FACULTY OF MEDICINE & HEALTH SCIENCES
UNIVERSITI PUTRA MALAYSIA

MODULE GUIDE YEAR 1

FIRST SEMESTER
SESSION 2024/2025

DOCTOR OF MEDICINE PROGRAMME (MD)

8th OCTOBER 2024

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Prepared by:

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Year 1 Coordinator
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Date : 8th October 2024

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Deputy Dean (Academic : Medicine)
Doctor Of Medicine Programme
Date : 8th October 2024

GENERAL GUIDELINES FOR CONDUCTING LECTURES/SCL/PRACTICALS

(to be distributed to all lecturers, tutors and demonstrators)

1. ALL lectures, SCLs and practicals are to be strictly conducted by LECTURERS ONLY. Tutors and demonstrators are only allowed to ASSIST during the practical sessions.
2. For each SCL and practical session, the students are to be divided into a MINIMUM of FOUR (4) groups, with the teaching of EACH group conducted by a lecturer.

3. ALL lectures, SCLs and practicals are to be divided EQUALLY between EVERY lecturer in that particular field.
4. (a) EACH unit should come up with their own respective questions/guides for EACH of the SCLs and practicals (if needed). ALL lecturers should be EQUALLY involved in creating these questions/guides (either by turn or together as a group).
   (b) These questions/guides (if needed) are to be distributed to every lecturer conducting that particular SCL/practical for review at least ONE WEEK* before the session. Any complaints/mistakes/disagreements should be notified to the creator of the questions/guides at least THREE (3)* days BEFORE the session is conducted, so modifications may be made.
   (c) The questions/guides (if needed) may be printed and distributed to all the students once it has been modified.
5. Format of the SCL is up to the unit to decide (MCQs, SAQs, essays, assignments, etc).

* The timelines given here are only a guide, as some would prefer to give the students the questions earlier to prepare, while others may choose to give them to the students on the day of the SCL/practical itself.

Reminder/Note:
Lecturers are supposed to be qualified specialists in their field, and thus assumed to be capable of helping students with any problems or questions the students may have pertaining to that field.
It is the responsibility of EVERY lecturer to conduct an equal number of classes to improve their own teaching skills and to be fair to their other colleagues.
Tutors and demonstrators may be allowed to assist or sit in as observers, but they do NOT have the required qualifications needed to conduct these teaching sessions.

MODULE : HUMAN BIOLOGY (MDR3001)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

The course encompasses organization, basic functions of cells, tissues and organs, as well as cellular communication. It also encompasses the gross anatomy of muscle, bone, central and peripheral nervous system as well as general embryology.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Elaborate the basic structures and functions of cells and tissues.
2. Correlate the basic knowledge between anatomy and physiology of a cell.
3. Ilustrate the basic histological structure of cells and tissues.

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	27 x 1 hour	27
SCL / PBL	1 x 1 hour	1
Practical	5 x 3 hours 3 x 2 hours	15 6
Assessment	1 x 3 hours	3
	TOTAL	**52**

CONTENTS

				Dr Nurul Huda MN Dr Razif A Dr Suryati MT
12.	Histology: Skin and appendages	2	P	**Dr Siti Saleha M** AP Dr Mohamad Aris MM AP Dr Cheah Pike See AP Dr Che Norma MT Dr Nurul Huda MN Dr Razif A Dr Suryati MT
13.	Osteology and arthrology	1	L	Dr Nurul Huda MN
14.	Vertebral column	1	L	Dr Nurul Huda MN
15.	Bone and cartilage	1	L	AP Dr Che Norma MT
16.	Histology: Bone and cartilage	3	P	**AP Dr Che Norma MT** AP Dr Mohamad Aris MM AP Dr Cheah Pike See Dr Nurul Huda MN Dr Razif A Dr Siti Saleha M Dr Suryati MT
17.	Myology	1	L	Dr Nurul Huda MN
18.	Muscle tissue	1	L	Dr Nurul Huda MN
19.	Excitability and resting membrane potential	1	L	AP Dr Yong YK
20.	Action potential and graded potential (I)	1	L	AP Dr Yong YK
21.	Action potential and graded potential (II)	1	L	AP Dr Yong YK
22.	Introduction to central and peripheral nervous system	1	L	AP Dr Che Norma MT
23.	Organization of somatic nervous system	1	L	Dr Siti Saleha M
24.	Organization of autonomic nervous system	1	L	Dr Siti Saleha M
25.	Nervous tissue	1	L	Dr Siti Saleha M

26.	Histology: Muscle and nervous tissue	3	P	**Dr Siti Saleha M** AP Dr Mohamad Aris MM AP Dr Cheah Pike See AP Dr Che Norma MT Dr Nurul Huda MN Dr Razif A Dr Suryati MT
27.	Cell communication and conduction of nerve impulse	1	L	AP Dr Yong YK
28.	Action and graded potential with communication between cells	2	P	**AP Dr Yong YK** AP Dr Hasnah B Dr Hafizah AH Dr Nur Izah AR Dr Nurul Hayati MZ Dr Rafidah H Dr Safuraa S
29.	Overview of autonomic nervous system	1	L	Dr. Safuraa S
30.	Gross anatomy and terminology	3	P	**AP Dr Mohamad Aris MM** AP Dr Che Norma MT AP Dr Cheah Pike See Dr Nurul Huda MN Dr Razif A Dr Siti Saleha M Dr Suryati MT
31.	Gametogenesis and ovulation	1	BL	Prof Dr Mohamad Aris MM
32.	Fertilization and implantation	1	BL	Prof Dr Mohamad Aris MM
33.	Germ discs and folding of embryo	1	L	Prof Dr Mohamad Aris MM
34.	Secondary mesoderm and somites	1	L	Prof Dr Mohamad Aris MM
35.	Embryonic period, foetus and placenta	1	L	Prof Dr Mohamad Aris MM
36.	Teratology and birth defects	1	L	Prof Dr Mohamad Aris MM
37.	Continuous assessment	1	A	AP Dr Hasnah Bahari
38.	Teaching evaluation	1	A	AP Dr Hasnah Bahari

39.	Feedback session	1	A	AP Dr Hasnah Bahari

Legends:
L = Lecture. **CL** = Conceptual Lecture.
BL = Blended Learning. **SCL** = Student-centered Learning.
P = Practical. **A** = Assessment.

LECTURERS

Module coordinator: AP Dr. Hasnah Bahari

Lecturers:
Prof. Dr. Mohamad Aris Mohd Moklas
Assoc. Prof. Dr. Che Norma Mat Taib
Assoc. Prof. Dr. Cheah Pike See
Assoc. Prof. Dr. Hasnah Bahari
Assoc. Prof. Dr. Yong Yoke Keong
Dr. Hafizah Abdul Hamid
Dr. Nur Izah Ab Razak
Dr. Nurul Hayati Mohamad Zainal
Dr. Nurul Huda Mohd Nor
Dr. Rafidah Hod
Dr. Razif Abas
Dr. Safuraa Salihan
Dr. Siti Saleha Masrudin
Dr. Suryati Mohd Thani

OUTLINE OF COURSE CONTENT

1. **Introduction and Terminology in Anatomy – Conceptual Lecture**
   Time: 1 hour

   At the end of the session, the students should be able to
   - describe the basic concepts of human anatomy.
   - describe the surface anatomy and landmarks of the human body.
   - define the basic terms for anatomical position, anatomical planes and movement.

2. **Epithelial Tissue and Glands – Blended Learning**
   Time: 1 hour

   At the end of the session, the students should be able to define and describe the basic histology concepts of epithelium and glands.

3. **Histology: Epithelial Tissue and Glands – Practical**
   Time: 3 hours

   At the end of the session, the students should be able to identify and illustrate the basic histology of epithelium and glands.

4. **Connective Tissue – Blended Learning**
   Time: 1 hour

   At the end of the session, the students should be able to define and describe the basic histology concepts of connective tissue.

5. **Histology: Connective Tissue - Practical**
   Time: 2 hours

   At the end of the session, the students should be able to identify and illustrate the basic histology of connective tissue.

6. **Cell Membrane and External Environment – Blended Learning**
   Time: 1 hour

   At the end of the session, the students should be able to
   - to explain the cell structure and functions.
   - to differentiate between the internal and external environment of the body.
   - to list types of transport protein – channels, carrier proteins and pumps.
   - to describe the cell membrane.

7. Cellular Organelles – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- to state types of cytoplasmic organelles and its functions.
- to state nuclear organelles and its functions.
- to describe the organelles and cellular organelles.

8. Cellular Transports – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- to explain passive transport, including diffusion, filtration, osmosis and its functions.
- to explain active transport including primary and secondary, endo and exocytosis, transcellular transport and its functions.

9. Principles of Intercellular Communication - Lecture
Time: 1 hour

- describe the structure and functions of cellular connection.
- to state the type of cellular connection – tight junctions, adherens junctions, gap junction.

10. Membrane Cell and Cellular Organelles – Practical
Time: 3 hours

At the end of the session, the students should be able to identify the membrane cell and cellular organelles.

11. Skin and Appendages – Student-centered Learning
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic histology concepts of skin and appendages.

12. Histology: Skin and Appendages – Practical
Time: 2 hours

At the end of the session, the students should be able to identify and illustrate the basic histology of skin and appendages.

13. Osteology and Arthrology – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic concepts of osteology and arthrology.

14. Vertebral Column –Lecture
Time: 1 hour

At the end of the session, the students should be able to
- recognise the characteristic features of the vertebral column, including the curvatures of the spine and its osteology.
- describe and demonstrate the basic concepts of vertebral column.

15. Bone and Cartilage – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic histology concepts of bone and cartilage.

16. Histology: Bone and Cartilage – Practical
Time: 3 hours

At the end of the session, the students should be able to identify and illustrate the basic histology of bone and cartilage.

17. Myology – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic concepts of muscles.

18. Muscle Tissue - Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic histology concepts of muscle tissue.

19. Excitability and Resting Membrane Potential – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- to state types of excitability tissue.
- to explain excitability.
- to explain the genesis and maintenance of RMP: - ions distribution, permeability, Na/K pump.

20. Action Potential and Graded Potential (I) & (II) – Lectures
Time: 2 hours

At the end of the session, the students should be able to
- to differentiate threshold and subthreshold stimuli.
- to describe graded potential.
- to explain the genesis of action potential.
- to differentiate absolute and relative refractory periods.
- to differentiate between action and graded potential.

21. Introduction to Central and Peripheral Nervous System – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic concepts of the central and peripheral nervous system.

22. Organization of Somatic Nervous System – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic concepts of the somatic nervous system.

23. Organization of Autonomic Nervous System – Conceptual Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic concepts of the autonomic nervous system.

24. Nervous Tissue – Lecture
Time: 1 hour

At the end of the session, the students should be able to define and describe the basic histology concepts of nervous tissue.

25. Histology: Muscle and Nervous Tissue – Practical
Time: 3 hours

At the end of the session, the students should be able to identify and illustrate the basic histology of muscle and nervous tissues.

26. Cell Communication and Conduction of Nerve Impulse - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- list type of communication – neural and hormonal.
- to explain saltatory and contiguous conduction.
- to identify the refractory area.
- to differentiate antidromic and orthodromic conduction.
- to list and explain the factors affecting nerve conduction.

27. Action and Graded Potential with Communication between Cells - Practical
Time: 2 hours

At the end of the session, the students should be able to identify and describe the action potential, graded potentials and cell communication.

28. Overview of Autonomic Nervous System - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the neurotransmitters of the sympathetic and parasympathetic nervous systems and differentiate between parasympathetic & sympathetic responses.
- describe the actions of parasympathetic and sympathetic agonists & antagonists, their adverse effects and clinical applications.

29. Gross Anatomy and Terminology – Practical
Time: 3 hours

At the end of the session, the students should be able to
- identify and demonstrate the basic terms for anatomical position, anatomical planes and movement.
- identify the basic gross anatomy of the body.

30. Gametogenesis and Ovulation – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to describe the basic concepts of gametogenesis and ovulation.

31. Fertilization and Implantation – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to describe the basic concepts of fertilisation and implantation.

32. Germ Discs and Folding of Embryo – Lecture
Time: 1 hour

At the end of the session, the students should be able to describe the basic concepts of germ disc and folding of embryo.

33. Secondary Mesoderm and Somites - Lecture
Time: 1 hour

At the end of the session, the students should be able to describe the basic concepts of secondary mesoderm and somites.

34. Embryonic Period, Foetus and Placenta - Lecture
Time: 1 hour

At the end of the session, the students should be able to describe the basic concepts of embryonic period, foetus and placenta.

35. Teratology and Birth Defects - Lecture
Time: 1 hour

At the end of the session, the students should be able to describe and identify the basic concepts of teratology and birth defects.

36. Assessment
Time: 1 hour

37. Teaching Evaluation and Feedback
Time: 2 hours

RECOMMENDED TEXTBOOKS

1. Anthony L. M. (2021). *Junqueira's Basic Histology: Text and Atlas (15th Edition)*. New York: Mc Graw Hill.

2. John, E. H. (2020). *Guyton and Hall: Textbook of Medical Physiology* (*14th Edition*). Philadelphia: Elsevier.

3. Sandler, T. W. (2019*). Langman's Medical Embryology (14th Edition)*. Philadelphia: Lippincott Williams & Wilkins.

4. Moore, K.L. & Dalley, A.F. (2018). *Clinically Oriented Anatomy (8th Edition).* Philadelphia: Lippincott Williams and Wilkins.

MODULE : HUMAN BIOCHEMISTRY AND GENETICS (MDR3002)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

This course encompasses i) the basic human biochemistry of proteins, carbohydrates and lipids involved in major metabolic pathways, as well as diseases caused by metabolic enzyme deficiencies, protein stability and malfunctional biological activities; and ii) the human genetics emphasise the fundamental concepts of genetics, the structure and functions of genes, DNA replication, regulation of gene expression, mutations and its relevance to human diseases as well as application of genetic tools in disease management.

LEARNING OUTCOMES

On completion of this course, the students should be able to:

1. Describe the structures of proteins, carbohydrates and lipids and relate to their biological roles.
2. Explain and perform enzyme catalysis, the factors involved in its regulation and apply the knowledge to the control of enzyme activity in metabolism.
3. Explain the metabolic inter-organ relationships of carbohydrates, lipids and proteins.
4. Interpret biochemical data in relation to the disease process.
5. Describe the basic principles of genetics.
6. Apply the knowledge of genetics in understanding human diseases.
7. Associate the principles of medical ethics with human genetics.

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	28 x 1 hour	28
Practical	6 x 3 hours	18
Assessment	1 x 1 hours	1
	TOTAL	**47**

CONTENTS

No.	Topics	Format	Hour	Lecturer
1.	Biochemical Components of the Human Body	L	1	Dr. Chau De Ming
2.	Introduction to Amino Acids and Proteins	L	1	AP Dr. Ho Kok Lian
3.	Enzyme Characteristics and Regulation	L	1	Dr. Jonathan Lim
4.	Introduction to Metabolism	L	1	AP Dr. Ho Kok Lian
5.	Carbohydrate Chemistry and Importance	L	1	AP Dr. Zalinah Ahmad
6.	Carbohydrate Metabolism I - Glycolysis, Gluconeogenesis	L	1	AP Dr. Abdah Akim
7.	Carbohydrate Metabolism II - Glycogen Synthesis and Breakdown	L	1	AP Dr. Abdah Akim
8.	Carbohydrate Metabolism III - Pentose Phosphate Pathway and Metabolism of Monosaccharides	L	1	AP Dr. Abdah Akim
9.	TCA cycle and Oxidative Phosphorylation	L	1	AP Dr. Ho Kok Lian
10.	Structure & Function of Lipids	L	1	AP Dr. Zalinah Ahmad
11.	Oxidation of Fatty acids & Ketogenesis	L	1	AP Dr. Zalinah Ahmad
12.	Fatty Acid Synthesis	L	1	AP Dr. Zalinah Ahmad
13.	Biosynthesis of Cholesterol, Bile Acids, Lipid Transport and Lipoprotein Metabolism	L	1	AP Dr. Intan Nureslyna
14.	Amino Acid Metabolism: Protein Turnover, Nitrogen Balance and Protein Catabolic Diseases	L	1	AP Dr. Ho Kok Lian
15.	Nucleic Acid Metabolism	L	1	AP Dr. Ho Kok Lian
16.	Biochemistry of Hormones and Signal Transduction	L	1	AP Dr. Ho Kok Lian
17.	Whole Body Integration of Metabolism	L	1	Dr. Sharifah Sakinah
18.	The Fed State & Starved State	L	1	Dr. Sharifah Sakinah

19.	The Principles and Language of Genetics	L	1	Dr. Chau De Ming
20.	Structure and Functions of DNA, Chromosome and Gene	L	1	Dr. Chau De Ming
21.	DNA Replication and Cell Cycle	L	1	AP Dr. Norshariza Nordin
22.	Transcription; mRNA translation and Gene Expression Regulation	L	1	Prof. Dr. Michael Ling King Hwa
23.	DNA & Chromosome Mutation	L	1	AP Dr. Norshariza Nordin
24.	Single Gene Disorder and Modes of Inheritance	L	1	Prof. Dr. Michael Ling King Hwa
25.	Multifactorial polygenic and chromosomal disorders	L	1	AP Dr Norshariza
26.	Cancer Genetics	L	1	AP Dr Rachel Mok
27.	Genetic Screening and Prenatal Diagnosis, Genetic counselling	L	1	AP Dr. Thilakavathy
28.	Application of Genetics in Disease Management	SGT	1	Dr. Chau, AP Dr. Shariza, Prof. Dr. Michael Ling, AP Dr. Mok, AP Dr. Thilakavathy
29.	Practical 1: Urine Analysis	P	3	AP Dr. Intan Nureslyna, Dr. Zalinah, Dr. Lim, AP Dr. Ho KL
30.	Practical 2: Serum Protein Determination	P	3	Dr. Lim, AP Dr. Zalinah, AP Dr. Ho
31.	Practical 3: Serum Uric Acid Determination	P	3	AP Dr. Zalinah, Dr. Lim, AP Dr. Ho
32.	Practical 4: DNA and Gene Analysis	P	3	Prof. Dr. Michael Ling King Hwa
33.	Practical 5: Clinical important enzymes and data analysis	P	3	AP Dr. Intan Nureslyna Samsudin, AP Dr Zalinah Ahmad
34.	Student Centered Learning	SCL	3	Dr. Chau, AP Dr. Shariza, Prof. Dr. Michael Ling, AP Dr. Mok, AP Dr. Thilakavathy
35.	Assessment	A	1	Module coordinator

Legends:
L = Lecture.
BL = Blended Learning.
P = Practical.
SGT = Small group teaching
A = Assessment.
SCL = Student Centered Learning

LECTURERS

Module Coordinator: Dr. Chau De Ming

Lecturers:
Assoc. Prof. Dr. Abdah Akim
Assoc. Prof. Dr. Zalinah Ahmad
Assoc. Prof. Dr. Ho Kok Lian
Assoc. Prof. Dr. Thilakavathy a/p Karuppiah
Assoc. Prof. Dr. Syahrilnizam Abdullah
Assoc. Prof. Dr. Norshariza Nordin
Assoc. Prof. Dr. Intan Nureslyna Samsudin
Assoc. Prof. Dr. Subashini C. Thambiah
Assoc. Prof. Dr. Michael Ling King Hwa
Assoc. Prof. Dr. Rachel Mok Pooi Ling
Dr. Sharifah Sakinah Syed Alwi
Dr. Chau De Ming
Dr. Jonathan Lim Chee Woei

OUTLINE OF COURSE CONTENT

1. **BIOCHEMICAL COMPONENTS OF THE HUMAN BODY**
   (Lecture – 1 hour)
   Biochemistry in clinical medicine
   Main classes of biochemical components in living systems
   Structures and functions of biochemical components:
   – Carbohydrates, lipids, proteins, nucleic acids (DNA and RNA), coenzymes, vitamins, hormones, water, minerals
   -- Percentage by weight of different components in the human body

2. **AMINO ACIDS, PROTEINS, PROTEIN STRUCTURE AND STABILITY**
   (Lecture - 1 hour)
   Amino acids as building blocks for proteins.
   Types of amino acids found in animal proteins.
   The peptide bond and its characteristics
   Some physiologically important peptides
   Primary structure - sequence of amino acids in the polypeptide chain
   Secondary structure such as the alpha helix or beta pleated sheet

Tertiary structure refers to the folded ball-like structures as seen in myoglobin
Quaternary structure refers to the presence of two or more globular structures as seen in haemoglobin.
The role of peptide bonds, hydrogen bonds, hydrophobic interactions, electrostatic
interactions, and disulphide bonds in maintaining protein structure & conformation.
Protein function and classification.
Primary structure dictates the tertiary conformation of a protein
Activity and function of proteins are determined by their structures
Protein structure of haemoglobin and its function
General features of globin genes and their location.
Effect of replacement of a single amino acid in the primary structure as seen in sickle cell anaemia haemoglobin and its effect on haemoglobin function.
Collagen structures - disorders of collagen biosynthesis and function
Minimum structural requirements needed to display biological activity as seen with adrenocorticotropic hormone.
Protection of biological activity of proteins as seen with proinsulin and zymogens.
Denaturation of proteins and their renaturation by protein disulphide isomerase.
Clinical aspects - sickle cell anaemia, osteogenesis imperfecta, Ehlers-Danlos.

3. ENZYME CHARACTERISTICS AND REGULATIONS

(Lecture -1 hour)
Enzymes as biological catalysts.
Classification of enzymes.
Coenzymes
Enzyme active site.
Purpose of enzyme regulation.
Significance of K_m and V_{max} (Lineweaver-Burk plot).
Effect of substrate, co-factor, pH and temperature on enzyme activity.
Inducers and repressors of enzyme synthesis.
Regulation of enzyme activity through enzyme compartmentalization multienzyme complexes, allosteric effectors and covalent modification

4. INTRODUCTION TO METABOLISM

(Lecture – 1 hour)
Classification of organisms according to different energy requirements
Overview of metabolism: anabolism & catabolism.
Thermodynamics of phosphate compounds and role of ATP
Oxidation-reduction reactions
Roles of reducing equivalents NADH, NADPH, FADH2
Redox potentials
Energy transduction and steady state
Amphibolic pathways
Overview of major metabolic pathways in the body

5. CARBOHYDRATE CHEMISTRY AND IMPORTANCE

(Blended Learning – 1 hour)
Chemical nature of dietary carbohydrates and digestion
Monosaccharides, disaccharides, polysaccharides
Sources of glucose and importance of glucose
Utilization of glucose in different parts of the body
Oxidation of glucose
Importance of glycolysis in certain tissues
Overview of glycolysis, glycogen metabolism, gluconeogenesis and pentose phosphate pathway.

6. SMALL GROUP TEACHING 1: CARBOHYDRATE METABOLISM I – GLYCOLYSIS, GLUCONEOGENESIS, GLYCOGEN METABOLISM

(SGT - 1 hour)
Aerobic and anaerobic glycolysis
Glycolytic pathway – enzymatic reactions
Priming stage or phosphorylation of glucose, splitting stage; and oxidoreduction stage and synthesis of ATP
Key regulatory enzymes
- pyruvate kinase, phosphofructokinase, glucokinase

Alternate fates of pyruvate
Control mechanism of glycolysis
- allosteric activation& inhibition
- hormones: insulin, glucagon & epinephrine

Clinical correlations - lactic acidosis, hyperglycaemia & diabetic mellitus; pyruvate kinase deficiency
Importance of blood glucose
Pathways of gluconeogenesis – from lactate, pyruvate, glucogenic amino acids
Energy cost of gluconeogenesis
Reciprocal regulation of glycolysis and gluconeogenesis
The alanine and Cori cycles
Clinical correlations - hypoglycaemia and premature infants; hypoglycaemia and alcoholism; diabetes mellitus Type I & II

7. SMALL GROUP TEACHING 2: CARBOHYDRATE METABOLISM II – GLYCOGEN METABOLISM

(SGT - 1 hour)
Glycogen structure and importance as glucose and fuel store in the body
Role in buffering blood glucose
Glycogen synthesis/ glycogenesis pathway
Charging of glucose in the form of UDP-glucose
Glycogen breakdown/ glycogenolysis pathway
Different fates of glucose 1-phosphate in muscle and liver
Control of glycogen metabolism – hormonal & via cyclic cascade mechanism
Response to stress & integration between glycolysis & glycogen metabolism.
Clinical correlations - glycogen storage diseases Types I -V

8. SMALL GROUP TEACHING 3: CARBOHYDRATE METABOLISM III - PENTOSE PHOSPHATE PATHWAY & METABOLISM OF MONOSACCHARIDES

(SGT - 1 hour)
Pentose phosphate pathway and its significance in metabolism
Oxidative and non-oxidative phases of PPP
Reducing equivalents – NADPH and NADH and differential significance in reductive and oxidative metabolic pathways
Role of Glucose 6-phosphate dehydrogenase (G6PD) in red blood cells
Role of reducing equivalents in maintaining RBC membrane integrity
Metabolism of other monosaccharides -fructose, galactose and mannose
Clinical correlations -

- Glucose 6-phosphate dehydrogenase (G6PDH) deficiency.
- Disorders of fructose metabolism and galactose metabolism.

9. TCA CYCLE AND OXIDATIVE PHOSPHORYLATION

(Blended Learning – 1 hour)
Importance of TCA cycle in humans
Enzymes and intermediates of TCA cycle; overall stoichiometry
Amphibolic behaviour of the TCA cycle and Anaplerotic reactions
Control of the TCA cycle
TCA cycle – source of intermediates for amino acid synthesis, gluconeogenesis
Bioenergetics - Free energy, redox reactions, ATP as an energy carrier
Mitochondrial electron transport – nicotinamide nucleotides, flavoproteins, ubiquinone, cytochromes
Respiratory complexes in mitochondria
Shuttle pathways for transport of electrons
Oxidative phosphorylation - chemiosmotic theory
Poisons that inhibit respiratory chain, uncouplers
Clinical aspects -

- pyruvate dehydrogenase deficiency.
- fumarase deficiency.
- MELAS (mitochondrial myopathy, encephalopathy, lactic acidosis & stroke).
- Cyanide poisoning.

10. LIPID STRUCTURE AND FUNCTIONS

(Lecture - 1 hour)
Physiological functions of lipids in the body
Types of lipids and their functional roles
Chemical nature of fatty acids – saturated, monounsaturated & polyunsaturated, hydrophobicity
Omega-3 (n-3) and omega-6 (n-6) fatty acids
Conjugated and non-conjugated fatty acids
Essential fatty acids
Arachidonic acid, prostaglandins and other prostanoids
Clinical correlations

11. FATTY ACID OXIDATION AND KETOGENESIS

(Lecture – 1 hour)

Beta-oxidation of saturated, monounsaturated and polyunsaturated fatty acids

Energy yield of fatty acid oxidation

Alpha-oxidation - Oxidation of branched chain fatty acids (eg. phytanic acid) and Refsum disease

Control and regulation of fatty acid oxidation

Excessive oxidation of fatty acid and ketogenesis – during starvation and diabetic mellitus

Ketogenesis in the liver and extrahepatic tissues.

Utilization of ketone bodies by the extrahepatic tissues.

Clinical correlations -

- Carnitinepalmitoyltransferase deficiency
- Acyl-CoA dehydrogenase deficiency.

12. FATTY ACID SYNTHESIS AND TRIACYLGLYCEROL STORAGE

(Lecture - 1 hour)

De novo Synthesis of fatty acids

- Pathway overview and key enzymes involved
- Role of carnitine in acetyl CoA transport

Elongation of fatty acids - elongases

Synthesis of monounsaturated and polyunsaturated fatty acids

Formation of double bonds

Roles of desaturases

Synthesis of triacylglycerols in the liver and adipose tissue

Regulation of fatty acid synthesis in the liver, adipose tissue

Clinical correlations -

- Refsum disease.
- Obesity.

13. SMALL GROUP TEACHING 4: (I) CHOLESTEROL AND BILE ACID METABOLISM, (II) LIPID TRANSPORT AND LIPOPROTEIN METABOLISM

(SGT – 1 hour)

Physiological functions of cholesterol in the body

Biosynthesis of cholesterol from acetyl CoA

- Outline of pathway.
- HMG CoA reductase and its role in the control of cholesterol synthesis.

Cholesterol transport in the blood and its equilibrium of cholesterol in lipoproteins and cell membrane

Cholesterol storage as cholesterol ester

Conversion of cholesterol to bile acids and control of cholesterol 7α-hydroxylase

Clinical correlations -

- Cholesterol gallstone.
- Cholesterol link to atherosclerosis.
- Cardiovascular diseases.

General structural features of lipoproteins

Types of blood lipoproteins – chylomicrons, VLDL, IDL, LDL & HDL

Sites of synthesis of various blood lipoproteins

Role of lipoprotein lipase in lipoprotein-triacylglycerol metabolism
Uptake of lipoproteins into cells – receptors
Clinical significance of LDL: HDL ratio in relation to coronary heart disease
Clinical correlations – hypo- and hyper-lipoproteinemia.

14. AMINO ACID METABOLISM: PROTEIN BREAKDOWN, NITROGEN BALANCE AND PROTEIN CATABOLIC DISEASES (Lecture – 1 hour)

Protein turnover and protein half-life
Protein breakdown and nitrogen balance
Positive and negative nitrogen balance
Roles of proteases and peptidases in protein breakdown
Metabolism of amino nitrogen from amino acids

- Removal of amino nitrogen – oxidative and non-oxidative deamination.
- Transamination – generation of new amino acids
- Significance of aminotransferases

Role of ubiquitin in protein degradation
Angelman syndrome
Location of gene associated with protein catabolism on chromosome 15
Ammonia metabolism and urea cycle
Regulation of urea cycle
Metabolism of the carbon skeleton of amino acids

- Glucogenic and ketogenic amino acids

Clinical correlations – deficiency of enzymes in urea cycle and phenylketonuria.
Ammonia metabolism and urea cycle
Regulation of urea cycle
Metabolism of the carbon skeleton of amino acids
- glucogenic and ketogenic amino acids
Clinical correlations – deficiency of enzymes in urea cycle & phenylketonuria.

15. NUCLEIC ACID METABOLISM

(Lecture – 1 hour)
Components of nucleic acids
Purines and pyrimidines
Chromosomes and molecular structure of the chromosome
Transfer of genetic information - colinearity of genes and proteins

- DNA replication →Transcription→Translation

Nucleotide synthesis – biosynthesis of purines and pyrimidines
Degradation of purine and formation of uric acid
Degradation of pyrimidine nucleotides
The salvage pathway for purines
Clinical correlations -

- Gout.
- Lesch-Nyhan Syndrome.
- Subclass of patients with autism.
- Hereditary orotic aciduria.

16. BIOCHEMISTRY OF HORMONES AND SIGNAL TRANSDUCTION

(Blended Learning - 1 hour)

Types of hormones – peptide hormones, steroid hormones

Overview on physiological actions of hormones

General mechanism of action of hormones that bind to cell surface receptors

Types of second messenger system

Mechanism of action of hormones that bind to intracellular receptors

Intracellular signal transduction cascades – kinases and signalling molecules

17. WHOLE BODY INTEGRATION OF METABOLISM

(Lecture - 1 hour)

The structural and metabolic roles of carbohydrates, lipids and proteins in the body.

Dietary carbohydrates and lipids as providers of energy and health.

The flow of carbons and metabolites in the metabolic pathways.

The interrelationships of carbohydrate, lipid and protein metabolism.

Metabolic interrelationships of major tissues e.g. liver, heart, brain, muscle

The Cori cycle and the alanine cycle.

Regulation of metabolic pathways:

- Compartmentalization of enzymes and metabolic pathways.
- Control of regulatory enzyme activity.
- Covalent modification.
- Allosteric control.
- Induction and repression of synthesis.
- Hormonal control.

Clinical correlations – Reye syndrome, obesity, starvation, malnutrition**.**

18. THE FED AND STARVED STATES

(Lecture - 1 hour)

The conditions of a fed state – conditions after a meal

The major metabolic events occurring in the fed state

Utilisation of dietary carbohydrates

- Conversion of glucose to glycogen.
- Conversion of excess glucose to fat.

Utilisation of dietary fat

- Oxidation of fatty acids.
- Transport and Storage of fat.

Utilisation of dietary proteins and amino acids

Synthesis of new proteins for wear and tear

Elimination of excess amino acids through urea cycle

Changes in insulin and glucagon levels in the fed state

The condition for the fasting and starved states

Glycogenolysis in the liver and muscle

Lipolysis in the adipose tissue

Oxidation of fatty acids in the liver and ketogenesis

Utilisation of ketone bodies in the extrahepatic tissues

Maintenance of blood glucose level and gluconeogenesis

Changes in insulin and glucagon levels in the starved state

19. THE PRINCIPLES AND LANGUAGE OF GENETICS

(Lecture - 1 hour)
History of medical genetics
Basic genetic concepts
Genes versus genome

20. STRUCTURE AND FUNCTIONS OF DNA, CHROMSOME AND GENE

(Lecture - 1 hour)
DNA structure and characteristics.
Types of RNA.
Chromosome structure (histone, euchromatic, etc, telomere) and its relationship to disease.
Gene structure (intron, exons, transcription site)

21. DNA REPLICATION AND CELL CYCLE

(Lecture - 1 hour)
Original of replication
DNA replication machinery and steps (polymerase, primase, ligase, leading and lagging strand)
Different stages of cell cycle
Checkpoints, cell division
Mitosis, meiosis, spermatogenesis, oogenesis

22. DNA TRANSCRIPTION, MRNA TRANSLATION AND GENE EXPRESSION REGULATION

(Lecture - 1 hour)
DNA transcription machinery and process.
Promoters, transcription factors.
mRNA maturation.
Translation machinery and process, tRNA.
Genetic code, codons.
Epigenetics.
Cell signalling.

23. SMALL GROUP TEACHING 5: DNA AND CHROMOSOME MUTATION

(SGT 5 – 1 hour)
Types of DNA mutations.
Causes of mutations.
Types of chromosome mutation.
Effects of DNA and chromosome mutations on gene functions.
Effects of DNA and chromosome mutations on disease development.
DNA repair mechanism.

24. SINGLE GENE DISORDERS AND MODES OF INHERITANCE

(Lecture - 1 hour)
Mandelian principles.
Autosomal recessive, dominant, X-linked and examples of diseases for each mode of inheritance.

25. MULTIFACTORIAL POLYGENIC AND CHROMOSOME DISORDERS

(Lecture - 1 hour)
Family association study.
Genome-wide association study, adoption, twin.
Autosome disorders, sex-chromosome disorders.
Examples of complex and chromosomal disorder.

26. CANCER GENETICS

(Lecture - 1 hour)
Definition.
Tumour suppressors vs oncogenes.
Genetic mutations in cancer.
Hallmarks of cancer.

27. GENETIC SCREENING AND PRENATAL DIAGNOSIS

(Lecture - 1 hour)
Diagnosis – Karyotyping.
Sequencing example (chromatogram).
Next Generation Sequencing, cytogenetics, PCR, etc
description of screening methods for related to diseases that have been taught)

28. SMALL GROUP TEACHING 6: APPLICATON OF GENETICS IN DISEASE MANAGEMENT

(SGT – 1 hour)
Disease diagnosis, treatment and prevention
Precision medicine
Targeted therapy
Gene therapy
Stem cell therapy
Gene/genome editing

29. PRACTICAL 1: URINE ANALYSIS (3 hours)

30. PRACTICAL 2: SERUM PROTEIN DETERMINATION (3 hours)

31. PRACTICAL 3 - BLOOD URIC ACID LEVEL (3 hours)

32. PRACTICAL 4: DNA AND GENE ANALYSIS 1 (3 hours))

33. PRACTICAL 5: CLINICAL IMPORTANT ENZYMES & DATA ANALYSIS (3 hours)

34. PRACTICAL 6: DNA AND GENE ANALYSIS 2 (3 hours)

RECOMMENDED TEXTBOOKS:

1. Lieberman, M.A., and Marks, A.D. (2018). *Marks' Basic Medical Biochemistry. 5th Edition.* Lippincott Williams and Wilkins.
2. Turnpenny P and Ellard S. and Young, I.D. (2012). *Emery's Elements of Medical Genetics. 14th Edition.* Philadelphia: Churchill Livingstone.

REFERENCE BOOKS:

1. Murray, R.K., Bender, D.A., Botham, K.M., Kennelly P.J., Rodwell V.W., and Weil P.A. (2012). *Harper's Illustrated Biochemistry* (*29th Edition).* New York: McGraw-Hill Co.
2. Delvin, T.M. (2010). *Textbook of Biochemistry with Clinical Correlations (6th Edition).* New York: John Wiley & Sons.
3. Davison, A., Milan, A., Philips, S., Ranganath, L. (2015). *Biochemistry & Metabolism*. London: JP Medical Ltd.
4. Hartl, D.L. and Jones, E.W. (2009). *Genetics: analysis of genes and genomes* (*7th Edition*) Sudbury: Jones and Bartlett.
5. Pierce, B.A. (2008). *Genetics: A Conceptual Approach (3rd Edition)*. New York: Palgrave Macmillan.
6. Young, I. D. (2010). *Medical Genetics (2nd Edition)* Oxford: Oxford University Press.

MODULE : INTRODUCTION TO GENERAL PATHOLOGY (MDR3003)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

The course encompasses principles of basic pathology which include general pathology and pathogens and relates with anatomy, physiology and biochemistry. It covers aspects of etiology, pathogenesis, morphological changes and clinical significance.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Able to correlate the concept and process that is involved in inflammation and the concept of tumorigenesis (C4).

2. Explain the general concept in pathology of cell response towards physiology changes. (C3, A2, LL).

3. Perform the diagnostic laboratory test associated with pathogen (P3).

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	20 x 1 hour	20
Practical	5 x 3 hours	15
Assessment	1 x 2 hours	2
	TOTAL	**37**

CONTENTS

No	Topics	Hours	Format	Lecturer
1.	Cellular response to stress and toxic insults I	1	L	Dr Huzlinda Hussin
2.	Tissue renewal, repair and regeneration	1	L	Dr Fauzah Abd Ghani
3.	Acute and chronic inflammation I	1	L	Dr Razana Mohd Ali
4.	Neoplasia I	1	L	AP Dr Maizaton Atmadini Abdullah
5.	Neoplasia II	1	L	Dr Lai Shau Kong
6.	Cellular response to stress and toxic insults	3	P	Dr Razana Mohd Ali Dr Wan Syahira Ellani Wan Ahmad Kammal
7.	Cellular response to stress and toxic insults II	1	SGT	Dr Razana Mohd Ali AP Dr Maizaton Atmadini Abdullah
8.	Acute and chronic inflammation II	1	SGT	AP Dr Maizaton Atmadini Abdullah Dr Fauzah Abdul Ghani
9.	Haemodynamic disorders, thromboembolic disease I	1	L	Dr Wan Syahira Ellani Wan Ahmad Kammal
10.	Neoplasia I	1	SGT	Dr Huzlinda Hussin Dr Wan Syahira Ellani Wan Ahmad Kammal
11.	Neoplasia II	1	SGT	Dr Fauzah Abd Ghani Dr Lai Shau Kong
12.	Acute and chronic inflammation	3	P	AP Dr Maizaton Atmadini Abdullah Dr Lai Shau Kong
13.	Haemodynamic disorders, thromboembolic disease II	1	SGT	Dr Razana Mohd Ali Dr Wan Syahira Ellani Wan Ahmad Kammal
14.	Neoplasia	3	P	Dr Wan Syahira Ellani Wan Ahmad Kammal Dr Fauzah Abd Ghani

15.	Introduction to bacteriology	1	L	Dr Azmiza Syawani Jasni
16.	Bacterial growth and genetic	1	BL	Dr Narcisse Mary Joseph
17.	Bacterial pathogenicity and immune response	1	L	AP Dr Vasantha Kumari Neela
18.	Introduction to virology	1	BL	AP Dr Niazlin Mohd Taib
19.	Introduction to mycology	1	BL	AP Dr Siti Norbaya Masri
20.	Introduction to parasitology and entomology	1	BL	Dr Rosni Ibrahim
21.	Antimicrobial agents I: Antibiotics	1	BL	Dr Tengku Zetty Maztura Tengku Jamaluddin
22.	Antimicrobial agents II	1	L	Prof Dr Zamberi Sekawi
23.	Antimicrobial agents III	1	L	Prof Dr Rukman Awang Hamat
24.	Introduction to microbiology lab techniques	3	P	AP Dr Siti Norbaya Masri AP Dr Leslie Than Thian Lung Dr Tengku Zetty Maztura Tengku Jamaluddin AP Dr Chee Hui Yee Dr Norashiqin Misni Dr Nur Raihana Ithnin
25.	Microbiology culture & identification	3	P	Dr Azmiza Syawani Jasni AP Dr Vasantha Kumari Neela AP Dr Niazlin Mohd Taib Dr Rosni Ibrahim
26.	Assessment	1	A	Module Coordinator
27.	Teaching evaluation	1	A	Module Coordinator

Legends:

L = Lecture
P = Practical
SGT = Small Group Teaching
A = Assessment

LECTURERS

Module coordinator : Dr Azmiza Syawani Jasni
Lecturers:

Prof Dr Zamberi Sekawi
Prof Dr Rukman Awang Hamat
AP Dr Vasantha Kumari Neela
AP Dr Chee Hui Yee
AP Dr Siti Norbaya Masri
AP Dr Niazlin Mohd Taib
AP Dr Leslie Than Thian Lung
AP Dr Maizaton Atmadini Abdullah
Dr Razana Mohd Ali
Dr Fauzah Abdul Ghani
Dr Huzlinda Hussin
Dr Lai Shau Kong
Dr Azmiza Syawani Jasni
Dr Tengku Zetty Maztura Tengku Jamaluddin
Dr Rosni Ibrahim
Dr Narcisse Mary A/P Sither Joseph
Dr Norashiqin Misni
Dr Nur Raihana Ithnin

OUTLINE OF COURSE CONTENT

				Jam Pembelajaran Bersemuka
LECTURE	**:**	1.	Cellular response to stress and toxic insults - Cell adaptation - Cell injury and cell death - Necrosis and apoptosis - Amyloidosis - Pigments and calcification	2
		2.	Acute and chronic inflammation - Response to injury and acute inflammation - Exudation and chemical mediators - Chronic inflammation and sequelae	2
		3.	Tissue renewal, repair and regeneration - Healing and repair - Healing and repair of bones, nerves and muscle	1
		4.	Haemodynamic disorders, thromboembolic disease - Embolisme - Infarction	2
		5.	Neoplasia - Dysplasia and neoplasia - Molecular basis of cancer - Carcinogenesis - Changes in cell growth and behaviour - Clinical aspects of cancer	4
		6.	Introduction to bacteriology	1

- Properties and classification of medically important bacteria

7. Bacterial growth and genetic 1

- Basic metabolic requirement for bacterial growth
- Bacterial cell division
- Bacterial growth cycle
- Mechanisms of gene transfer between bacteria
- The importance and application of DNA in the laboratory diagnosis and identification of the causative agents

8. Bacterial pathogenicity and immune response 1

- Routes of transmission of bacteria
- Virulence factors and pathogenesis

9. Introduction to virology 1

- Properties and classification of medically important viruses
- Epidemiology, mode of transmission and risk factors related to viral infection

10. Introduction to mycology 1

- Fungal classifications and properties
- The differences between fungal and bacteria
- The differences in reproduction and classification
- Pathogenesis in fungal infection

11. Introduction to parasitology and entomology 1

- Properties and the characteristics of medically important parasites

- Host-parasites relationship
- Epidemiology, mode of transmission and risk factors related to parasitic infection

12. Antimicrobial agents 3

- Antimicrobials classes
- Adverse reactions of antimicrobials
- Sensitivity test
- Principles of antimicrobial use

Total **20**

PRACTICAL:

1. Introduction to microbiology lab techniques 3

- Hand hygiene and aseptic technique
- Nasal swab and gram staining
- Stainings in a diagnostic laboratory
- Sterilisation and disinfection methods

2. Microbiology culture & identification 3

- Microbiological investigations for the laboratory diagnosis of bacterial infections
- Biochemical test for organism identification

3. Cellular response to stress and toxic insults 3

- Morphology characteristic of cellular response
- Morphology characteristic of necrosis and apoptosis
- Clinical correlation

4. Acute and chronic inflammations 3

- Morphology characteristics
- Clinical correlation

5. Neoplasia 3

- Morphology characteristics neoplasia benign and malignant
- Clinical correlation

Jumlah **15**

PENILAIAN :

Kerja Kursus	30%
Peperiksaan Akhir	70%

RUJUKAN :

1. Barbara, Y., Geraldine, O., Phillip, W. (2013). *Wheather's Functional Histology: A Text and Colour Atlas. 6th Edition*. Churchill Livingstone.

2. Goering, R.V., Mims, C.A., Dockrell, H.M., Zuckerman, M., Riott, I.M., and Chiodini, P.L. (2013) *Mims' Medical Microbiology (5th Edition),* Philadelphia : Elsevier.

3. Kumar, V., Abbas, A.K., and Aster, J.C. (2014*). Robbins and Cotran Pathologic Basis of Disease (9th Edition).* Philadelphia: Elsevier Saunders

MODULE : GENERAL AND BIOCHEMICAL PHARMACOLOGY (MDR3004)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

This course encompasses concepts on pharmacodynamics and pharmacokinetics including various types of clinical drug effects, dose-response relationship, and possible drugs interactions. It also introduces chemotherapeutic and autonomic drugs.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Describe the general principles of pharmacodynamics drugs relevant to their therapeutic effects.
2. Explain the mechanism of action, drug effects, and clinical chemotherapeutics application as well as autonomic nervous system.
3. Measure the pharmacokinetic parameters.

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	14 x 1 hour 3 x 2 hour	14 6
SCL / SGT/ PBL	7 x 2 hours	14
Practical	2 x 3 hours	6
Assessment	1 x 2 hours	2
	TOTAL	**42**

CONTENTS

No	Topics	Hours	Format	Lecturer
1.	Introduction to pharmacology	1	L	Prof. Dr. Rusliza Basir
2.	Administration, absorption and distribution of drugs	2	L	Dr. Azmah Saat
3.	Mechanism of drug action	2	L	Dr. Siti Khadijah Adam
4.	Dose-response relationship	1	L	Dr. Siti Khadijah Adam
5.	Types of drug therapy	2	SGT	Dr. Azmah Saat
6.	Biotransformation and excretion	1	L	Dr. Sandra Maniam
7.	Administration, distribution, mechanism and excretion of drugs exercises	2	SCL	Dr. Azmah Saat
8.	Drug development	2	SGT	Dr. Muhamad Zulfadli Mehat
9.	Pharmacokinetics I	1	L	Dr. Haniza Hassan
10.	Pharmacokinetics II	1	L	Dr. Haniza Hassan
11.	Pharmacokinetics calculations	2	SCL	Dr. Haniza Hassan
12.	Practical class- pharmacokinetics (simulation)	3	P	All lecturers (Dr. Haniza Hassan)
13.	Variation in drug response I	1	L	Dr. Jonathan Lim Chee Woei
14.	Variation in drug response II	1	L	Dr. Jonathan Lim Chee Woei
15.	Drugs interaction	2	L	Dr. Muhamad Zulfadli Mehat
16.	Pharmacogenetics	1	L	Prof. Dr. Johnson Stanslas
17.	Case study on drugs response and interaction	2	SCL	Dr. Jonathan Lim Chee Woei
18.	Adverse drug reaction I	1	SGT	Prof. Datin Dr. Sharida Fakurazi
19.	Adverse drug reaction II	1	SGT	Prof. Datin Dr. Sharida Fakurazi
20.	Enzyme inhibition & Chemotherapy	2	L	Prof. Dr. Johnson Stanslas
21.	Sympathomimetics	1	L	Dr. Nizar Abd Manan

22.	Sympatholytics	1	L	Dr. Nizar Abd Manan
23.	Parasympathomimetics	1	L	Dr. Nizar Abd Manan
24.	Parasympatholytics	1	L	Dr. Nizar Abd Manan
25.	Case study on drugs for autonomic nervous system	2	SCL	Dr. Nizar Abd Manan
26.	Practical class - Effect of ANS drugs on blood pressure (simulation)	3	P	All lecturers (Dr. Nizar Abd Manan)
27.	Assessment	1	A	Module Coordinator
27.	Teaching evaluation	1	A	Module Coordinator

Legends:
L = Lecture. **CL** = Conceptual Lecture. **BL** = Blended Learning. **P** = Practical.
SCL = Student-centered Learning. **PBL**=Problem Based Learning. **A** = Assessment.

LECTURERS

Module coordinator : Dr. Jonathan Lim Chee Woei

Lecturers:
Prof. Datin Dr. Sharida Fakurazi
Prof. Dr. Johnson Stanslas
Prof. Dr. Rusliza Basir
Dr. Azmah Sa'at
Dr. Jonathan Lim Chee Woei
Dr. Haniza Hassan
Dr. Muhammad Zulfadli Mehat
Dr. Nizar Abd Manan
Dr. Sandra Maniam
Dr. Siti Khadijah Adam

OUTLINE OF COURSE CONTENT

1. **Introduction to Pharmacology – Lecture**
   Time: 1 hour

At the end of the session, the students should be able to:
- define pharmacodynamics and pharmacokinetics
- state source of drugs
- describe different preparations (formulations) of drugs
- explain various therapeutic effects of drugs

2. **Administration, Absorption and Distribution of Drugs– Lecture**
   Time: 2 hours

At the end of the session, the students should be able to:
- explain the advantages and disadvantages of different routes of administration
- explain the mechanisms of drug absorption
- explain the factors affecting absorption and bioavailability
- explain the clinical significance of absorption and bioavailability
- explain free drug and protein-bound drug
- describe clinical significance of binding of drugs to plasma proteins
- explain factors influencing drug distribution and their clinical significance
- explain volume of distribution and its clinical significance

3. **Mechanism of Drug Action – Lecture**
   Time: 2 hours

At the end of the session, the students should be able to:
- list the primary drug targets
- describe biochemical and physical changes during drug interaction and explain the mechanisms involved
- explain affinity and intrinsic activity in drug-receptor interaction
- define agonist, antagonist, partial agonist and inverse agonist
- explain competitive, non-competitive, physiological, chemical and pharmacokinetic antagonism
- explain drug desensitization and tachyphylaxis

4. **Dose-Response Relationship – Lecture**
   Time: 1 hour

At the end of the session, the students should be able to:
- illustrate dose-response curves with drug potency and efficacy
- explain the clinical significance of therapeutic and safety indices
- illustrate graded and quantal dose-response curves
- explain potentiation and synergism of drug effects

5. **Types of Drug Therapy – Small Group Teaching**
   Time: 2 hours

At the end of the session, the students should be able to:
- describe and explain the types of drug therapy

6. **Biotransformation and Excretion – Lecture**
   Time: 1 hour

At the end of the session, the students should be able to:
- explain the importance of drug biotransformation
- describe phase i and ii metabolism
- explain the implications and consequences of metabolism
- explain the effect of enzyme inducers and inhibitors on drug effects

7. **Administration, Distribution, Mechanism and Excretion of Drugs Exercises – Student-Centered Learning**
   Time: 2 hours

At the end of the session, the students should be able to:
- co-relate with applied pharmacology.

8. **Drug Development – Small Group Teaching**
   Time: 2 hours

At the end of the session, the students should be able to:
- outline the drug discovery and development processes
- explain preclinical evaluation of new drug candidates
- describe the concept and purpose of the various preclinical toxicological evaluations
- explain the various phases of clinical trials

9. **Pharmacokinetics I– Lecture**
   Time: 1 hour

At the end of the session, the students should be able to:
- define pharmacokinetics
- describe important parameters of pharmacokinetics
- illustrate the pharmacokinetics profile of single and multiple dosing of drugs
- explain factors affecting the bioavailability, particularly oral drugs
- relate the physiological barriers to the extent of drug distribution

10. Pharmacokinetics II– Lecture
Time: 1 hour

At the end of the session, the students should be able to:
- explain the importance clearance and how diseases of organs involved in drug clearance cause toxicity
- interpret pharmacokinetics variables
- explain the clinical significance of pharmacokinetics parameters and factors which influence them

11. Pharmacokinetics Calculations– Student-centered Learning
Time: 2 hours

At the end of the session, the students should be able to:
- calculate dosing based on pharmacokinetics parameters
- relate to the principal of pharmacokinetics

12. Pharmacokinetics (simulation)– Practical
Time: 3 hours

13. Variation in Drug Response I– Blended Learning
Time: 1 hour

At the end of the session, the students should be able to:
- describe PK, PD and idiosyncratic variability
- explain the factors that are responsible for variation in drug response
- describe how major sources of PK variability influence TDM

14. Variation in Drug Response II– Lecture
Time: 1 hour

At the end of the session, the students should be able to:
- In TDM, explain how dosage adjustments are established in patients with serious organ damage, particularly for drugs with narrow therapeutic window

15. Drugs Interaction— Lecture
Time: 2 hours

At the end of the session, the students should be able to:
- define drug-drug interaction
- describe types of drug-drug interaction
- explain mechanism of pharmacodynamics and pharmacokinetics interactions
- explain the clinical significance of drug-drug interactions

16. **Pharmacogenetics– Lecture**
    Time: 1 hour

    At the end of the session, the students should be able to:
- define pharmacogenetics
- explain how genetics factors (usually single nucleotide polymorphisms (SNPs) that influence drug biotransformation affect drug response
- explain how genetics factors that influence interaction of drugs with cellular targets affect drug response

17. **Case Study on Drugs Response and Interaction– Student-centered Learning**
    Time: 2 hours

    At the end of the session, the students should be able to:
- relate to the principal of drugs response and interaction
- explain the types of drug response and interaction

18. **Adverse Drug Reaction I– Small Group Teaching**
    Time: 1 hour

    At the end of the session, the students should be able to:
- describe toxicity of drugs directed to organs eg liver toxicity
- explain the pathology of organ toxicity

19. **Adverse Drug Reaction II – Small Group Teaching**
    Time: 1 hour

    At the end of the session, the students should be able to:
- explain drug overdose and poisoning and the basis of antidote application
- explain types i-iv adrs and the mechanism involved
- describe drug tolerance, dependence, addiction

20. **Enzyme Inhibition and Chemotherapy– Lecture**
    Time: 2 hours

    At the end of the session, the students should be able to:
- describe classes of enzymes inhibitors
- know a few common drugs used in the clinic that target metabolic enzymes
- explain the principle of chemotherapy
- describe why enzymes constitute as good targets in chemotherapy

21. Sympathomimetics – Lecture

Time: 1 hour

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

a) define sympathomimetics.
b) identify drugs that act as sympathomimetics.
c) describe target sites and pharmacological actions of sympathomimetics.
d) explain the mechanism of actions, pharmacokinetics, therapeutic applications, adverse effects & contraindications of the sympathomimetics.
   i. Direct acting agents
   ii. Indirect acting agents
   iii. Mixed action (direct and indirect acting) agents

22. Sympatholytics – Lecture

Time: 1 hour

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

a) define sympatholytics.
b) identify drugs that act as sympatholytics.
c) describe target sites and pharmacological actions of sympatholytics.
d) explain the mechanism of actions, pharmacokinetics, therapeutic applications, adverse effects & contraindications of the sympatholytics.
   i. α-blockers
   ii. β-blockers
   iii. α- and β-blockers
   iv. Adrenergic partial agonists
   v. Indirect acting adrenergic antagonists

23. Parasympathomimetics – Lecture

Time: 1 hour

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

a) define parasympathomimetics.
b) identify drugs that act as parasympathomimetics.
c) describe target sites and pharmacological actions of parasympathomimetics.
d) explain the mechanism of action, pharmacokinetics, therapeutic applications, adverse effects & contraindications of the parasympathomimetics.
   i. Choline esters
   ii. Cholinergic alkaloids
   iii. Acetylcholinesterase inhibitors

24. Parasympatholytics – Lecture
Time: 1 hour

At the end of the session, the students should be able to:
a) define parasympatholytics.
b) identify drugs that act as parasympatholytics.
c) describe target sites and pharmacological actions of parasympatholytics.
d) explain the mechanism of actions, pharmacokinetics, therapeutic applications, adverse effects & contraindications of the parasympatholytics.
   i. Antimuscarinic drugs
   ii. Antihistamines with antimuscarinic action
   iii. Ganglionic blockers
   iv. Neuromuscular blocking drugs with antimuscarinic action

25. Case Study on Drugs for Autonomic Nervous System – Student-centered Learning
Time: 2 hours

At the end of the session, the students should be able to:
- explain the therapeutic applications and clinical correlations of drugs that act on the autonomic nervous system.

26. Effect of ANS Drugs on Blood Pressure (simulation) – Practical
Time: 3 hours

At the end of the session, the students should be able to:
- explain the effects and mechanism of actions of ANS drugs on the blood pressure and heart rate.

RECOMMENDED TEXTBOOKS

1. Bennett, P.N., Brown, M.J. & Sharma, P. (2019). *Clinical Pharmacology, (12th Edition)*. Philadelphia: Elsevier.

2. Katzung, B. & Trevor, A. (2020). *Basic and Clinical Pharmacology, (15th Edition).* New York: McGraw-Hill Lange.

3. Ritter, J.M., Flower, R., Henderson, G., Loke, Y.K., MacEwan, D. & Rang, H.P (2019). *Rang and Dale's Pharmacology, (9th Edition).* London: Elsevier.

4. Waller, D.G., Sampson, T. & Hitchings, A. (2022). *Medical Pharmacology and Therapeutics, (6th Edition)*. London: Elsevier Health Science.

MODULE : MUSCULOSKELETAL SYSTEM (MDR3005)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

The course encompasses the introduction to anatomy, histology and physiology of the musculoskeletal system. It also introduces students on the pathology and pharmacology of the system.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Identify the anatomical structure within the musculoskeletal system.
2. Relate relevant physiological processes to the musculoskeletal system.
3. Relate various aspects of the musculoskeletal system with pathological changes, disease manifestations and treatment of patients' pharmacology.

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	27 x 1 hour	27
SCL / PBL	3 x 1 hour 4 x 2 hours	3 8
Practical	6 x 3 hours	18
Assessment	1 x 2 hours	2
	TOTAL	**58**

CONTENTS

No	Topics	Hours	Format	Lecturer
1.	Introduction to upper limb	1	CL	AP Dr. Cheah Pike See
2.	Pectoral region and back	1	BL	AP Dr. Cheah Pike See
3.	Axilla and brachial plexus	1	L	AP Dr. Cheah Pike See
4.	Arm and forearm	1	BL	AP Dr. Cheah Pike See
5.	Gross anatomy of upper limb (1)	3	P	All anatomists
6.	Hand	1	SCL	All anatomists (AP Dr. Cheah Pike See)
7.	Joints of the upper limb	1	BL	AP Dr. Cheah Pike See
8.	Nerve lesions of the upper limb	1	L	AP Dr. Cheah Pike See
9.	Gross anatomy of upper limb (2)	3	P	All anatomists
10.	Somites & development of the limb	1	L	AP Dr. Che Norma MT
11.	Introduction to lower limb	1	CL	AP Dr. Che Norma MT
12.	Thigh	1	BL	AP Dr. Che Norma MT
13.	Gluteal region	1	SCL	All anatomists (AP Dr. Che Norma MT)
14.	Gross anatomy of lower limb (3)	3	P	All anatomists
15.	Leg and foot	1	BL	AP Dr. Che Norma MT
16.	Joints of the lower limb	1	L	AP Dr. Che Norma MT
17.	Nerve lesions of the lower limb	1	L	AP Dr. Che Norma MT
18.	Gross anatomy of lower limb (4)	3	P	All anatomists
19.	Introduction to head and neck	1	CL	Dr. Razif A
20.	Skull and scalp	1	L	Dr. Razif A

No	Topics	Hours	Format	Lecturer
21.	Face and facial expression	1	L	Dr. Razif A
22.	Neck	1	L	Dr. Razif A
23.	Infratemporal fossa & temporomandibular joint	1	L	Dr. Razif A
24.	Development of face & tongue	1	L	Dr. Razif A
25.	External ear and nose	1	SCL	All anatomists (Dr. Razif A)
26.	Gross anatomy of head and neck	3	P	All anatomists
27.	PBL Clinical (1) Session 1	2	PBL	Lecturers
28.	PBL Clinical (1) Session 2	2	PBL	Lecturers
29.	Synapse & motor end-plate	1	L	Dr. Safuraa S
30.	Skeletal muscle excitation, contraction coupling	1	BL	Dr. Safuraa S
31.	Somatic motor system (1)	1	L	Dr. Safuraa S
32.	Somatic motor system (2)	1	BL	Dr. Safuraa S
33.	Radiology of the limbs	1	L	AP Dr. Suraini MS
34.	Assessment	2	A	Module coordinator
35.	Bone and soft tissue tumours	1	L	Dr. Huzlinda H
36.	Pathology of the musculoskeletal system, soft tissue and skin	3	P	All pathologists
37.	PBL Clinical (2) Session 1	2	PBL	Lecturers
38.	PBL Clinical (2) Session 2	2	PBL	Lecturers
39.	Neuromuscular blockers	1	BL	Dr. Haniza H
40.	Skin & soft tissue infections	1	BL	AP Dr. Niazlin MT
41.	Infections of bones & joints	1	L	Dr. Lim Teck Siang

Legends:
L = Lecture. **CL** = Conceptual Lecture. **BL** = Blended Learning. **P**=Practical. **SCL** = Student-centered Learning. **PBL** = Problem Based Learning. **A** = Assessment.

LECTURERS

Module coordinator: Dr. Hafizah Abdul Hamid

Lecturers:
Prof. Dr. Mohamad Aris Mohd Moklas
Assoc. Prof. Dr. Che Norma Mat Taib
Assoc. Prof. Dr. Cheah Pike See
Assoc. Prof. Dr. Maizaton Atmadini Abdullah
Assoc. Prof. Dr. Niazlin Mohd Taib
Assoc. Prof. Dr. Suraini Mohamad Saini
Dr. Fauzah Abd Ghani
Dr. Haniza Hassan
Dr. Huzlinda Hussin
Dr. Lim Teck Siang
Dr. Nurul Huda Mohd Nor
Dr. Razana Mohd Ali
Dr. Razif Abas@Buang
Dr. Safuraa Salihan
Dr. Siti Saleha Masrudin
Dr. Suryati Mohd Thani

PBL Clinical Case (1) Lecturers:
Prof. Dr. Mohamad Aris Mohd Moklas
Dr. Azmah Sa'at
Dr. Azmiza Syawani Jasni
Dr. Haniza Hassan
Dr. Huzlinda Hussin
Dr. Muhammad Zulfadli Mehat
Dr. Nizar Abd Manan
Dr. Nur Izah Ab Razak
Dr. Nur Raihana Ithnin
Dr. Nurul Hayati Mohamad Zainal
Dr. Sandra Maniam
Dr. Suryati Mohd Thani

PBL Clinical Case (2) Lecturers:
Prof. Dr. Sharida Fakurazi
Assoc. Prof. Dr. Che Norma Mat Taib
Assoc. Prof. Dr. Cheah Pike See
Assoc. Prof. Dr. Niazlin Mohd Taib
Dr. Azmah Sa'at

Dr. Haniza Hassan
Dr. Lai Shau Kong
Dr. Muhammad Zulfadli Mehat
Dr. Nizar Abd Manan
Dr. Norashiqin Misni
Dr. Nur Izah Ab Razak
Dr. Nurul Hayati Mohamad Zainal

OUTLINE OF COURSE CONTENT

1. Introduction to Upper Limb – Conceptual Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate the surface anatomy and dermatomes of upper limb.
- identify the important structures of upper limb and their key anatomical relations.

2. Pectoral Region and Back – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate the pectoral and back region.
- correlate with applied anatomy.

3. Axilla and Brachial Plexus – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate the axillary region.
- describe the neurovascular structures and lymphatic drainage.
- describe and illustrate the brachial plexus.

4. Arm and Forearm – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of arm and forearm.
- correlate with applied anatomy.

5. Gross Anatomy of Upper Limb (1) - Practical
Time: 3 hours

6. Hand – Student-centered Learning
Time: 1 hour

7. Joints of the Upper Limb – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of hand.
- correlate with applied anatomy.
- describe and demonstrate movements of the upper limb.

8. Nerve Lesions of the Upper Limb – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- correlate with applied anatomy.

9. Gross Anatomy of Upper Limb (2) - Practical
Time: 3 hours

10. Somites and Development of the Limb – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- understand the formation of limbs.

11. Introduction to Lower Limb – Conceptual Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate the surface anatomy and dermatomes of lower limb.
- identify the important structures of lower limb and their key anatomical relations.

12. Thigh – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of thigh.
- correlate with applied anatomy.

13. Gluteal Region – Student-centered Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of gluteal region.
- correlate with applied anatomy.

14. Gross Anatomy of Lower Limb (3) - Practical
Time: 3 hours

15. Leg and Foot – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of leg and foot.
- correlate with applied anatomy.

16. Joints of the Lower Limb – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate movements of the lower limb.

17. Nerve Lesions of the Lower Limb – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- correlate with applied anatomy.

18. Gross Anatomy of Lower Limb (4) - Practical
Time: 3 hours

19. Introduction to Head and Neck – Conceptual Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and demonstrate the surface anatomy and sensory innervation of head and neck.
- identify the important structures of head and neck and their key anatomical relations.

20. Skull and Scalp – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of skull.
- correlate with applied anatomy.

21. Face and Facial Expression – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of face.
- correlate with applied anatomy.

22. Neck – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of neck.
- correlate with applied anatomy.

23. Infratemporal fossa and Temporomandibular Joint (TMJ) - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the bones, muscles and neurovascular structures of TMJ.
- correlate with applied anatomy.

24. Development of Face and Tongue – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and illustrate the pharyngeal arches, pouches and clefts.
- understand the formation of face and tongue.
- correlate with applied anatomy.

25. External Ear and Nose – Student-centered Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify bones and muscles of external ear and nose.
- identify surface marking of external ear and nose.

26. Gross Anatomy of Head and Neck - Practical
Time: 3 hours

27. PBL Clinical (1) Session 1
Time: 2 hours

28. PBL Clinical (1) Session 2
Time: 2 hours

29. Synapse and Motor End-Plate – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- define direct/indirect, presynaptic/postsynaptic inhibition.
- describe the neuromuscular junction.
- explain transmission of impulses from nerve ending to skeletal fibres.

30. Skeletal Muscle Excitation, Contraction Coupling – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- explain general mechanism involved in muscle contraction.
- discuss molecular mechanism involved in muscle contraction.
- discuss the importance of troponin.

31. Somatic Motor System (1) – Lecture
Time: 1 hour

At the end of the session, the students should be able to
- distinguish between isometric, isotonic and exercises.
- describe the fiber types according to its classification.
- explain the skeletal muscle properties and concept of summation of contractions.

32. Somatic Motor System (2) – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- distinguish the different control (nervous, hormonal) skeletal, smooth and cardiac muscles contractions.
- differentiate the roles of calcium in skeletal, smooth and cardiac muscles.

33. Radiology of the Limbs - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- explain radiological modalities involved in assessments of the limbs.
- describe radiological anatomy of the upper and lower limbs.

34. Assessment
Time: 2 hours

35. Bone and Soft Tissue Tumours - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- describe and identify the classfication, pathogenesis, clinical, radiological and morphological features of primary bone and soft tissue tumours such as osteosarcoma, chondrosarcoma, osteochondroma, ewing sarcoma, giant cell tumour, lipoma, haemangioma, neurofibroma and leiomyoma.

36. Pathology of the Musculoskeletal System, Bone and Soft Tissue - Practical
Time: 3 hours

37. PBL Clinical (2) Session 1
Time: 2 hours

38. PBL Clinical (2) Session 2
Time: 2 hours

39. Neuromuscular Blockers – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- identify the suitable pharmacological agents used to perform the procedure of neuromuscular blockade.

40. Skin and Soft Tissue Infections – Blended Learning
Time: 1 hour

At the end of the session, the students should be able to
- describe the causative agents of skin and soft tissues infection.

- explain the epidemiology, pathogenesis, clinical manifestations and complications of skin and soft tissues infection.
- discuss clinical and laboratory diagnosis of skin and soft tissues infection.
- discuss principle of management and preventive measures of skin and soft tissues infection.

41. Infection of Bones and Joints - Lecture
Time: 1 hour

At the end of the session, the students should be able to
- identify the concept of bones and joints infection.

RECOMMENDED TEXTBOOKS

1. Katzung, B. & Trevor, A. (2015). *Basic and Clinical Pharmacology, (13th Edition).* Ohio: McGraw-Hill Lange.

2. Kim, E. B., Susan, M. B., Scott, B. & Heddwen L. B. (2019). *Review of Medical Physiology*. (*26th Edition*). Ohio: Lange Medical Books.

3. Kumar, V., Abbas, A.K. & Aster, J.C. (2017). *Robbins & Cotran Pathologic Basis of Disease (10th Edition).* Philadelphia: Elsevier.

4. Mescher, A. (2015). *Junqueira's Basic Histology: Text and Atlas (14th Edition).* Philadelphia: Mcgraw-Hill Lange.

5. Moore, K.L. & Dalley, A.F. (2013). *Clinically Oriented Anatomy (7th Edition).* Philadelphia: Lippincott Williams and Wilkins.

MODULE : PROFESSIONALISM AND PERSONAL DEVELOPMENT 1 (MDR3101a)

LEVEL : YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

The course introduces the attributes of medical professionalism, basic principles of medical ethics, communication skills and doctor-patient relationships. Principles of evidence-based medicine, reflective practices, cultural competency as well as resilience will be introduced.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Demonstrate the behavior and attitude of a thriving medical professional.
2. Demonstrate a patient-centered communication skill in one's clinical approach.
3. Implement reflective learning in lieu of positive personal development and professionalism.

TEACHING AND LEARNING METHODS

		Hours
Lectures (L/CL/BL)	10 x 1 hour	10
SGD	7 x 2 hours 1 x 3 hours	17
Practical	2 x 2 hours	4
Assessment **(Reflective writing)**	4 x 1 hour (S1Y1, S2Y1, S1Y2, S2Y2)	4 (not counted in teaching hours)
	TOTAL	**31**

CONTENTS (Given below is the contents for Sem 1 - Year 1 only)

No	Topics	Sem/ Year	Total Hours	TCL (L)	SCL (L)	SCL (P)	Format	Lecturer
1.	Introduction to PPD module (not counted in teaching hours) 24 Oct 2024 W1 Thursday 8-9 am Introduction to Professionalism and Medical Ethics 28 Oct 2024 W2 Monday 12-1pm	1/1	1	1			CL	Dr. Rafidah Dr. Safuraa
2.	Honesty and Integrity (P & ME) 29 Oct 2024 W2 Tuesday 2-5pm	1/1	2	1	1		PreR L +SGD	Dr Siti Khadijah Adam, Dr Nizar A.Manan, Dr Amirah Razali, Dr Fatimah JKK, PM Dr Hasyma, Dr Suhainizam JKK, Dr Jonathan, Dr Faridah Idris
3.	Resilience and Self-care 5 Dec 2024 W7 Thursday 2-5pm	1/1	3	1	2		PreR L + SGD	Dr Siti Khadijah Adam, Dr Nizar A.Manan, Dr Shankari Jab Oftal, Dr Fatimah JKK, PM Dr Hasyma, Dr Suhainizam JKK, Dr Jonathan, Dr Faridah Idris
4.	Introduction to Reflective Writing 23 Dec 2024 2024 W10 Thursday ; 2-3 pm + 9 Jan 2025 W12 Thursday ; 2-4 pm	1/1	3	1	2		PreR L +SGD	Dr Siti Khadijah Adam, Dr Nizar A.Manan, Dr Amirah Razali, Dr Fatimah JKK, PM Dr Hasyma, Dr Suhainizam JKK, Dr Jonathan, Dr Faridah Idrisi
5.	Communication Skills 1 6 Feb 2025 W16 Thursday 2-4 pm	1/1				2	P + SGD	Dr Siti Khadijah Adam, Dr Nizar A.Manan, Dr Shankari Jab Oftal, Dr Fatimah JKK, PM Dr Hasyma, Dr Suhainizam JKK, Dr Jonathan, Dr Faridah Idris

No	Topics	Sem/ Year	Total Hours	TCL (L)	SCL (L)	SCL (P)	Format	Lecturer
6.	**Assessment 1 Reflective Writing 1 and PPD Peer Review (not counted in teaching hours)** 20 Feb 2025 W18 Thursday 9-11 am	**1/1**	**1** **1**				**Written Assessment**	**Dr. Rafidah**
7.	**Feedback on Reflective Writing** **(not counted in teaching hours)** 27 February 2025 W19 Thursday 12-1 pm	**1/1**	**1**				**Personal meeting**	**Related Assessors**

Legends:
PreR L = Prerecording Lecture. **CL** = Conceptual Lecture.
BL = Blended Learning. **P** = Practical.
SCL = Student-centered Learning. **TCL** = Teacher centered Learning. **A** = Assessment. **SGD** = Small Group Discussion. **L** = Lecture

TEACHERS/ LECTURERS

Module Coordinator: Dr. Rafidah Hod

Lecturers:

DR. AMIRAH RAZALI
DR. FATIMAH BINTI AHMAD FAUZI
DR. FARIDAH IDRIS
DR. HASYMA ABU HASSAN
DR. JONATHAN LIM CHEE WOEI
DR. NIZAR ABD MANAN
DR. SAFURAA SALIHAN
DR. SHANKARI
DR. SITI KHADIJAH ADAM
DR. SUHAINIZAM MUHAMAD SALILUDDIN

***Note: Teachers may vary each semester. There will be an updated information every semester on teachers list**

<u>OUTLINE OF COURSE CONTENT</u> (FOR THIS SEMESTER 1)

1. Introduction to PPD module
Professionalism and Medical Ethics (P & ME) - Conceptual Lecture, Lecture and SGD
Time: 1 (CL) + 2 (SGD) hours

At the end of the session, the students should be able to
- define professionalism and medical ethics
- describe role of MMC guidelines and code of conduct in ensuring professionalism among medical professionals
- demonstrate understanding of the following professionalism attributes
  - Honesty and Integrity (S1Y1)

2. Communication skills - Lecture and SGD
Time: 2 (SGD/ P) hours

At the end of the session, the students should be able to
- identify essential verbal and non-verbal cues
- identify barriers to effective communication
- demonstrate awareness of own communication skills

3. Introduction to Reflective Writing - Lecture and SGD
Time: 1 (L) + 2 (SGD) hours

At the end of the session, the students should be able to
- demonstrate understanding on the importance of reflection
- demonstrate use of tools such as Gibb's Reflective Cycle to structure Reflection
- demonstrate reflective writing

4. Resilience and Self-care - SGD
Time: 1 (PreR L) + 2 (SGD) hours- S1Y1

At the end of the session, the students should be able to
- demonstrate understanding on resilience
  i) Having the ability to bounce back from stressful situation
  ii) Understanding its effect on academic and work success
  iii) apply good resilience traits
- interpret the steps in developing resilience

i) Understanding the importance of self-care
ii) Recognizing and building strengths
iii) Setting goals

- articulate own resilience traits

RECOMMENDED TEXTBOOKS

1.	Cooper, N & Frain, J. (2017). *ABC of Clinical Communication*. Wiley Blackwell.
2.	Cruess R.L, Cruess S.R, Steinert Y (2015). *Teaching Medical Professionalism: Supporting the development of a professional identity (2nd edition)*. Cambridge University Press.
3.	Kurtz, S., Silverman, J. & Draper, J. (1998). *Teaching and learning communication skills in medicine*. Oxford:Radcliffe Medical Press.
4.	Spandofer, J., Pohl, C.A., Rattner, S.L. & Nasca, T.J. (2009) *Professionalism in Medicine: A Case-Based Guide for Medical Students*. Cambridge University Press.
5.	Toy, E.C., Raine, S.P. & Cochrane, T.I. (2015). *Case Files Medical Ethics and Professionalism*. McGraw Hill Professional.

MODULE : EARLY CLINICAL EXPERIENCE (MDR3103)

LEVEL : FIRST SEMESTER YEAR 1

PROGRAMME : DOCTOR OF MEDICINE (MD)

CONTENT SYNOPSIS

This course exposes the students to patient history taking and physical examination. It also involves effective communication skills and basic clinical procedures. The module is designed for teaching in a small group.

LEARNING OUTCOMES

On completion of this module, the students should be able to:

1. Show effective and ethical communication during history taking
2. Perform basic systematic physical examination on patients
3. Perform basic clinical procedures

TEACHING AND LEARNING METHODS

		Hours
TCL	1 x 1 hour	1
SCL / SGT	3 x 1 hour 3 x 2 hours	3 6
	TOTAL	**10**

LEARNING ASSESSMENT

Assessment will be in the form of:

- Competency logbook and coursework

LECTURERS

Module coordinator : Dr. Safuraa Salihan

CONTENTS

SEMESTER 1

ECE 1 : Introduction to ECE
Time : 1 hour

- Introduction to the ECE

Lecturer: Dr. Safuraa Salihan

ECE 2 : Introduction to history taking and communication skills
Time : 2 hour (TCL)

- General format for history taking
- Communication skills

Lecturer: Dr Safuraa Salihan

ECE 3 : History taking I
Time : 2 hours (SCL)

- History taking practice session

Lecturers:

Others TBA

ECE 4 : Physical examination of the musculoskeletal system
Time : 2 hours (SCL)

- Physical examination of the musculoskeletal system

Lecturer: TBA

ECE 5 : Physical examination of the musculoskeletal system
Time : 2 hours (SCL)

- Examination of the musculoskeletal system practical

Lecturers: TBA

RECOMMENDED TEXTBOOKS

1. Talley, N.J., and O'Conner, S. (2021). *Clinical Examination (9th Edition)*. APAC / Maclenan & Petty Pty Ltd, Australia.
2. Swash, M. (2020). *Hutchinson's Clinical Examination (21st edition)*. W.B. Saunders, London.
3. Munro, J. and Edwards, C. (eds.) (2019). *Macleod's Clinical Examination (10th edition)*. Churchill Livingstone, London.
4. Edwards,C.R.W., Boucher, I.A.D., Haslett, C. and Chilvers, E.R. (eds) (2020). *Davidson's Principles and Practice of Medicine (18th edition).* Churchill Livingstone, London.
5. Ruth Bird, Simon Fleming, Helen Twohig, Ali Majeed (2018) (4th Edition). *OSCE A teaching manual for medical undergraduate*.