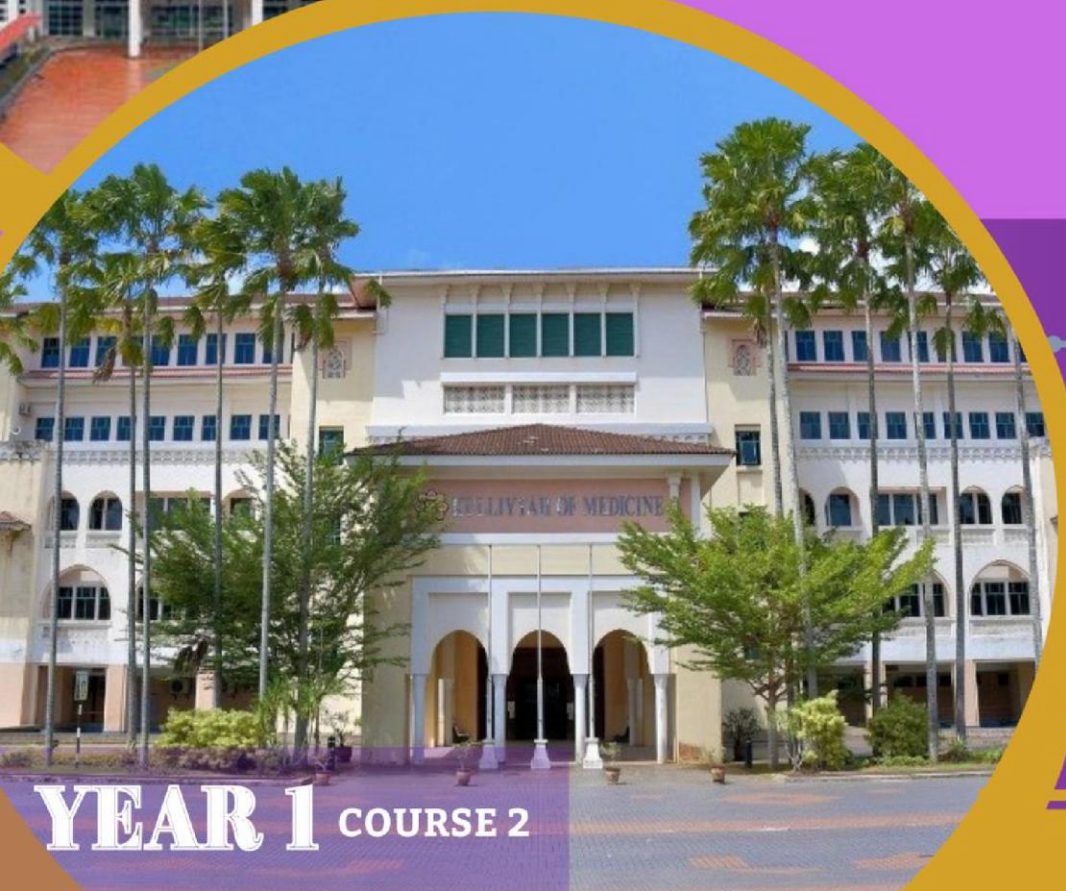
TAWHIDIC EPISTEMOLOGY LEADING THE WAY
UMMATIC EXCELLENCE LEADING THE WORLD
KHALĪFAH - AMĀNAH - IQRA' - RAHMATAN LIL-'ĀLAMĪN

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
Garden of Knowledge and Virtue

IIUM KULLIYYAH OF MEDICINE


# STUDENT STUDY GUIDE

## MBBS 1209
## Response to Diseased State and Exogenous Agents

## 2025/2026

### Medicine with a soul
**Realising Competence & Compassion with Conscience**

The Kulliyyah of Medicine believes that medicine is not merely a profession, but a sacred trust (amanah) guided by divine purpose. Rooted in the spirit of tawhid, our philosophy views knowledge, ethics, and spirituality as inseparable dimensions of a holistic educational journey. The goal is to nurture physicians who do not simply treat illness, but who also restore dignity, embody mercy, and uphold unwavering integrity in service to humanity.

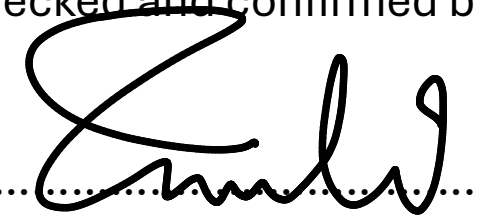
**YEAR 1** COURSE 2

MBBS 1209

Department of Basic Medical Sciences &

Department of Pathology and Laboratory Medicine

Checked and confirmed by



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(Asst. Prof. Dr. Wan Zurainah Sazali)

Year 1 Semester 1 Course 2 Coordinator

Academic Session 2025/2026

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Date of Course: 17/11/2025 - 01/03/2026

# STUDENT'S PARTICULAR

Photo

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Matric Number :_____

Email :_____

HP Number :_____

Course/acad. Year :_____

Date Started :_____

Date End :_____

Supervisor :_____

Student Signature :_____

# FOREWORD FROM THE DEAN

This logbook is created to accompany you through each posting of the MBBS journey. While it serves as a tool to document skills and clinical encounters, it also reflects the Kulliyyah of Medicine's deeper vision of medical education, which is medicine with a soul.

Medicine is more than science and procedures. It is a calling to heal, to relieve suffering, and to serve humanity. To realise this calling, three qualities must shape your journey: competence, compassion and conscience.

Competence is the foundation. As you progress, discipline and dedication will help you acquire knowledge, sharpen skills, and develop sound judgement. This logbook is designed to track that growth and ensure you build confidence and reliability in your practice.

Yet competence alone is incomplete. Compassion reminds us that patients are more than clinical cases. They are human beings with fears, hopes, and dignity. To listen, to empathise, and to offer comfort is as essential as any technical act. Each entry in this logbook represents not only a clinical skill but also an encounter with a life entrusted to your care. Compassion must be renewed constantly, and this renewal comes through reliance on Allah, for it is only Allah who heals the hearts.

Guiding both is conscience, the moral compass that anchors you to integrity and accountability. In times of uncertainty or challenge, conscience ensures your decisions remain ethical even when no one is watching, just in every circumstance, and aligned with the trust placed in you as a future doctor.

This logbook is therefore not simply a checklist but a companion in shaping your professional identity. Engage with it sincerely, reflect on your experiences, and let it help you grow into a doctor who embodies both science and spirit.

May this journey mould you into a healer who practises medicine with competence, guided by compassion, and always with conscience. Be the doctor who brings people closer to their Creator.

**Prof. Dr. Mohd Aznan Md Aris**
Dean
Kulliyyah of Medicine
International Islamic University Malaysia
September 2025

# FOREWORD FROM DEPUTY DEAN ACADEMIC AND INTERNATIONALISATION

In the Name of Allah, the Most Gracious, the Most Merciful.

This MBBS Guidebook has been thoughtfully developed to serve as a comprehensive reference for students throughout their academic journey at the Kulliyyah of Medicine. It is designed to guide students in navigating the curriculum by clearly outlining the course structure, expected learning outcomes, and assessment framework. Importantly, the guidebook also highlights the Tawhidic framework, which forms the foundation of our educational philosophy and approach to medical education.

As the Deputy Dean (Academic and Internationalisation), I take great pride in witnessing how the MBBS curriculum aligns with the Vision and Mission of the International Islamic University Malaysia (IIUM), in general, and the aspirations of the Kulliyyah of Medicine, in particular. The Kulliyyah is committed to nurturing future doctors who are holistic in nature – equipped with sound medical knowledge, clinical skills, professionalism, and strong Islamic values.

Grounded in Tawhidic epistemology, our curriculum aspires to produce medical graduates who embody competence, compassion, and conscience. These qualities are essential in preparing doctors who not only excel clinically but also serve humanity with integrity, empathy, and a strong sense of ethical responsibility.

I would like to express my sincere appreciation to all dedicated academicians and staff whose commitment and teamwork have made the preparation of this concise yet meaningful guidebook possible. It is my hope that this guidebook will be a valuable companion to our students throughout their years of study.

May Allah guide and bless our journey in the pursuit of knowledge and service to mankind. InsyaAllah

**Assoc. Prof. Dr. Ardilla Hanim Abdul Razak**
Deputy Dean (Academic & Internationalisation)
Kulliyyah of Medicine
International Islamic University Malaysia
December 2025

# REMARKS FROM THE HEAD OF DEPARTMENT

**السلام عليكم ورحمة الله وبركاته**

It is my pleasure to present this **Student Study Guide for MBBS Phase 1**, prepared to assist you as you embark on your journey through the medical programme at the Kulliyyah of Medicine. More than a manual, this guide serves as a roadmap to help you pursue your studies with clarity, balance, and purpose.

This guide outlines the essential learning outcomes, assessment formats, resources, and expectations. I encourage you to make active use of this guide. In practice, this could mean:

- **Check** the learning outcomes at the start of each course or week so you know what is expected.
- **Plan** your study schedule around the assessment timelines and rubrics provided.
- **Reflect** at the end of each week by revisiting the outcomes and identifying areas that need further practice or clarification.

By using this guide in such a way, it becomes not just a reference document, but a steady companion in your growth as a medical student. Lastly, I urge you to embrace every opportunity to learn - not only in the classroom and the laboratory, but also in the encounters, challenges, and reflections that will shape you throughout your life as a medical student.

May Allah bless your efforts, ease your challenges, and guide you towards success in this noble profession. **والسلام**

With best wishes,
**Asst. Prof. Dr. Aszrin Abdullah**
MBBS (Adelaide), PhD (IIUM)
Head
Department of Basic Medical Sciences
Kulliyyah of Medicine
International Islamic University Malaysia

# KULLIYYAH VISION AND MISSION

## VISION

Kulliyyah of Medicine aims to become a leading centre of educational excellence which seeks to nurture the dynamic and progressive role of physicians for the ummah.

## MISSION

Towards actualising the Kulliyyah's vision, our missions are:

1. To acquire and propagate the medical knowledge and skill in the spirit of tauhid (faith).
2. To nurture balanced staff and students, integrating the qualities of faith *(iman)*, knowledge *(` ilm)*, and good character *(akhlaq)*.
3. To foster culture that instils commitment for sustainable development, life-long learning and a deep sense of social responsibility for all mankind.

# PROGRAMME EDUCATIONAL OBJECTIVES (PEO) AND PROGRAMME LEARNING OUTCOMES (PLO)

## PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

In consonance with the vision and missions of the Kulliyyah of Medicine, we aim to nurture doctors of outstanding quality who:

1. Knowledgeable, clinically competent, and ethical in practice, compliant with professional bodies and regulations by incorporating Islamic values.
2. Exemplary leaders at the workplace and community, practising effective communication and interaction.
3. Proficient professionals with inquisitive minds in applying lifelong learning skills relevant to medical practice for career development.

## PROGRAMME LEARNING OUTCOMES (PLO)

At the end of the Medical Programme, the graduate should be able to:

1. Apply various mechanisms of human bodily functions in health and disease from the biological, behavioural, epidemiological, and social aspects.
2. Analyse medical situations to competently formulate a management plan.
3. Perform history taking, physical examination and basic medical procedures competently.
4. Engage in responsible inter-professional collaboration through mutual respect and effective interaction in their practice.
5. Communicate earnestly and effectively in the workplace and community.
6. Apply appropriate digital and numeracy skills relevant to medical practice.
7. Demonstrate the ability to build trust, collaborate, work and lead at the workplace and community.
8. Execute independent learning and self-improvement towards educational and professional goals.
9. Relate entrepreneurial competency skills for sustainability of self and community.
10. Exhibit ethics and professionalism in practice, compliant with professional bodies and regulations by incorporating Islamic values.

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# INTRODUCTION

**COURSE TITLE : RESPONSE TO DISEASE STATE AND EXOGENOUS AGENT**

**CONTENT SYNOPSIS**

This 10-week course is offered in Year 1 Semester 1. This course covers the important aspects of basic pathology, immunology, endocrinology, molecular biology, and pharmacology. The teaching and learning activities are spread throughout the 10-week period and include lecture, practical, flipped classroom (FC), problem-based learning (PBL), team-based learning (TBL), and directed self-learning (DSL). The students are assessed continuously via facilitator assessment (PBL), Multiple True False (MTF), and One Best Answer (OBA). Final assessment includes Short Notes (SN), Scenario-Based Questions (SBQ), and Objectively Structured Practical examination (OSPE).

**OBJECTIVE/ INTENDED LEARNING OUTCOME**

1. Explain the histology of lymphoid organs and basic immunology.
2. Explain the basics of molecular biology, pathology, endocrinology, and pharmacology.
3. Explain the mechanisms of immunology and pathology in relation to diseased state.
4. Demonstrate laboratory skills related to histology, basic immunology, pathology, and pharmacology.
5. Perform good communication skills and independent learning in problem-solving.

**LEARNING ACTIVITIES**

1. Lecture
2. Practical
3. Directed Self-Learning (DSL)
4. Flipped Classroom (FC)
5. Problem-Based Learning (PBL)
6. Team-Based Learning (TBL)

**ASSESSMENT METHODS**

1. Continuous Assessment (30%)
    a. PBL Facilitator Assessment (15%)
    b. Quiz (15%)
2. End of Semester Examination (70%)
    a. Multiple Choice Questions
    b. Scenario-Based Questions
    c. Short Notes
    d. Objectively Structured Practical Examination

**OUTLINE OF COURSE CONTENT**

| ANATOMY | | |
|---|---|---|
| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Lymphoid Organs I | LO1: List the primary and secondary lymphoid organs.<br>LO2: Explain the function of primary and secondary lymphoid organs.<br>LO3: Describe the microscopic structure of the thymus gland.<br>LO4: Explain microscopic structure of a lymph node.<br>LO5: Describe lymph flow in a lymph node. |
| 2 | Lymphoid Organs II | LO1: Discuss microscopic structure of the spleen and its blood flow.<br>LO2: Differentiate microscopic structures of lingual, palatine and pharyngeal tonsils.<br>LO3: Describe lymphoid nodules in mucosa-associated lymphoid tissue (MALT).<br>LO4: Differentiate the distribution of T cells and B cells in lymphoid organs. |

| BIOCHEMISTRY | | |
|---|---|---|
| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | General Introduction to Hormone Biosynthesis and Metabolism | LO1: Describe hormone, and basic functions of hormones in the human body.<br>LO2: Identify the main glands and organs involved in hormone production and secretion.<br>LO3: Describe the different types of hormones, including peptide, steroid, and amino acid-derived hormones.<br>LO4: Describe general principles of hormone biosynthesis.<br>LO5: Describe general principles of metabolism and degradation of various hormones. |
| 2 | Mechanism of Hormonal Actions | LO1: Explain the mechanisms of hormone action, including endocrine, paracrine, and autocrine.<br>LO2: Describe the classification of hormones, including Group I and Group II hormones.<br>LO3: Describe Group I hormones' mechanism of action by alteration of gene expression.<br>LO4: Describe Group II hormones' mechanism of action, including G protein-coupled receptor, second messenger systems, and enzyme-linked receptors. |
| 3 | Inborn Errors of Metabolism | LO1: Define IEM<br>LO2: Describe the general principle and pathogenesis of IEM.<br>LO3: Describe with example inborn errors in metabolism with regards to their causes, biochemical and clinical effects. |

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| 4 | Purine Metabolism | LO1: Describe the structure of purine bases, nucleoside and nucleotide.<br>LO2: Describe the de novo purine nucleotide synthesis and its regulation.<br>LO3: Describe the degradation of purine nucleotides.<br>LO4: Describe the salvage pathway of purine nucleotide.<br>LO5: Relate the clinical importance of purine metabolism disorders. |
| 5 | Pyrimidine Metabolism | LO1: Describe the structure of pyrimidine bases, nucleoside and nucleotide.<br>LO2: Describe the de novo pyrimidine nucleotide synthesis and its regulation.<br>LO3: Describe the degradation of pyrimidine nucleotides.<br>LO4: Describe the salvage pathway of pyrimidine nucleotide.<br>LO5: Relate the clinical importance of pyrimidine metabolism. |
| 6 | Introduction to Nucleic Acids and DNA Replication | LO1: Describe the nucleotides, structures, types, functions and properties of DNA and RNA.<br>LO2: Describe the process of DNA replication (Semi-conservative mechanism, Initiation, Chain elongation and Termination).<br>LO3: Describe the enzymes/proteins involved in DNA replication.<br>LO4: Compare the prokaryotic and eukaryotic DNA replication.<br>LO5: Relate DNA replication and its repair mechanism.<br>LO6: Describe the inhibitors of DNA replication. |
| 7 | Transcription | LO1: Define transcription and the enzymes in involved in prokaryotic and eukaryotic transcription.<br>LO2: Describe the process of transcription.<br>LO3: Describe post-transcriptional modifications.<br>LO4: Compare the Prokaryotic and Eukaryotic transcription.<br>LO5: Describe on the inhibitors of transcription. |
| 8 | Translation | LO1: Define genetic code and their salient features.<br>LO2: Define translation and the components required for it.<br>LO3: Describe the steps involved in translation.<br>LO4: Describe the co & post translational modification of polypeptide chains in protein synthesis.<br>LO5: Describe the inhibitors in protein synthesis. |

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| 9 | Gene Expression & Regulation | LO1: Define gene expression.<br>LO2: Describe the process of gene expression.<br>LO3: Describe the regulation of prokaryotic gene expression.<br>LO4: Describe the regulation of eukaryotic gene expression. |
| 10 | Molecular Technique and Its Application | LO1: Describe molecular techniques used to obtain fragments of DNA (restriction fragment, reverse transcriptase, chemical synthesis).<br>LO2: Describe techniques for identifying DNA sequences (probes, gel electrophoresis, detection of specific DNA sequence, DNA sequencing).<br>LO3: Describe techniques for amplifying DNA sequences (cloning and PCR).<br>LO4: Describe the applications of each molecular technique (research, diagnosis, prevention and treatment). |

| **PHARMACOLOGY** | | |
|---|---|---|
| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Pharmacology Overview | LO1: Define the term 'drugs'.<br>LO2: Summarise the concept of Pharmacology.<br>LO3: Define the important terminologies in pharmacology. |
| 2 | Overview of Pharmaco-kinetics | LO1: Define pharmacokinetics.<br>LO2: Explain pharmacokinetic processes.<br>LO3: Describe the drug transport system across the cell membrane. |
| 3 | Absorption & Bioavailability | LO1: Describe drug absorption.<br>LO2: Discuss factors affecting drug absorption.<br>LO3: Compare the differences between acidic and basic drugs.<br>LO4: Define bioavailability and describe the importance.<br>LO5: Describe the principle of first pass metabolism and its importance. |
| 4 | Routes of Drug Administration | LO1: Describe the different routes of drug administration.<br>LO2: List the advantages and disadvantages of each route of drug administration.<br>LO3: Describe the bioavailability and the first pass metabolism of each route. |

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| 5 | Drug Distribution | LO1: Define drug distribution.<br>LO2: Discuss factors affecting drug distribution.<br>LO3: Describe drug binding to plasma proteins and tissues and their clinical importance.<br>LO4: Discuss the volume of distribution, factors affecting it and its clinical importance.<br>LO5: Define redistribution. |
| 6 | Drug Metabolism & Biotransformation | LO1: Define biotransformation.<br>LO2: Explain the phases of biotransformation.<br>LO3: Describe induction and inhibition of drug metabolism.<br>LO4: Discuss paracetamol poisoning.<br>LO5: Describe kinetics of drug metabolism. |
| 7 | Drug Excretion | LO1: Define drug excretion and drug elimination.<br>LO2: Describe the major routes of drug excretion.<br>LO3: Discuss the importance of urine pH manipulation.<br>LO4: Discuss aspirin poisoning.<br>LO5: Describe drug clearance and drug kinetics of elimination. |
| 8 | Basic Clinical Pharmacokinetics | LO1: Describe the One-compartment and the Two-compartment models.<br>LO2: Define the half-life of the drug and its clinical significance.<br>LO3: Explain the plasma drug concentration-time curve.<br>LO4: State the dosage kinetics.<br>LO5: Explain about steady-state concentration and maintenance dose.<br>LO6: Explain the therapeutic range/index, the different types of dosing, and the loading dose. |
| 9 | Mechanisms of Drug Action | LO1: State the definition of drugs, its effects and the sites of drug action.<br>LO2: Describe the drug-receptor complex.<br>LO3: Differentiate structurally specific & non-structurally specific drugs.<br>LO4: Describe the combined effects of drugs.<br>LO5: Explain agonists and antagonists. |

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| 10 | Basic Pharmacodynamics | LO1: Define pharmacodynamics.<br>LO2: Explain the dose response relationship.<br>LO3: Describe the drug response curve.<br>LO4: Define efficacy and potency.<br>LO5: Calculate therapeutic index and safety index. |
| 11 | Drug Discovery & Development | LO1: Summarise the processes involved in new drug discovery and development.<br>LO2: Explain on the important aspects in developing new drug.<br>LO3: Describe the important stages in drug development.<br>LO4: Differentiate between preclinical and clinical stages of drug development. |
| 12 | Adverse Drug Reactions | LO1: Define adverse drug reactions.<br>LO2: Classify adverse drug reactions.<br>LO3: Differentiate the different types of adverse drug reaction.<br>LO4: Summarise the mechanism of each adverse drug reaction. |

| **PATHOLOGY** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Introduction to Pathology | LO1: Define pathology in medicine.<br>LO2: Explain the terms aetiology, pathogenesis, and pathophysiology.<br>LO3: Define diagnosis, prognosis, sequelae and complications.<br>LO4: Compare between macroscopic and microscopic features. |
| 2 | Cell Injury | LO1: State the differences between reversible and irreversible cellular injury.<br>LO2: State the causes of cellular injury.<br>LO3: Describe the sequence of event in cell injury.<br>LO4: Explain the mechanism of cell injury. |
| 3 | Cellular Adaptation | LO1: Describe the classification of cellular adaptation.<br>LO2: Describe the causes of cellular adaptation.<br>LO3: Describe the pathogenesis of cellular adaptation.<br>LO4: List examples of cellular adaptation. |
| 4 | Intracellular Accumulation, Calcification and Amyloidosis | LO1: Define intracellular accumulation, calcification and amyloidosis.<br>LO2: List different types of intracellular accumulation, calcification and amyloidosis.<br>LO3: Describe the mechanism of intracellular accumulation, calcification and amyloidosis. |

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| | | LO4: List examples of intracellular accumulation, calcification and amyloidosis. |
| 5 | Necrosis and Apoptosis | LO1: Define necrosis and apoptosis.<br>LO2: Describe the pattern of necrosis and its clinical example.<br>LO3: Compare the morphologic changes in necrosis and apoptosis.<br>LO4: Describe the intrinsic and extrinsic pathways of apoptosis. |
| 6 | Acute Inflammation I | LO1: Define inflammation and its causes.<br>LO2: Describe the cardinal signs of inflammation.<br>LO3: Compare acute and chronic inflammation.<br>LO4: Describe the pattern of acute inflammation.<br>LO5: Describe the vascular and cellular components of acute inflammation. |
| 7 | Acute Inflammation II | LO1: Define inflammatory mediators.<br>LO2: Describe the mediators in acute inflammation.<br>LO3: Describe the morphological changes in acute inflammation.<br>LO4: Identify the laboratory findings in acute inflammation.<br>LO5: Describe the local and systemic manifestation of inflammation.<br>LO6: Describe the sequelae of acute inflammation. |
| 8 | Chronic Inflammation | LO1: Define chronic inflammation and identify its causes.<br>LO2: Describe the morphological characteristics of chronic inflammation.<br>LO3: Describe the role of macrophages in chronic inflammation.<br>LO4: Describe the different types of granulomatous inflammation.<br>LO5: Describe the morphological changes in granulomatous inflammation. |
| 9 | Wound Healing and Repair | LO1: Define regeneration and repair.<br>LO2: Compare between regeneration and repair.<br>LO3: Describe the stages of wound healing.<br>LO4: Compare between healing by first intention and second intention.<br>LO5: Identify factors that influence outcomes of wound healing and repair.<br>LO6: Describe the complications of wound healing. |
| 10 | Oedema | LO1: Define oedema and effusions.<br>LO2: Compare between exudates and transudates.<br>LO3: Identify the causes and explain the mechanism of oedema.<br>LO4: Describe the difference between hyperaemia and congestion. |

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| 11 | Thrombosis | LO1: Describe primary and secondary haemostasis.<br>LO2: Define thrombosis.<br>LO3: Describe Virchow's triad and explain the mechanism of thrombus formation.<br>LO4: Describe fate of thrombus.<br>LO5: List clinical features of thrombosis and state the examples. |
| 12 | Embolism and Infarction | LO1: Define embolism and infarction.<br>LO2: Describe different types of embolism.<br>LO3: Identify the causes of embolism and infarction.<br>LO4: Describe the mechanism of embolism and infarction and state the examples.<br>LO5: Describe the general clinical and laboratory features of embolism and infarction. |
| 13 | Shock | LO1: Define shock.<br>LO2: Describe pathophysiology of shock.<br>LO3: Describe the stages of shock.<br>LO4: Describe the different types of shock.<br>LO5: Explain the clinical manifestation of each type of shocks.<br>LO6: Describe the investigation and principle of management in shock. |
| 14 | Introduction to Medical Genetics | LO1: Define transcription, translation, and central dogma.<br>LO2: Define some standard genetic terms, e.g., DNA, allele, mosaicism, heterogeneity.<br>LO3: Describe the types of mutation.<br>LO4: Identify standard chromosomal and molecular techniques used in diagnostic. |
| 15 | Genetic Disorder I | LO1: Define genetic disorders.<br>LO2: State the different categories of genetic disorders.<br>LO3: Describe Mendelian disorders inheritance.<br>LO4: List common Mendelian disorders.<br>LO5: Describe selected Mendelian disorders: Thalassaemia, Hereditary Spherocytosis, Haemophilia, G6PD deficiency. |
| 16 | Genetic Disorder II | LO1: Identify the human chromosome.<br>LO2: Describe chromosomal disorders.<br>LO3: Describe selected chromosomal disorders: Down syndrome, Klinefelter syndrome, Turner syndrome.<br>LO4: Identify multifactorial inheritance and state the examples.<br>LO5: Identify other non-classic inheritances and state the examples. |

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| | | LO6: State the indications for genetic analysis. |
| 17 | Nomenclature and Characteristic of Neoplasia | LO1: Define neoplasm.<br>LO2: Describe the nomenclature in neoplasm.<br>LO3: Explain the characteristic features of benign and malignant neoplasm.<br>LO4: Describe the factors that influence the predisposition to neoplasm. |
| 18 | Molecular Basis of Cancer I | LO1: Define cell cycle.<br>LO2: Describe the criteria for malignant transformation (hallmarks of cancer).<br>LO3: Describe the target of genetic damage.<br>LO4: Describe the regulatory genes in cell growth and survival. |
| 19 | Molecular Basis of Cancer II | LO1: List common oncogenes.<br>LO2: Describe selected oncogenes in cancer formation, e.g. RAS, MYC, BCR-ABL.<br>LO3: List common tumour suppressor gene.<br>LO4: Describe selected tumour suppressor genes in cancer formation, e.g. p53, Rb. |
| 20 | Carcinogens and Carcinogenesis | LO1: Define carcinogens and carcinogenesis.<br>LO2: List different types of carcinogens.<br>LO3: Explain the general mechanism of chemical carcinogenesis.<br>LO4: Describe the mechanism radiation carcinogenesis.<br>LO5: Explain selected viruses and bacteria implicated in carcinogenesis. |
| 21 | Clinical Aspect of Neoplasm | LO1: Describe the clinical importance of neoplasm on patients.<br>LO2: Describe the mechanism of cancer cachexia.<br>LO3: Describe paraneoplastic syndrome and the pathophysiology.<br>LO4: Define cancer grading and cancer staging and their importance.<br>LO5: Describe the determination of cancer grading.<br>LO6: Describe the TNM cancer staging. |
| 22 | Cancer Metastasis | LO1: Define cancer metastasis.<br>LO2: Describe different routes of cancer metastasis and state the examples.<br>LO3: Explain haematogenous metastatic cascade.<br>LO4: Describe the clinical features and investigation for cancer metastasis. |

| IMMUNOLOGY | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Introduction to Immunology | LO1: Define immunity, immune system and immunology.<br>LO2: Describe the spectrum of basic immunology and clinical immunology.<br>LO3: Discuss the role of immune system.<br>LO4: Discuss the role of the immune system in both the immune-pathogenesis and immunotherapy of infectious diseases, autoimmune diseases and cancer.<br>LO5: Describe the overview of the Microbiome-Gut-Immune-other Body System Axis. |
| 2 | Basic Components of the Immune System | LO1: Describe the individual components of innate and adaptive immune system and their roles.<br>LO2: Differentiate the features of innate and adaptive immunity.<br>LO3: Describe the interaction between innate and adaptive immunity in response to different types of infectious agents and non-infectious agents.<br>LO4: Discuss the importance of innate and adaptive immune response. |
| 3 | Antigen and Antibody I | LO1: Describe the properties of antigen and hapten.<br>LO2: Differentiate between the concept of immunogenicity and antigenicity.<br>LO3: Describe the factors influencing immunogenicity.<br>LO4: Describe the examples and functions of adjuvants.<br>LO5: Differentiate between the basic structure of B and T cell receptor. |
| 4 | Antigen and Antibody II | LO1: Describe the functions of different isotypes of antibodies.<br>LO2: Describe the mechanisms of gene recombination and expression of immunoglobulin heavy and light chain.<br>LO3: Describe the mechanisms of gene recombination and expression of T cell receptor α and β chain.<br>LO4: Explain the steps involved in the production of monoclonal antibody.<br>LO5: Describe the clinical and research applications of monoclonal antibody. |
| 5 | The Complement System | LO1: Define what complement system consists of and their function.<br>LO2: Describe what activates the complement system, how they act and their regulation.<br>LO3: Describe diseases related to deficiencies & abnormalities of complement system. |
| 6 | Antigen and Antibody Reaction I | LO1: Describe the concept of antigen antibody interactions (affinity, avidity and cross reactivity).<br>LO2: Explain the principles of the immunological assays (immunoprecipitation, immunoagglutination) developed from the specificity of antigen- antibody interactions. |

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| | | LO3: Describe the clinical applications of the immunological assays. |
| 7 | Antigen and Antibody Reaction II | LO1: Explain the principles of the immunological assays (ELISA, immunofluorescence and flow cytometry) developed from the specificity of antigen-antibody interactions.<br>LO2: Describe the clinical applications of the immunological assays. |
| 8 | Cytokines | LO1: Illustrate how cytokines exert their effects: autocrine, paracrine and endocrine fashion.<br>LO2: Explain the modes of action of cytokines: pleiotropic, synergistic, antagonistic, redundant.<br>LO3: Describe how cytokines exert specific action.<br>LO4: Classify the cytokines by their function.<br>LO5: List five examples of cytokine related therapies in medicine. |
| 9 | Phagocytosis I | LO1: Define endocytosis and phagocytosis.<br>LO2: Describe the characteristics of each professional phagocyte.<br>LO3: Describe the steps of phagocytosis.<br>LO4: Explain the killing mechanism of phagocytosis by neutrophils and macrophages/ dendritic cells. |
| 10 | Phagocytosis II | LO1: Identify phagocytes with the role of professional antigen presenting cells.<br>LO2: Differentiate non-professional and professional APCs.<br>LO3: Explain the killing mechanism by B-cells.<br>LO4: Describe the importance of phagocytosis. |
| 11 | The HLA System | LO1: Describe MHC and HLA.<br>LO2: Describe the organization of HLA genes.<br>LO3: Explain the function of HLA and their importance.<br>LO4: Describe the structure of HLA-I and HLA-II proteins.<br>LO5: Explain MHC inheritance and heterogeneity and relate it with the HLA polymorphism. |
| 12 | Antigen Presentation | LO1: Describe the endogenous and exogenous antigens.<br>LO2: Explain exogenous antigen processing.<br>LO3: Explain endogenous antigen processing.<br>LO4: Define cross presentation. |
| 13 | Humoral Immunity | LO1: Describe the development of B lymphocyte.<br>LO2: Describe the mechanisms of B cell activation and antibody production.<br>LO3: Explain the properties and functions of memory B cells. |

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| | | LO4: Explain the functions of antibody. |
| 14 | Cell-mediated Immunity | LO1: Describe the development of T lymphocyte.<br>LO2: Describe the mechanisms of naïve CD4+ and CD8+ T cells activation before differentiating into effector and memory T cells.<br>LO3: Describe the functions of effector CD4+ T cells and CD8+ T cells.<br>LO4: Describe the properties and functions of memory T cells.<br>LO5: Illustrate the properties and functions of lymphocytes that are considered as cells of innate immunity. |
| 15 | Hypersensitivity I | LO1: Explain the mechanisms behind the hypersensitivity type I.<br>LO2: Describe the detection and treatments of the hypersensitivity type I. |
| 16 | Hypersensitivity II | LO1: Explain the mechanisms behind the hypersensitivity type II.<br>LO2: Explain the mechanisms behind the hypersensitivity type III.<br>LO3: Explain the mechanisms behind the hypersensitivity type IV.<br>LO4: Describe the clinical manifestations associated with each type of hypersensitivity reactions. |
| 17 | Immunotolerance and Autoimmunity I | LO1: Explain the concept and significance of tolerance.<br>LO2: List the factors which determine induction of tolerance.<br>LO3: Describe the mechanism of tolerance induction.<br>LO4: Describe the concepts of autoimmunity and disease. |
| 18 | Autoimmunity II | LO1: Explain the features of major autoimmune diseases.<br>LO2: Discuss the theories on aetiology of autoimmune disease. |
| 19 | Immunodeficiency Disorders I | LO1: Define and differentiate between primary and secondary immunodeficiency.<br>LO2: Describe the systematic approach to diagnose a PID.<br>LO3: Describe the approach in investigating a suspected case of PID.<br>LO4: Describe the immunopathological basis of PID. |
| 20 | Immunodeficiency Disorders II | LO1: Describe common PIDS in relation to the epidemiology, clinical manifestations, principal investigations and management.<br>LO2: Describe the common causes of secondary immunodeficiency.<br>LO3: Explain the immunopathological basis of common secondary immunodeficiency. |
| 21 | Tumour Immunology | LO1: Describe the immune mechanism of defence against tumour.<br>LO2: Describe the mechanisms of immune evasion by tumour.<br>LO3: Describe various immunological means to screen and diagnose tumour. |

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| | | LO4: Describe various immunological means to prevent and treat tumour. |
| 22 | Transplantation Immunology I | LO1: Relate The Malaysian Organ Sharing System (MOSS) and organ transplantation needs in Malaysia and globally.<br>LO2: Define the various types of tissue/organ grafts: Autograft (autologous), isograft (syngeneic), Allograft (allogeneic), Xenograft (xenogeneic).<br>LO3: Explain the immunology of allotransplant rejection: alloantigen recognition and the roles of both cellular and humoral factors.<br>LO4: List the types of tissue and solid organ allotransplants. |
| 23 | Transplantation Immunology II | LO1: Describe the types and mechanisms of allograft rejection: hyperacute, acute and chronic.<br>LO2: Explain the role of graft-versus host disease in hematopoietic stem cell transplantation.<br>LO3: Explain the requirement for ABO blood grouping, HLA typing, screening and crossmatching for detection of recipient preformed antibodies to donor's HLA antigens.<br>LO4: List the immunosuppressive multidrug therapy to prevent/suppress allograft rejection. LO5: Describe the preservation and survival of removed solid organs by prevention of ischemia/reperfusion injury. |

| **RADIOLOGY** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Ionizing Radiation & Radiation Hazard | LO1: Describe the general concept of radiation and radiation hazard.<br>LO2: Identify the use of radiation in medicine.<br>LO3: Explain the general concept of radiation protection. |

| **FLIPPED CLASSROOM** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Histology of Lymphoid Organs | LO1: Differentiate the microscopic appearance of a lymph node, spleen and thymus gland.<br>LO2: Illustrate the microscopic structure of a lymph node, spleen and thymus gland.<br>LO3: Relate the knowledge of lymph flow with clinical cases. |

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| 2 | Molecular Genetics | LO1: Relate the knowledge in basic structure of DNA and RNA with their function and involvement in DNA replication.<br>LO2: Relate the basic knowledge in transcription and translation with clinical cases.<br>LO3: Relate the knowledge in gene expression and regulation with their clinical relevance.<br>LO4: Relate the molecular techniques with the clinical applications. |
| 3 | Pathology 1 | LO1: Answer basic pathology problems of cell injury, cellular adaptation, necrosis and apoptosis, and intracellular accumulation.<br>LO2: Relate the knowledge in basic pathology with clinical cases.<br>LO3: Interpret data related to cell injury, cellular adaptation, necrosis and apoptosis, and intracellular accumulation. |
| 4 | Pathology 2 | LO1: Answer basic pathology problems of thrombosis, embolism and infarction.<br>LO2: Relate the knowledge in basic pathology with clinical cases.<br>LO3: Interpret data related to thrombosis, embolism and infarction. |
| 5 | Pathology 3 | LO1: Answer basic pathology problems of oedema and shock.<br>LO2: Relate the knowledge in basic pathology with clinical cases.<br>LO3: Interpret data related to oedema and shock. |
| 6 | Pathology 4 | LO1: Answer basic pathology problems of genetic disorders and hallmark of cancer.<br>LO2: Relate the knowledge in basic pathology with clinical cases.<br>LO3: Interpret data related to genetic disorders and hallmark of cancer. |
| 7 | Immunology 1 | LO1: Identify the correct concepts of immune response towards infectious and noninfectious agents.<br>LO2: Illustrate the relationship between innate and adaptive immunity.<br>LO3: Relate the mechanisms of gene recombination and the diversity in B cell and T cell receptors.<br>LO4: Identify the complement factors involved in the classical, alternative and lectin pathways. |
| 8 | Immunology 2 | LO1: Relate the concept of antigen-antibody reaction in different types of laboratory investigations.<br>LO2: Explain cytokines' role in disease: inflammation, septic shock and cytokine storm.<br>LO3: Tabulate the characteristic features of professional phagocytes and APCs with their functions.<br>LO4: Justify HLA polymorphism in the innate immunity response and tissue compatibility in transplantation. |

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| | | LO5: Compare the two types of antigen processing. |
| 9 | Immunology 3 | LO1: Distinguish between T-dependent and T-independent humoral immune response.<br>LO2: Distinguish between the mechanisms of hypersensitivity reactions type I, II, III, and IV.<br>LO3: Relate the failure of tolerance with development of autoimmune diseases.<br>LO4: Understand the basic and applied concept of tumour immunology. |

| **PRACTICAL ANATOMY** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Histology of Lymphoid Organs | LO1: Differentiate the microscopic appearance of a lymph node, spleen and thymus gland.<br>LO2: Illustrate the microscopic structure of a lymph node.<br>LO3: Illustrate the microscopic structure of the thymus gland.<br>LO4: Illustrate the microscopic structure of the spleen. |

| **PRACTICAL PATHOLOGY** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Practical 1: Inflammation and Necrosis | LO1: Identify the basic pathological features of acute inflammation, e.g. acute appendicitis.<br>LO2: Identify the basic pathological features of chronic inflammation, e.g. chronic cholecystitis.<br>LO3: Identify the basic pathological features of granulomatous inflammation, e.g. TB lymphadenitis.<br>LO4: Identify the basic pathological features of necrosis, e.g. small bowel necrosis.<br>LO5: Interpret data related to inflammation and necrosis. |
| 2 | Practical 2: Inflammation and Repair | LO1: Identify the basic pathological features of acute inflammation, e.g. abscess wall.<br>LO2: Identify the basic pathological features of chronic inflammation, e.g. gastric ulcer.<br>LO3: Identify the basic pathological features of wound healing, e.g. granulation tissue, keloid.<br>LO4: Interpret data related to inflammation and repair. |
| 3 | Practical 3: Cellular Response to Injury | LO1: Identify the basic pathological features of cellular adaptation, e.g. squamous metaplasia.<br>LO2: Identify the basic pathological features of intracellular accumulation, e.g. fatty change, calcification.<br>LO3: Identify the basic pathological features of thrombosis. |

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| | | LO4: Interpret data related to cellular response to injury. |
| 4 | Practical 4: Benign and Malignant Neoplasms (Gross) | LO1: Identify the basic gross pathological features of benign neoplasms, e.g. ovarian serous cystadenoma, leiomyoma, lipoma.<br>LO2: Identify the basic gross pathological features of malignant neoplasms, e.g. ovarian serous cystadenocarcinoma, colon adenocarcinoma.<br>LO3: Interpret data related to genetic disorders. |
| 5 | Practical 5: Benign and Malignant Neoplasms | LO1: Identify the basic microscopic pathological features of benign neoplasms, e.g. leiomyoma, fibroadenoma.<br>LO2: Identify the basic microscopic pathological features of malignant neoplasms, e.g. adenocarcinoma, squamous cell carcinoma.<br>LO3: Interpret data related to benign and malignant neoplasm. |

| **PRACTICAL IMMUNOLOGY** | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Practical 1: Immunofluorescence | LO1: Explain the principles of the immunofluorescence developed from the specificity of antigen- antibody interactions.<br>LO2: Relate the principles of immunofluorescence to clinical applications. |
| 2 | Practical 2: Immunoagglutination | LO1: Explain the principles of immunoagglutination developed from the specificity of antigen- antibody interactions.<br>LO2: Relate the principles of immunoagglutination to clinical applications.<br>LO3: Describe the objectives and methodology for the urine pregnancy test, rapid plasma reagin (RPR) test, and anti-streptolysin O titre (ASOT) test.<br>LO4: Perform urine pregnancy test, RPR test, and ASOT test.<br>LO5: Interpret the results for the urine pregnancy test, RPR test, and ASOT test. |
| 3 | Practical 3: Immunoprecipitation | LO1: Explain the principles of the immunoprecipitation developed from the specificity of antigen- antibody interactions.<br>LO2: Relate the principles of immunoprecipitation to clinical applications.<br>LO3: Describe the objectives and methodology for the qualitative identification of antigens/antibodies using double immunodiffusion.<br>LO4: Perform double immunodiffusion assay for qualitative identification of antigens/antibodies.<br>LO5: Interpret the results for the qualitative identification of antigens/antibodies using double immunodiffusion. |

| PRACTICAL PHARMACOLOGY | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Routes of Drug Administration | LO1: Demonstrate the method of handling, treating, and preparing animals for the experiments and the ethical guidelines during treatments of animal.<br>LO2: Identify and compare various routes of drug administration and explain the clinical implications associated with each route. |

| DIRECTED SELF-LEARNING | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Molecular Pharmacology | LO1: Summarise the functions of receptors and identify the receptor sites.<br>LO2: Describe the signalling or transducer mechanisms.<br>LO3: List common examples of ligands for each type of signalling mechanism.<br>LO4: Explain receptor regulation.<br>LO5: List examples of second messengers. |

| TEAM-BASED LEARNING | | |
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| **NO** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Immunology | LO1: Describe the immunopathological basis of specific immunodeficiency conditions, their typical clinical manifestations, principle of investigation and management.<br>LO2: Discuss the future technologies in organ and tissue transplantation.<br>LO3: Apply the concepts of immunology in solving relevant clinical scenario |
| 2 | Pharmacology | LO1: Apply basic pharmacokinetic concepts in clinical scenarios.<br>LO2: Apply basic pharmacodynamic concepts in clinical scenarios. |
| 3 | Pathology 1 | LO1: Apply pathology basis of inflammation in clinical scenario.<br>LO2: Interpret laboratory findings relevant to inflammation and healing.<br>LO3: Work in teams to arrive at a conclusive basic pathology interpretation.<br>LO4: Organise input in systematic manner. |
| 4 | Pathology 2 | LO1: Apply pathology basis of neoplasia in clinical scenario.<br>LO2: Interpret laboratory findings relevant to neoplasia.<br>LO3: Work in teams to arrive at a conclusive basic pathology interpretation.<br>LO4: Organise input in systematic manner. |

| PROBLEM-BASED LEARNING | | |
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| **BIL** | **TOPIC** | **SPECIFIC LEARNING OUTCOMES** |
| 1 | Genetic Disorder | LO1: Discuss the pathophysiology of jaundice.<br>LO2: Discuss the pathophysiology of anaemia relevant to the case.<br>LO3: Discuss the genetic inheritance relevant to the case.<br>LO4: Integrate basic science of medical genetics into the case.<br>LO5: Identify relevant laboratory investigations pertaining to the case. |
| 2 | Hypersensitivity | LO1: Discuss the basic principles of the immune system.<br>LO2: Discuss pathophysiology of relevant immune related diseases.<br>LO3: Discuss clinical features and diagnosis of immunological disorders.<br>LO4: Explain principles of management.<br>LO5: Discuss the Islamic perspective relevant to the case. |
| 3 | Malignancy | LO1: Discuss the pathophysiology of clinical features of anaemia related to malignancy.<br>LO2: Discuss the hallmark of cancer and carcinogenesis relevant to the case.<br>LO3: Discuss the clinical aspects of malignancy relevant to the case.<br>LO4: Identify relevant investigations of the case.<br>LO5: Discuss the Islamic perspective relevant to the case. |
| 4 | Inflammation | LO1: Differentiate the type of oedema in the case.<br>LO2: Discuss the pathophysiology of cardinal signs of inflammation in this case.<br>LO3: Discuss issues on wound healing relevant to the case.<br>LO4: Identify relevant investigations of the case.<br>LO5: Discuss the Islamic perspective relevant to the case. |

**OUTLINE COURSE CONTENT (PRACTICAL/PBL/DSL/TBL)**

| TYPE/DISCIPLINE | LECTURER | TITLE |
|---|---|---|
| Anatomy | All Anatomy Lecturers | Practical: Histology of Lymphoid Organs |
| Pharmacology | All Pharmacology Lecturers | Practical: Routes of Drug Administration |
| | | DSL: Molecular Pharmacology |
| | | TBL: Pharmacokinetic and Pharmacodynamic |
| Pathology | All Pathology Lecturers | Practical 1: Inflammation and Necrosis |
| | | Practical 2: Inflammation and Repair |
| | | Practical 3: Cellular Response to Injury |
| | | Practical 4: Benign and Malignant Neoplasm (Gross) |
| | | Practical 5: Benign and Malignant Neoplasm |
| | | TBL 1: Inflammation and Healing |
| | | TBL 2: Neoplasia |
| Immunology | All Immunology Lecturers | Practical 1: Immunofluorescence |
| | | Practical 2: Immunoagglutination |
| | | Practical 3: Immunoprecipitation |
| | | TBL: Immunodeficiency, Organ or Tissue Transplantation |
| PBL | All Lecturers | PBL 1: Jaundice |
| | | PBL 2: Cyanosis |
| | | PBL3: Pallor |
| | | PBL4: Oedema |

# IMPORTANT NOTES/GUIDE TO STUDENT

Please review the Student Study Guide before the start of each course.  It will help you understand what to expect, stay on track, and make the most of your learning journey.

Thank you.

# TEACHING AND LEARNING METHODS

L : Lecture

PRAC : Practical

PBL : Problem-Based Learning

FC : Flipped Classroom

TBL : Team-Based Learning

DSL : Directed Self-Learning

# ASSESSMENT

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| Continuous Assessment | (CONASS) |
| End of Semester Examination | (ESE) |
| Resit Examination | (RE) |

# LOCATION

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| Lecture Hall 1 | LH1 |
| Centralised Teaching Laboratory 1 | CTL1 |
| Centralised Teaching Laboratory 2 | CTL2 |
| Dissection Hall | DH |
| Seminar Room 1 | SR1 |
| Seminar Room 2 | SR2 |
| Seminar Room 3 | SR3 |
| Seminar Room 4 | SR4 |
| Seminar Room 5 | SR5 |
| Seminar Room 6 | SR6 |
| Tutorial Room 1 | TR1 |
| Tutorial Room 2 | TR2 |
| Tutorial Room 3 | TR3 |
| Tutorial Room 4 | TR4 |
| Tutorial Room 5 | TR5 |
| Tutorial Room 6 | TR6 |
| Clinical Skill Lab | CSL |

# STUDENT REFLECTION

Your reflection is a chance to pause, think, and share your personal journey so far.

It is **COMPULSORY** to complete and submit your written reflection **before the mentor–mentee session**. Write **at least 50 words**, be honest, and make it personal. Your mentor will be reading it.

To help you reflect meaningfully, you may write about:

1. **Your learning progress** – What have you understood well so far? What still challenges you?
2. **Your personal growth** – Any changes in your habits, attitudes, or skills this semester?
3. **Your next steps** – What actions will you take to improve or maintain your performance?

Submit here: https://forms.office.com/r/8ESbRTnE6L

*Generic or incomplete answers will be treated as "Not Submitted." This is your voice, make it count.*

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