BAKHTAWAR AMIN
MEDICAL & DENTAL COLLEGE

Bakhtawar Amin Medical & Dental College

(BAMDC) Multan

STUDY GUIDE (2024-2025)

3rd Year MBBS

Study Guide 3rd Year MBBS

BLOCK 07

2024-25

INTRODUCTION

WHAT IS A STUDY GUIDE?

This study guide book is designed for Medical Undergraduates by consolidated effort of all subjects across the year to provide students of BAMDC a resource material which would highlight important aspects of curriculum.

The study guide aims to promote self-regulated lifelong learning among students by giving them the control over their learning.

The pervasive curriculum aspects of undergraduates' competencies, assessment policies and curriculum coordinators are mapped in his guide book. Horizontal integration across the year better conceptual understanding while vertical integration promotes clinically relevant understanding.

BAMDC aims to improve health indicates of society by improvement of students and doctors in preventive health service provision and health education provision to society through community programs.

The study guide gives an overview of intended course outcomes and objectives in relation to the course content. The assessment methodology tailored to intuitional strategy is provided. This study guide has been carefully designed keeping in view PMDC and UHS curriculum and guide lining dedicated effort by faculty is done to make this guide tailored to student's needs.

Our aim to improve it by every passing day. This humble effort of all faculty acts as a guiding light for our dear students.

1. Rationale of Curriculum

Curriculum is a framework that sets expectations for students' learning. It serves as a guide for teachers, a roadmap if you will, that establishes standards for student performance and teacher accountability.

The curriculum should be student-oriented utilizing active processes for learning and should not make the student a passive recipient. The curriculum is materials used to convey information to students.

"A curriculum consists of the "roadmap" or "guideline" of any given discipline."

"The curriculum represents the expression of educational ideas in practice. The word curriculum has its roots in the Latin word for "track or race-course". From there, it came to mean course of study or syllabus." (David Prideaux)

The Pakistan Medical & Dental Council is a statutory body constituted by the Federal Government under the Pakistan Medical & Dental Council Ordinance, 1962.

The curriculum of the college has a vision and mission aligned with that of UHS and states as follows;

Vision:

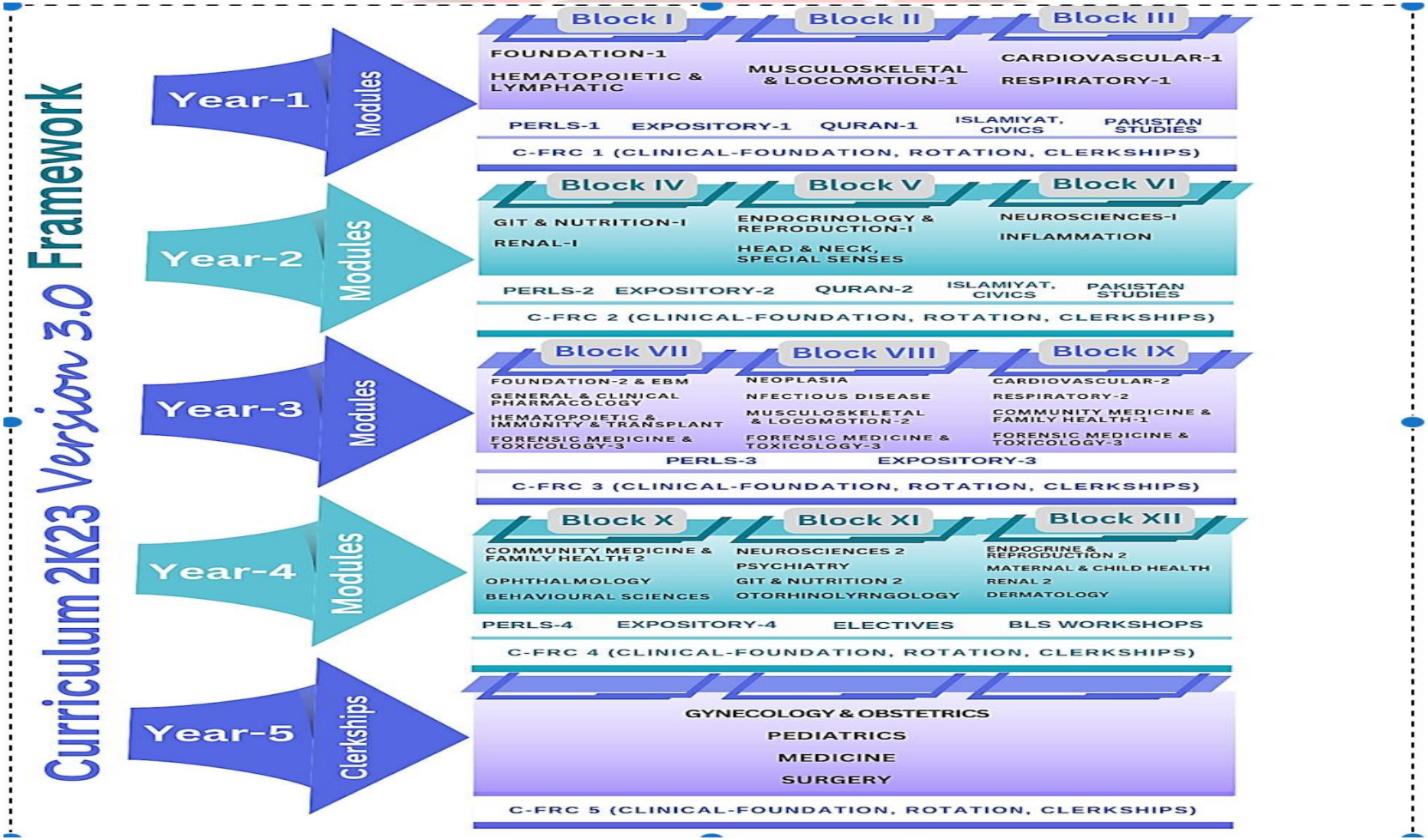
"Bakhtawar Amin Medical and Dental College will work to become the premier academic Medical College in the region dedicated to achieving excellence all around in medical education, clinical programs, and innovative research."

Mission:

"Bakhtawar Amin Medical and Dental College will lead in advancing health through the best clinical care, innovative research, and the education of tomorrow's leaders in biomedicine in a culture that supports diversity, inclusion, critical thinking, creativity and adhering to the highest ethical standards."

2. Curricular Framework

A significant highlight of this integrated curriculum is the proposed competency framework for the pre- clinical years. This framework is designed to empower students to seamlessly apply their knowledge of basic medical sciences to problem-solving scenarios in clinical years and clerkships. It serves as a bridge that ensures a cohesive transition between foundational knowledge and practical application.



It is an aid to:

- Inform students how the student learning program of the semester-wise module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules and regulations

THE STUDY GUIDE:

- Communicates information on the organization and management of the module. This will help the student to contact the right person in case of any difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial, and case-based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer-assisted learning programs, web- links, and journals, for students to consult in order to maximize their learning.
- Highlights information on the contribution of continuous and semester examinations on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focuses on information about examination policy, rules and regulations

3. LEARNING METHODOLOGIES

The following teaching/learning methods are used to promote better understanding:

- Interactive Lectures
- Hospital / Clinic visits
- Small Group Discussion
- Case- Based Learning
- Practical's
- Skills session
- E-Learning
- Self-Directed Study

Interactive lectures:

In large group, the lecturer introduces a topic which explains the underlying phenomena through questions, pictures, exercise, etc. Students are actively involved in the learning process.

Small group discussions:

This format helps students to clarify concepts and acquire skills and attitudes. Students exchange opinions and apply knowledge gained from lectures and self-study. The facilitator role is to ask probing questions, summarize, or rephrase to help clarify concepts.

Practical and manual skills:

In practical sessions students perform practical as assigned in the curriculum and syllabus provided by PMDC. They are also required to maintain a practical manual of the lab work. Understanding and effectively using the microscope, lab apparatus, blood pressure apparatus etc.

Self- directed learning:

Students' take responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours or after wards for self-study.

Assignments:

Students are given written formative assignments on designated topics.

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THEORY		
GENERAL PHARMACOLOGY		
CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 17

		INTEGRATING DISCIPLINE	TOPIC
F2-Ph-001	Define Pharmacology, different branches of Pharmacology, Drug Nomenclature and Pharmacopoeias	Pharmacology	Introduction
F2-Ph-002	Identify the Sources & Active Principles of Drugs with Clinical Applications of Active Principles. Describe different sources of drugs. Tabulate differences between fixed oils and volatile oils as sources of drugs.		Sources of drugs and active principles
F2-Ph-003	Summarize definitions of various pharmacokinetic and pharmacodynamic parameters		Parameters
F2-Ph-004	Name various routes of drug administration. Discuss the advantages & disadvantages of various routes of drug administration. Describe the factors that influence the route of administration of a drug. Understand the Clinical Relevance of the Selection of Routes of Administration.		Routes of Administration

F2-Ph-005	Enlist the different processes by which drugs are transported across cell membranes. Describe and differentiate each transport process.		Permeation
F2-Ph-006	Describe drug absorption.	Pharmacology	Absorption
	Describe drug-based factors affecting rate and extent of drug absorption. Predict the relative permeation of a clinically useful weak acid or a weak base from knowledge of its pKa, the pH of the medium using the Henderson Hasselbalch equation. Determine percentage of drug ionized or unionized when placed in a certain Ph media. Explain ion trapping. Describe patient-based factors affecting rate and extent of drug absorption. Describe the Clinical Significance of Drug Absorption.		

F2-Ph-007	Define Bioavailability. Describe factors affecting bioavailability. Define Area under the curve (AUC). Explain first pass elimination. Explain extraction ratio. Understand that how bioavailability and the first pass effect, affect the different Clinical conditions. Explain bioequivalence and therapeutic equivalence.	Pharmacology	Bioavailability and first pass effect
F2-Ph-008	Define drug distribution.	Pharmacology	Distribution

	Describe the distribution of a drug through various body compartments. Explain selective distribution. Describe factors affecting distribution of a drug. Explain volume of distribution (Vd) and how to calculate Vd. understand the clinical significance of Vd Explain the characteristics of a drug that is bound to plasma proteins. Describe the clinical consequences of displacement of a drug from plasm protein binding.		
	Explain metabolism and biotransformation. Describe the aims and outcomes of metabolism and biotransformation. Explain a 'prodrug' Enlist and describe characteristics of Phase 1 and		

F2-Ph-009	Phase 2 reactions of biotransformation. Describe microsomal and non-microsomal biotransformation reactions. Describe the microsomal oxidation system. Explain Hoffman's elimination. Describe factors affecting metabolism & biotransformation.	Pharmacology	Metabolism and biotransformation
	Describe the clinical significance of enzyme induction and enzyme inhibition with their examples. Describe the clinical significance of metabolism & biotransformation. Describe clinical significance of enterohepatic recycling of drugs.		

F2-Ph-010	Define Plasma Half-Life, and Understand the concept of plasma half-life. Describe factors affecting half-life and clinical significance of plasma half-life. Understand the concept of drug clearance. Describe factors affecting drug clearance. Explain the Clinical Significance of different values of Drug Clearance. Explain steady state plasma concentration. Explain Clinical Significance of Steady State plasma concentration. Define & Explain Elimination and Orders of Elimination – First & Zero Order Kinetics with examples. Describe Clinical Significance of First & Zero Order Kinetics.	Pharmacology	Elimination

	Tabulate differences between First order kinetics and Zero Order Kinetics. Define, explain & calculate maintenance dose and loading dose using appropriate formula.		
F2-Ph-011	Describe drug excretion. Enlist routes of drug excretion. Describe processes of drug excretion through the kidneys. Describe factors affecting glomerular filtration & tubular reabsorption. Describe the Clinical Significance of Glomerular Filtration, Active Tubular Secretion and Passive Tubular Reabsorption of Drugs	Pharmacology	Excretion
GENERAL PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 06**	
		INTEGRATING DISCIPLINE	**TOPIC**

F2-Pa-001	Define mutation and classify different types Describe the features and examples of the following i. Autosomal dominant disorders ii. Autosomal recessive disorders iii. X-linked disorders Give brief account of steps of PCR and types of PCR	Pathology	Genetics
F2-Pa-002	Give brief account of; i. Marfan syndrome ii. Ehlers-Danlos syndrome iii. Down syndrome iv. Klinefelter syndrome v. Turner syndrome	Pathology	Genetic syndromes
	Define karyotyping and enlist the karyotyping of above-mentioned syndromes		
F2-Pa-003	To know the difference between gram positive and negative cell wall. How it affects the choice of antibiotic	Pharmacology	Comparison of Gram-positive and negative Bacterial cell wall structure, how bacteria differ from viruses
MICROBIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 09**	
		INTEGRATING DISCIPLINE	**TOPIC**

F2-Pa-004	Classify gram-positive and negative cocci. Classify gram +ve and gram –ve rods. Classify spirochetes and atypical bacteria. Classify culture media and describe blood, chocolate, McConkey, nutrient, CLED, TCBS, TSI, citrate & urease media. Blood culture. seaboard agar. Define conjugation, transduction, transformation and describe mechanisms of antimicrobial resistance. Define colonization resistance and enlist normal flora of skin, gut, respiratory tract, and vagina. Classify DNA viruses and RNA viruses. Classify medical mycoses fungi. Classify medically important parasites.	General Microbiology	Microbiology

FORENSIC MEDICINE			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**

F2-For-001	Describe Forensic Medicine & its various branches.	Forensic Medicine & Jurisprudence	Introduction to the subject of Forensic Medicine
F2-For-002	Describe evidence, its types & recording of evidence	Jurisprudence	Chain of evidence
F2-For-003	Describe the importance of diagnosis of death		Introduction to Thanatology
F2-For-004	Describe the WHO format of the death certificate.		Death certificate
COMMUNITY MEDICINE			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
F2-CM-001	Define Health. What are health dimensions?	Medicine	Concept & health disease
	What are the good health indicators?		
	Calculate and interpret health indicators of Public Health Importance.		
PATIENT SAFETY			

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 04	
		INTEGRATING DISCIPLINE	TOPIC
F2-PS-001	Explain why patient safety is a critical concern in healthcare and how it impacts the quality of patient care.	Clinical subjects	What is patient safety
F2-PS-002	Students should understand the relationship between human factors and patient safety		Applying human factors is important for patient safety

GENERAL SURGERY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 03	
		INTEGRATING DISCIPLINE	TOPIC
F2-S-001	Describe the basics of Wound Healing & tissue repair	Pathology	Wound Management
F2-S-002	Classify Burns & its management	Gen surgery	Burns
F2-S-003	Identify hemorrhage & shock in Trauma patient.	Emergency medicine	Shock & hemorrhage

GENERAL MEDICINE

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 02	
		INTEGRATING DISCIPLINE	TOPIC

F2-M-001	Signs, symptoms, and differentials of common bacterial diseases.	Medicine	Bacterial diseases
F2-M-002	Signs, symptoms, and differentials of common viral diseases.		Viral diseases
PSYCHIATRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**
F2-BhS-001	Define health behavior and discuss the importance of behavioral sciences in medical practice. Identify biological, psychological, and social factors that influence health behaviors and decision- making. Discuss key behavioral change models (e.g., Health Belief Model, Theory of Planned Behavior) and their application in patient care.	Behavioral sciences	Introduction to Health Behavior and Its Determinants
PRACTICAL / LAB WORK			
FORENSIC MEDICINE			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 04**	
		INTEGRATING DISCIPLINE	**TOPIC**

F2-For-009	Describe trace evidence & its types	Forensic Medicine	Trace evidence
F2-For-010	Types of fingerprints		Dactylography Recording of evidence
	Recording of dying declaration		
F2-For-011	Take written informed consent for various procedures		Consent form
PATHOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**
F2-Pa-005	To perform steps of gram staining. How this staining will help to choose antibiotics.	Pathology	Use of Microscope & Gram staining
PHARMACOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 03**	
		INTEGRATING DISCIPLINE	**TOPIC**
F2-Ph-012	Calculations of drug dosing (e.g., IV infusion) & dose of children.	Pharmacology	Calculation
F2-Ph-013	Calculations (Mean, Mode, Median, Standard Deviation, and Standard Error), and Metrology.		Drug dosing
CLINICAL ROTATIONS / COMMUNITY HEALTHCARE			
SURGERY			

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 02	
		INTEGRATING DISCIPLINE	TOPIC
F2-S-004	Enlist Suture types & techniques	Surgical Emergency Integrate General Surgery	Basic Surgical Skills
F2-S-005	Classify Wound Dressings & its protocols		Wound Management

MEDICINE

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 02	
		INTEGRATING DISCIPLINE	TOPIC
F2-M-003	History taking skills	Gen medicine	History taking
F2-M-004	Approach to patient	Gen medicine	General physical examination

PHARMACOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 58	
		INTEGRATING DISCIPLINE	TOPIC
	Define Pharmacodynamics, Affinity, Efficacy, Potency		
	Explain Agonists, partial agonists, inverse agonists, bias, allosteric agonists, and modulators with examples.		

GPh-Ph- 001	Define Spare receptors and give clinical importance.	Pharmacology	Pharmacodyna mics
	Elaborate Transmembrane signaling pathways		
	Name the Effectors controlled by G-proteins		
	Describe various Drug–antagonism types with examples		
	Define Median Effective (ED50), Median Toxic (TD50) & Median Lethal Dose (LD50) and its clinical relevance		
	Define the Therapeutic index and give its clinical importance.		
	Define the Therapeutic window and give its clinical importance.		
	Compare & discuss the information derived from Graded and Quantal dose-response curves.		
	Explain the significance of Semi-log Transformation.		
	Define Desensitization, Tachyphylaxis, Tolerance, Resistance, Super sensitivity, Hypersensitivity, Superinfection, Iatrogenic effect, and Idiosyncrasy, and give examples.		
	Describe the Phenomenon of down-regulation of receptors.		
	Describe Pharmacogenetics and give examples.		
	Illustrate various phases of Drug development.		

GPh-Ph- 002	List the cholinergic receptors and recall their site of action and 2nd messenger system.	Biochemistry & Physiology	Autonomic Pharmacology Cholinergic System
	Classify cholinergic agonists and antagonists.		
	Discuss the pharmacological actions / systemic effects of cholinergic agonists and antagonists.	Physiology	
	Outline the clinical uses and adverse effects of Cholinomimetics.		
	Differentiate between myasthenic crisis and cholinergic crisis.	Medicine	
	Give the outline of the management of Myasthenia gravis.		
	Role of pharmacology in Alzheimer's disease.		
	Role of Pharmacology in treatment of Glaucoma	Ophthalmolog y	
	Discuss the management of Organophosphate (OPC) poisoning	Medicine	
	Describe the process of "aging" in OPC poisoning and its management		
	Discuss the Therapeutic Uses of Antimuscarinics		
	Role of anticholinergic drugs in the management of Parkinson's disease		
	Enlist the Toxicity and contraindications of Atropine along with their rationale.		

	Enlist the Toxicity and Management of Nicotine Poisoning		
	Enlist the Toxicity and Management of Mushroom Poisoning		
GPh-Ph- 003	Enlist the adrenergic receptors and recall their site of action and 2nd messenger system.	Physiology and Biochemistry	Autonomic Pharmacology (Adrenergic System)
	Classify adrenergic agonists		
	Recall the general characteristics of catecholamines.	Biochemistry	
	Compare the structural characteristics of catecholamines & non-catecholamines		
	Discuss the pharmacological actions / systemic effects of direct and indirect-acting adrenergic agonists.	Physiology	
	Enlist the therapeutic uses, adverse effects, and contraindications of direct-acting adrenergic agonists.		
	Classify alpha blockers		
	Elaborate the clinical uses of alpha-blockers.	Medicine	
	Discuss the adverse effects of alpha-blockers.		
	Classify Beta-blockers		
	Explain the clinical indications of beta antagonists		
	Enlist their adverse effects.		
	Compare and contrast the characteristics of Reserpine and Guanethidine.		

	Explain the pharmacological actions of ganglion blockers.		
	Discuss epinephrine reversal		
	Expand on the pharmacology of drugs that balance sympathetic and parasympathetic activity. (like clonidine and methyldopa)		
	Use of Artificial Intelligence (AI) in understanding and modulating the autonomic nervous system		
	Use of AI to improve pharmacotherapy for conditions like hypertension and chronic heart failure		
BIOCHEMISTRY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**
GPh-B-001	Describe the features of Signal transduction. Describe different types of second messengers Differentiate the G protein and non-G protein mediated	Biochemistry	Signal Transduction & Second Messengers
PHYSIOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 02**	
		INTEGRATING DISCIPLINE	**TOPIC**

GPh-P-001	Describe the types of adrenergic and cholinergic receptors and their functions. Explain the effects of sympathetic and parasympathetic on various organs/systems of the body	Medical physiology	Autonomic Nervous System

BEHAVIOURAL SCIENCES

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 02	
		INTEGRATING DISCIPLINE	TOPIC
GPh-BhS-001	Describe common ethical dilemmas in drug trials & pharmaceutical industry.	Behavioural sciences	Ethical dilemmas

PRACTICAL / LAB WORK

PHARMACOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 12	
		INTEGRATING DISCIPLINE	TOPIC
GPh-Ph- 004	Preparation on Normal Saline, dextrose Saline and 1000 ml of O.R.S. in water	Pharmacology	Drug preparation and dispensing
	To prepare and dispense doses of carminative mixture		
	To prepare and dispense 100 ml of 0.1 % KMnO4 solution using a stock solution		
	To prepare and dispense 4 doses of APC Powder		

	To prepare and dispense 12 g of Sulphur ointment B-P 10%		
GPh-Ph-005	Analysis and interpretation of Drugs (Acetylcholine, Atropine Adrenaline, Propranolol) on animal through	Pharmacology	
	online videos / simulations / graphs / practical performance.		Autonomic Nervous System
	Analysis and interpretation of different Concentrations of Acetylcholine on Rabbit's Ileum through online videos / simulations / graphs / practical performance.		
	Analysis and interpretation of drug Antagonism Between Acetylcholine and Atropine on Rabbit's Ileum through online videos / simulations / graphs / practical performance.		
	Analysis and interpretation of Drugs (Pilocarpine, Adrenaline, Atropine, Homatropine, Proparacaine) on Rabbit's Eye through online videos / simulations / graphs / practical performance.		

PATIENT SAFETY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 03	
		INTEGRATING DISCIPLINE	TOPIC
GPh-PS- 001	Understanding of the terms error, slip, lapse, mistake, violation, near miss and hindsight bias	Pharmacology	Learning from errors to prevent harm

GPh-PS- 002	Learn and practice ways to improve the safety of medication use.		Medication safety

SYLLABUS

THEORY			
HEMATOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 39**	
		INTEGRATING DISCIPLINE	**TOPIC**
	Describe the stages in formation of red blood cells (RBCs), white blood cells (WBCs), platelets	Hematology	
	Correlate hematopoiesis with various hematopoietic growth factors along with normal bone marrow morphology		
	Identify normal values of RBC, WBC, hemoglobin level, packed cell volume, MCH, MCV, MCHC and platelet count.		
	Classify and interpret the anemias on basis of morphology and underlying pathogenesis of RBC production		

HIT-H- 001	Describe and interpret data related to causes, clinical features, clinical presentation and diagnosis of hypochromic anemia, megaloblastic anemia, anemia of chronic disease, Hereditary Spherocytosis, aplastic anemia and hemolytic anemias		Hematopoietic system
	Give biochemical explanation for megaloblastic anemia in subjects suffering from deficiency of vitamin B_9 and B_{12}.	Hematology	
	Give biochemical explanation for microcytic anemia in subjects suffering from deficiency of vitamin B_6, vitamin B_2, vitamin C, vitamin A, and iron.		
	Elaborate the biochemical mechanism underlying hemolysis in subjects suffering from deficiency of pyruvate kinase and glucose-6-phosphate dehydrogenase.		
	Elaborate the biochemical mechanism underlying hemolysis in subjects suffering from hereditary spherocytosis and elliptocytosis.		
	Give biochemical explanation for hemolysis in subjects suffering from vitamin E deficiency.		
	Describe the clinical manifestations, clinically differentiating features and clinical course of patient with anemia.	Hematology	

	Recognize symptoms driving surgical decisions such as jaundice, pallor and fatigue that may require surgical intervention especially splenectomy	General Surgery		
	Evaluate physical signs for surgical planning as splenectomy particularly in cases where splenic sequestration or hypertension exacerbates hemolysis			
	Monitor patient's post-splenectomy for recurrent symptoms like jaundice or anemia, which may suggest incomplete resolution or complications requiring surgical or medical management			
	Describe and interpret data related to etiology, pathogenesis, clinical types and diagnosis of thalassemia with emphasis on incidence, common mutations, associated psychosocial problems and prevention	Hematology		
	Clearly differentiate between quantitative and qualitative hemoglobinopathies.	Biochemistry		
	Elaborate the genetic basis and inheritance of important types of quantitative hemoglobinopathies (alpha and beta thalassemia's).			
	Elaborate the genetic basis and inheritance of important types of qualitative hemoglobinopathies (HbS, HbC, HbSC).			

	Explain how does electrophoresis help in confirming the diagnosis of various types of qualitative hemoglobinopathies (HbS, HbC, HbSC).		
	Enlist the inherited and acquired causes of methemoglobinemia's and elaborate the consequences.		
	Describe and interpret the data inheritance, clinical features, lab diagnosis of Von Willebrand's disease, Hemophilia A&B and Polycythemia	Hematology	
	Give explanation for hemorrhages in subjects suffering from vitamin K and vitamin C deficiency.	Biochemistry	
	Elaborate mechanisms which can cause neutropenia/agranulocytosis	Hematology	
	Explain how does deficiency of glucose-6-phosphate translocase result in neutropenia and recurrent infections.	Biochemistry	
HIT-H- 002	Differentiate between infective and malignant causes of leukocytosis with special reference to infectious mononucleosis, acute and chronic non-specific lymphadenitis	Hematology	Lymphoid system
	Explain and interpret the data of Non-Hodgkin's lymphoma in terms of classification, etiology, pathogenesis, clinical features, diagnosis, staging and prognosis.		

	Explain and interpret the data of Hodgkin's lymphoma in terms of classification, etiology, pathogenesis, clinical features, diagnosis, staging and prognosis.		
	Explain the pathophysiology of gastric lymphomas including the type (eg. MALT and diffuse large B-cell lymphoma), role of H. pylori infection	General Surgery	
	Identify the clinical features and diagnostic modalities (eg. Endoscopy, biopsy and imaging) and differential diagnosis of gastric lymphomas inpatients presenting with gastrointestinal symptoms		
HIT-H- 003	Explain and interpret the data of acute and chronic leukemias with respect to classification, etiology, pathogenesis, clinical features, diagnosis, staging and prognosis.	Hematology	Haemopoietic system
	Describe the clinical manifestations, clinically differentiating features and clinical course of patient with leukemia.	General Medicine	
	Explain and interpret the data of multiple myeloma with respect to aetiology, pathogenesis, morphology, clinical features, diagnosis, staging and prognosis		
	Explain and interpret the data of disseminated intravascular coagulation with respect to classification, aetiology, pathogenesis, morphology, clinical features, diagnosis, prognosis and management.	Hematology	

	Classify anticlotting drugs: Compare their usefulness in venous and arterial thromboses Describe the mechanisms of action, clinical uses and adverse effects of anticoagulants Compare Unfractionated heparin, LMW heparins and oral anticoagulants		
	Compare and contrast the mechanism of action, clinical uses, and toxicities of the oral anticoagulants (warfarin, rivaroxaban, and dabigatran). Explain the pharmacokinetic and pharmacodynamic drug interactions of Warfarin	Pharmacology	
	Describe the mechanisms of action, clinical uses and adverse effects of antiplatelet drugs Illustrate where the 4 major classes of antiplatelet drugs act Differentiate between Clopidogrel and Ticlopidine		
	Discuss the mechanism of action, clinical uses, adverse effects and contraindications of Thrombolytics Tabulate differences between Streptokinase & recombinant tissue plasminogen activators.	Pharmacology	
	Enumerate hematopoietic growth factors, explain their mechanism of action, uses and adverse effects.		
	Explain and interpret the data with respect to causes of decreased production and decreased survival of platelets in terms of classification, etiology,	Hematology	

	pathogenesis, morphology, clinical features, diagnosis, prognosis and management.		
	Interpretation of coagulation profile in the assessment of bleeding disorders		
	Describe the clinical manifestations, clinically differentiating features of patients with bleeding tendency.	General Medicine	
	List the drugs used to treat bleeding disorders	Pharmacology	
HIT-H- 004	Understand the ABO and Rhesus blood groups their clinical importance and method of group typing	Hematology	Blood Transfusion
	Explain and identify common indications of blood products (red cells, platelets and plasma) and hazards of blood transfusion and methods of their prevention in different clinical scenarios		
	Enlist changes that take place in the biochemical composition of stored blood. Give significance of rejuvenation.	Biochemistry	

GENERAL PATHOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 10	
		INTEGRATING DISCIPLINE	TOPIC
HIT-Pa-001	Describe clinical aspects of innate and acquired immunity, active and passive immunity	General Pathology	Immunology

	Classify the types of cells taking part in immune response (Phagocytes, T cells, B cells & NK cells) and apply data in their clinical importance		
	Correlate complement activation pathways with their role in immune response to infections, autoimmunity, transplant rejection and immune deficiency disease		
	Elaborate MHC and their role in clinical diseases		
	Understand the types and apply the knowledge in clinical aspects of antibodies		
HIT-Pa-002	Classify immunosuppressants and antibodies with their mechanism of action, clinical uses, and toxicities	Pharmacology	Hematopoietic system
	Identify the major cytokines and other immunomodulating agents and know their clinical applications.		
HIT-Pa-003	Understand the clinical aspects of hypersensitivity reactions and interpret the data related to these conditions (infectious diseases and autoimmune disease)	General Pathology	Immunology
HIT-Pa-004	Describe types of transplant rejection & Graft vs Host disease and apply the knowledge in different clinical scenarios		Transplantation
	Role of pharmacology in organ transplant	Pharmacology	
	Overview of prophylactic treatments of Post- Transplant Infections, such as antiviral drugs (e.g., valganciclovir for CMV) and antifungal medications		

	Describe clinical aspects of auto immunity and autoimmune disease and apply the knowledge in different clinical settings.	General Pathology	

PRACTICAL / LAB WORK

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 15	
		INTEGRATING DISCIPLINE	TOPIC
HIT-H- 005	Perform CBC on analyzer and interpret the report.	Hematology	Hematopoietic and Lymphoid System
HIT-H- 006	Analyze RBC indices, Platelet Indices and WBC parameters.		Hematopoietic System
	Perform PT, APTT and Bleeding Time. Interpret the reports		
	Perform Blood Group and Cross Match, interpret the reports.		
	Identify normal blood cells.		
	Identify common malignant disorders e.g. CML, CLL, Acute Leukemias.		
HIT-Pa-005	Interpret the data of ELISA for different tests related to immunology.	Immunology	Immunology
HIT-Pa-006	Interpret the data of Graft rejection, Graft versus host disease.		Transplant

CLINICAL ROTATIONS / COMMUNITY HEALTHCARE

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 06	
		INTEGRATING DISCIPLINE	TOPIC
HIT-H- 007	Administer Blood Products x3	Hematology	Blood Transfusion
	Clinical Audit for indications and transfusion reactions x3		

THEORY

THANATOLOGY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 05	
		INTEGRATING DISCIPLINE	TOPIC
For-Th-001	Define life and death.	Integration with Medicine	Death and life
	Describe views about death of different authorities.		
	Differentiate between somatic and molecular death.		
	Diagnose a case of death clinically.		
	Describe the legal procedure of disposal of a dead body-known /unclaimed		
	Describe brain death.		
	Explain criteria of diagnosis of brain death		

	Enlist guiding principles to diagnose a case of brain death		
	Describe the medico legal importance of brain stem death.		
	Summarize ethical, legal and moral considerations related with organ transplant and brain death		
	Differentiate between Death and Apparent/Suspended Animation		
	Describe different clinical conditions simulating with suspended animation		
For-Th-002	Classify post-mortem changes.	Forensic Medicine, Pathology & Chemical Pathology	Post-mortem changes - (Immediate early and late)
	Classify post-mortem changes.		
	Describe immediate signs of somatic death		
	Explain early eye changes after death		
	Explain Post-mortem Cooling of Dead body (Algor Mortis) and its medicolegal implications.		
	Describe methods of recording the temperature of a dead body.		
	Explain cooling curve of a dead body.		
	State different formulas applied for calculating body temperature after death.		
	Summarize factors affecting Algor Mortis		
	Explain Postmortem Lividity and its mechanism of development.		

	Explain its Medicolegal implications.		
	Summarize factors affecting post-mortem lividity.		
	Differentiate Postmortem Lividity from Congestion and Bruise		
	Explain Rigor Mortis and its mechanism of development.		
	Describe its Medicolegal implications.		
	Summarize factors affecting Rigor Mortis		
	Summarize conditions simulating Rigor Mortis		
	Distinguish Rigor Mortis from Cadaveric Spasm and instantaneous rigor		
	Enlist late changes after death		
	Explain the process of putrefaction.		
	Describe different stages of putrefaction.		
	Summarize factors affecting putrefaction		
	Describe forensic entomology and its role in the estimation of post mortem interval		
	Summarize the procedure to collect specimens of forensic entomology		
	Draw and label graphic representation of post-mortem changes.		
	Infer the importance of putrefaction in toxicological analysis		
	Describe the process of Mummification		

	Describe the process of adiopocere formation		
For-Th-003	Summarize the biochemical changes in blood, vitreous humour and CSF after death	Biochemistry	Bio chemical changes, after death.
	List of different parameters to determine PMI.		Estimation of
For-Th-004	Describe rate method and concurrent methods to estimate PMI.	Forensic Medicine	Post-mortem interval
For-Th-005	Define sudden death Summarize common causes of sudden death	Medicine	Sudden death
For-Th-006	Differentiate between modes, manner cause and mechanism of death.		Mechanism, manner, cause, modes of death,
For-Th-007	Define and classify post mortem artefacts Explain medico legal significance of artefacts.	Forensic medicine	Post-mortem artefacts
For-Th-008	Discuss the use of flow-cytometry in forensic medicine.		Flow- cytometry
For-Th-009	Define sudden infant death syndrome Explain causes of sudden infant death syndrome and its pathological findings	Medicine	Sudden infant death syndrome (SIDS)
AUTOPSY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 6**	
		INTEGRATING DISCIPLINE	**TOPIC**
For-	Define autopsy	Forensic medicine	Autopsy, Its types and

Au-001	Summarize types of autopsies		objectives.
	Compare the differences of medical and medico legal autopsy.		
	Enlist objectives of autopsy		
	Enlist Essentials of autopsy		
For-Au-002	Compare and contrast four death investigation systems i. Coroner s system, ii. Medical examiner system, iii. Continental system, iv. Procurator fiscal system in Scotland.		Global systems of death investigations
For-Au-003	Define autopsy protocol. i. Preliminary documents required for ii. autopsy,		Autopsy Protocol
	iii. Bio data. iv. Identification v. External examination vi. Internal examination vii. Conclusion. viii. Documentation.		
	Differentiate between narrative and numerical autopsy protocol.		

For-Au-004	Describe primary autopsy incisions, secondary autopsy incisions and tertiary autopsy Incisions		Autopsy incisions
	Explain autopsy incisions to dissect neck, heart, brain, spinal cord, limb and bone marrow		
	Explain incisions to reveal pneumothorax, DVT, Fat embolism and pulmonary embolism		
For-Au-005	Describe 4 autopsy techniques- Letulle, Ghon, Virchow and Rokitansky		Autopsy techniques
For-Au-006	Describe the viscera with quantity to be taken for toxicological analysis		Collection of viscera at autopsy
	Describe the viscera with quantity to be taken for histopathological analysis.		
	Explain preservatives used for autopsy samples.		
	Demonstrate the preservation of different viscera to be sent to analyst.		
	Explain the autopsy protocol for collection/recovery, preservation, labelling and dispatch of biological and non-biological material		
For-Au-007	Describe standard autopsy suite		Essential of autopsy suite
	Summarize the requirements of autopsy room		
For-Au-008	Summarize the hazards of autopsy		Hazards of autopsy
For-Au-	Define Negative autopsy		Negative autopsy

009	Explain the causes of negative autopsy		
For-Au-010	Define exhumation Enlist the objectives of exhumation Explain the procedure of exhumation Enlist the specimens collected in exhumation Enlist the limitations of exhumation Summarize the precautions during exhumation		Exhumation
For-Au-011	Summarize the objectives of autopsy on mutilated dead body/fragmentary remains	Anatomy	Examination of fragmentary / Mutilated / Skeletal remains
PERSONAL IDENTITY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
For-PI-001	Define Personal Identity Describe types of personal identity List the purpose of identification in Living & dead Briefly describe the parameters of Personal Identity in living and dead	Forensic Medicine	Personal Identity

	Describe different methods of determining personal identity		
	Enumerate surest methods to determine personal identity for identification		
	Enlist the ages of medico-legal importance for civil & criminal responsibility		
For-PI-002	Determine the age of a living person for medico-legal Purpose		Age determination
	Determine the age of a fetus regarding its length, weight & morphological features		
	Determine the age of an examinee from appearance & union of ossification centres of different bone		
	Identify the sequence of appearance of ossification		
	activity in intrauterine life.		
	Relate the medico-legal importance of bones in the identification		
For-PI-003	Determine the sex of an individual by carrying out anatomical, chromosomal investigations	Anatomy	Sex determination
	Diagnose the disorders of sexual development		
	Describe the Medico Legal Importance of Sex Determination		
	Enlist limitations of sex determination in Dead		
For-PI-004	Describe the process of estimation of age from primary, secondary & mixed dentition	Forensic Medicine	Forensic Odontology

	Describe different methods for age estimation from odontology		
	Enlist the information obtained from dental examination		
	Relate medico legal importance of identification with odontology		
For-PI-005	Determine Race of a person from different parameters		Race determination
For-PI-006	Determine stature of a person by different methods.		Stature estimation
For-PI-007	Describe anthropometry with reference to age Determination		Anthropometry
For-PI-008	Classify fingerprint patterns according to Galton's classification.		Dactylography
	Explain different methods of recording fingerprints.		
	Describe the advantages & medico legal importance of Dactylography		
	Define Poroscopy / Locards method		
For-PI-009	Describe the role of DNA Fingerprinting in identification.	Pathology	DNA Profiling
	Enlist the samples required for DNA profiling in medicolegal cases		
	Enumerate the medicolegal importance of DNA Fingerprinting		

For-PI-010	Identify different methods of identification in case of mutilated, burnt and decomposed dead bodies	Forensic Medicine	Mass Disaster Identification
	Apply the international SOP of disaster Victim Identification (DVI) in mass disaster		
PRACTICAL / LAB WORK			
THANATOLOGY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 06**	
		INTEGRATING DISCIPLINE	**TOPIC**
For-Th-010	Demonstrate the immediate, early and late changes after death in a corpse.	Forensic Medicine	Autopsy
	Calculate time since death on the basis of findings noted in the corpse		
For-Au-011	Prepare a death certificate of cause of death according to WHO guidelines	Medicine	WHO guidelines of death certificate
AUTOPSY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
For-Au-012	Demonstrate correct report writing	Forensic medicine	Autopsy report
For-Au-013	Observe the procedure of autopsy examination and dissection		autopsy

For-Au-014	Demonstrate the correct method of preservation and dispatch of specimens for histopathological and toxicological analysis	Pathology	Biological material
PERSONAL IDENTITY			
CODE	**SPECIFIC LEARNING OUTCOMES**	**TOTAL HOURS = 05**	
		INTEGRATING DISCIPLINE	**TOPIC**
For-PI-011	Identify the person for different medico-legal cases (age determination, sex determination)	Forensic medicine	Personal identification
	Take fingerprints by plain and rolling method and classify according to Galton's Classification		
	Estimate & certify the age of a person for medico-legal purposes		
For-PI-012	Identify the bite marks and perform their analysis		Bite marks analysis
For-PI-013	Estimate the age of the person from the oral examination of the teeth	Forensic medicine	Age & sex determination
	Interpret the findings from x-rays of bones for appearance and union of ossification centres for age determination		
	Identify the sex and age from morphological features of different bones.		