathogenesis, clinical findings of these nematodes
- Discuss the laboratory diagnosis, treatment and prevention of diseases caused by tissue nematodes

26. Tissue nematodes II (Toxocara, Trichenella, Ancylostoma, Angiostrongylus, Anisakis)

- Discuss the important properties of tissue nematodes; Toxocara, Trichenella, Ancylostoma, Angiostrongylus, and Anisakis
- Describe the pathogenesis, clinical findings of these nematodes
- Discuss laboratory diagnosis, treatment and prevention of diseases caused by these nematodes

PHARMACOLOGY

1. Drugs used to treat Anemia and Hematopoietic Growth Factors

- List the hematopoietic agents
- Explain the basic and clinical pharmacology of drugs used to treat anemias (including Iron, Vit.B12 and Folic Acid)

2. Coagulants & Anti-Coagulants

- Classify anticoagulants
- Discuss basic and clinical pharmacology of anticoagulants

3. Fibrinolytic & Thrombolytic drugs

• Classify fibrinolytic & thrombolytic drugs and describe their basic and clinical pharmacology

4. Vasoactive Peptides

- Classify vasoactive peptides
- Discuss the clinical importance and properties of different vasoactive peptides
- Describe the basic and clinical pharmacology of vasoactive peptides

5. Introduction to Anti-Microbial Therapy

Explain the general principles of antimicrobial therapy

Blood- 2 Module Study Guide- MBBS Year-3, 2022

- Classify and discuss mechanism(s) of action of antimicrobials
- Discuss antimicrobial spectra of different drug classes and drug resistance mechanisms
- List the clinical uses and their adverse effects

6. Cell Wall Synthesis Inhibitors-I (β-Lactam Antibiotics)

- Classify the types of Penicillin
- Describe the basic and clinical pharmacology of Penicillin

7. Cell Wall Synthesis Inhibitors-II (Cephalosporins & Others)

- Classify Cephalosporins
- Describe the basic and clinical pharmacology of cephalosporins and other drugs

8. Protein Synthesis Inhibitors-I & II

• Describe the basic and clinical pharmacology of protein synthesis inhibitors

9. Anti-Metabolites (Sulfonamides & Trimethoprim)

- Classify Sulfonamides and Trimethoprim
- Explain the pharmacokinetics, pharmacodynamics, adverse effects and their clinical uses
- Describe basic and clinical pharmacology
- List clinical uses and adverse effects

10. Anti-Viral Drugs-I

- Classify drugs used in the treatment of various viral infections (except drugs used in viral hepatitis)
- Discuss their mode of actions, pharmacokinetics, pharmacodynamics and adverse effects

11. Fluoroquinolones

- Classify Fluoroquinolones
- Describe basic and clinical pharmacology
- List clinical uses and adverse effects

12. Anti-Protozoal Drugs-I (Anti-Malarial Drugs)

- Classify antiprotozoal drugs
- Discuss their pharmacokinetics and pharmacodynamics.
- Describe their clinical uses and adverse effects

13. Immunosuppressives and Immunomodulants

• Classify immunosuppressants and immunomodulants

Jinnah Sindh Medical University Blood- 2 Module Study Guide- MBBS Year-3, 2022

- Describe the basic and clinical pharmacology of immunosuppressants and immunomodulants
- Explain their importance and the conditions in which they are used

14. Anti-Cancer Drugs-I & II

- Describe causes of cancer and discuss rationale of cancer chemotherapy
- Classify anticancer drugs according to cell cycle specificity
- Discuss their basic and clinical pharmacology of anti-cancer drugs

15. Anti-Fungal Drugs

- Classify anti-fungal drugs
- Discuss the basic and clinical pharmacology of antifungal drugs

TUTORIALS

FORENSIC MEDICINE

1. Blood grouping

- List the commonly used blood grouping systems
- Discuss the medico legal importance of ABO and Rh blood groups

2. Medico Legal report and examination of person who consumed alcohol

- Explain the procedure of examination of a drunkard person
- Discuss the medicolegal report of a person who consumed alcohol

3. Kerosene oil and petroleum products poisoning (Hydrocarbons)

• Describe the mode of action, signs, symptoms, treatment, postmortem findings and medico legal aspects of Kerosene oil and petroleum products poisoning

PATHOLOGY

1. Interpretation of Complete Blood Count

- Interpret peripheral blood smear
- Interpret the reports of Complete Blood Count
- 2. Bleeding disorders
- Interpret bleeding disorders based on data provided

3. Examination of bone marrow

- List the types of bone marrow
- Discuss sites for bone marrow procedures

Blood- 2 Module Study Guide- MBBS Year-3, 2022

- List the indications for bone marrow examination
- Discuss M:E ratio
- Diagnose common hematological conditions based on main morphological characteristics

PHARMACOLOGY

1. Coagulants, Anti-Coagulants, Fibrinolytic & Thrombolytic Agents

- Classify coagulants, anti-coagulants, fibrinolytic and thrombolytic agents
- Discuss their pharmacokinetics & pharmacodynamics, clinical uses and adverse effects

2. Cell Wall Synthesis Inhibitors

- Classify cell wall synthesis inhibitors
- Discuss their pharmacokinetics and dynamics, and their clinical importance

3. Protein Synthesis Inhibitors

- Classify protein synthesis inhibitors
- Discuss their pharmacokinetics and dynamics, and clinical importance

4. Anti-Metabolites and Fluoroquinolones

- Classify anti-metabolites and fluoroquinolones
- Discuss their pharmacokinetics and pharmacodynamics, clinical uses and adverse effects

5. Anti-Viral Drugs-I

- Classify anti-viral drugs
- Discuss thier pharmacokinetics and pharmacodynamics
- Discuss clinical importance of anti-viral agents (except drugs used in viral hepatitis)

6. Anti-Malarial Drugs/ drug treatment of Dengue fever

- Classify the drugs used to treat malaria
- Discuss their pharmacokinetics and pharmacodynamics, resistance
- Discuss their clinical importance of anti-malarial agents and drugs used in dengue fever

7. Immunomodulants and Suppressants Drugs

- Classify Immunosuppressives and Immunomodulants
- Discuss their basic and clinical pharmacology

8. Anti-Cancer Drugs

• Classify anti-cancer drugs

Blood- 2 Module Study Guide- MBBS Year-3, 2022

Discuss their basic and clinical pharmacology		
INTERNAL ASSESSMENT	 Internal assessment will be according to JSMU policy. The details of internal assessment will be determined by the respective institutions. Internal assessment carries 20% weightage in the final, end-of-year examination. 	
FINAL EXAMINATION	MCQs and OSPE	
COURSE EVALUATION	Course will be evaluated through a feedback form which will be posted on the JSMU website	



JINNAH SINDH MEDICAL UNIVERSITY