

# Dow University of Health Sciences



## FOUNDATION MODULE

8 weeks, 9 credit hours

First Year MBBS

## 5 YEAR CURRICULAR ORGANIZATION

Spiral	year	Modules			
First Spiral	I	<b>FND1- Foundation</b> Cell, Genetics & Cell Death (Basics of Anatomy, Physiology, Biochemistry, Gen. Pathology, Gen. Pharmacology, Community Medicine & Behavioral Sciences) <b>6 Weeks</b>		<b>Foundation Sub Module</b> Genetics, Microbiology, Bioethics <b>2 Weeks</b>	<b>HEM1- Blood Module</b> Immunity, Inflammation, Tissue repair, Antimicrobials & Neoplasia 8 Week
		<b>LCM1- Locomotion</b> Bones, Joints, Nerves & Muscles, 8 weeks		<b>RSP1- Respiratory System</b> 4 weeks	<b>CVS1- Cardiovascular System</b> 4 weeks
	II	<b>NEU1- Nervous System</b> 8 weeks		<b>HNN1- Head &amp; Neck &amp; Special</b> 4 weeks	<b>END1- Endocrinology</b> 4 weeks
		<b>GIL 1-GIT and Liver</b> 8 weeks		<b>EXC1- Renal and Excretory System</b> 4 weeks	<b>REP1- Reproductive System</b> 4 weeks
Second Spiral	III	<b>IDD 1- Infectious diseases</b> 4 weeks	<b>HEM2- Hematology</b> 4 weeks	<b>RSP2- Respiratory System</b> 4 weeks	<b>CVS2- Cardiovascular System</b> 4 weeks
		<b>GIL 2-GIT and Liver (including Nutritional Disorders)</b> 8weeks		<b>EXC2- Renal &amp; Excretory System</b> 4 weeks	<b>END2- Endocrinology</b> 4 weeks
	IV	Half of the class will cover Ophthalmology in first 3 weeks of Teaching session and the other half will cover ENT/EYE modules during this period. This will be interchanged in next half of teaching session			
		<b>OPH / ENT</b> 3 week		<b>ORT2 Orthopedics / Trauma</b> , 6 weeks	<b>REP2- Reproductive System</b> 8 Weeks
		<b>OPH / ENT</b> 3 weeks	<b>PMR- Rheumatology &amp; Rehabilitation</b> 2 weeks	<b>DPS- Dermatology Plastic Surgery / Burns</b> 2 weeks	<b>GEN Genetics</b> 1 week
		<b>NEU2- Neurosciences and Psychiatry</b> 8 weeks			
Third Spiral	V	Half of the class will cover Medicine & Allied and the other half will cover Surgery & Allied modules in first half of teaching session. The two halves will exchange in latter half of year.			
		Clinical Rotation 8:30 to 1:00 (with Ambulatory, Emergency, Intensive care) In Medicine, Pediatrics, Cardiology and Neurology units		Clinical Rotation 8:30 to 1:00 (Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres) In Surgery, Gynae & Obstetrics, Orthopedics and Neurosurgery.	
		<ul style="list-style-type: none"> <li>▪ Lecture on problem based approach, twice a week</li> <li>▪ Ward tutorial twice a week</li> <li>▪ Student research presentation once a week</li> </ul>		<ul style="list-style-type: none"> <li>▪ Lecture on problem based approach, twice a week</li> <li>▪ Ward tutorial twice a week</li> <li>▪ Student research presentation once a week</li> </ul>	
		<b>PARALLEL THEMES:</b> The following themes are not part of any individual module but shall run concurrently: <b>Communication Skills, Clinical Skills, Writing and Presentation Skills, Article Writing, Ethics</b>			

## **RATIONALE:**

A Student stepping into a medical school requires orientation, and introduction to medical sciences with respect to health & disease. The student also needs certain guidelines to achieve goals to become a successful but ethical doctor in future.

Foundation module provides integration of core concepts that underlie the foundation of basic sciences and their use in clinical medicine. This will eventually lead to develop critical thinking for integration and application of basic knowledge for clinical application

## **TERMINAL OBJECTIVE:**

By the end of Foundation module, the student shall be able to:

- Define levels of organization of human body
- Identify homeostatic mechanism and its importance in body functions
- Describe the anatomy, biochemistry & physiology of cell
- Explain different modes of transportation across the cell membrane
- Interpret the biochemistry of carbohydrates, proteins and fats
- Define & illustrate stepwise mechanism of human development
- Discuss histology of epithelium, glands, connective & muscular tissue.
- Recognize morphologic alterations in cell injury & cell death.
- Define behavioral sciences and its role in medical sciences
- Discuss community medicine and its application for a medical doctor

## **MODULE OBJECTIVES:**

1. Conceptualize the integrated assembly of structures and functions in human body by relating with the arrangement of different LEVELS
2. Recognize the role of physiochemical aspects for the maintenance of homeostasis.
3. Identify the different types, occurrence and role of macromolecules for health
4. Use light microscope to identify the various tissues stained by H/E staining.
5. Relate organization and structure of different components of a cell and arrangement of cells in organ system manner in a living human body.
6. Correlate the composition and basic structure of cell membrane with its functional importance and adaptation.
7. Interpret the physiological basis of different types of transport mechanisms through cell membrane
8. Recognize the exact location of a dissected/prosected part /organ of human body with respect to various TERMS of POSITIONS,

9. Discuss the pathological aspects of cell and different mechanisms associated with morphological spectrum of injury at simple and electron microscopic levels.
10. Differentiate between normal and abnormal cell division
11. Describe the organization of cells in the epithelium and other basic tissues of body
12. Differentiate a human cell from a bacterial cell for the recognition of disease caused by bacteria
13. Application of basic principles of chemistry in body homeostasis
14. Use the knowledge of CARBOHYDRATE chemistry for health
15. Classify protein on the basis of structure, function and chemical reactions and recognize their importance in balanced diet and health
16. Justify the importance of LIPIDS for balanced diet and health
17. Appreciate the function of Support and Protection by using the general knowledge of SKIN, FASCIA and BONES and their component tissues
18. Associate the Movement and Posture of human body with the structure of MUSCLES and JOINTS.
19. Explain the process of energy flow within the cell.
20. Explain the Physiological functions of Transportation and Exchange by applying knowledge of structure of BLOOD VESSELS.
21. Integrate the function of Defense with the structure of LYMPH NODES AND LYMPHATICS.
22. Correlate the functions of Control and Regulation with the knowledge of arrangement and distribution of NERVOUS SYSTEM.
23. Apply the basic concepts of Chemistry of Nucleic acids and their types for understanding the mechanism of transfer of genetic characters and for protein synthesis.
24. Identify the various stages of development of human embryo to understand the mechanism of developmental disorders and anomalies.
25. Conceptualize the interchange of substances between maternal and fetal blood by applying the knowledge of structure and functions of placenta and fetal membranes
26. Relate various birth defects with genetic factors and environmental teratogens
27. Recognize the importance of procedures for assessing fetal status for the wellbeing of newborn infant
28. Effect of endogenous (physiological) and exogenous (drug) molecules on functioning of cells
29. Correlate the principles of general pharmacology for the appropriate therapy of disorders / diseases
30. Recognize the importance of Community medicine for the development of public health
31. Recognize the importance of behavioral sciences
32. Recognize the importance of medical ethics for future practice.

## **MODULE CONTENTS:**

### **ANATOMY**

#### **Gross Anatomy:**

1. Levels of organization of human body
2. Terminologies: Anatomical positions, Terms of positions, Anatomical planes
3. Terms of movement
4. Division and Function of Skeletal System, Classification of Bones, Gross Structure of Adult Long Bone, Parts of Young Long Bone
5. Bone development (ossification), Blood supply of long bone Cartilage Bone markings
6. General concepts of muscles
7. General concepts of joints
8. General concepts of blood vessels
9. Introduction to Lymphatic system
10. Nervous System Division CNS, PNS Neurons: Types Classification Nerve (With Its covering) & Myelin sheath
11. Typical Spinal Nerve
12. Autonomic nervous system sympathetic
13. Autonomic nervous system, Parasympathetic
14. Integumentary system Parts, function, appendages + fascia

#### **General Histology:**

1. Cell Introduction
2. Introduction to microscopy
3. Nucleus
4. Cell Organelles (Endoplasmic Reticulum, Golgi Apparatus, Ribosomes, Centrioles, Mitochondrion, Lysosomes, Peroxisomes)
5. Inclusions (Lipid, Glycogen, Pigments, Melanin, Lipofuscin, Lutein & Secretory Granules), Cytoskeleton (Microtubules, Filaments : Thick, Thin /Microfilaments, Intermediate)
6. Epithelium (Types, Location, Functions)
7. Epithelium: 2 Types, Location, Functions
8. Exocrine glands
9. Cell Surface Modification (Microvilli, Cilia, Flagella)
10. Cell Junctions
11. Connective tissue 1: components
12. Connective tissue 2: classification description of each type
13. Muscular tissue

#### **General Embryology:**

1. Mitosis + Cell cycle
2. Meiosis + Comparison with Mitosis
3. Gametogenesis: spermatogenesis and spermiogenesis
4. Oogenesis, Prenatal and Postnatal maturation of oocytes and comparison of gametes
5. Female Reproductive Cycle Ovarian cycle + menstrual cycle
6. Female Reproductive organs
7. Transportation of ovum and fertilization
8. First Week of Development After Fertilization

9. 2nd Week of Development
10. 3rd week of development I, gastrulation, formation of primitive streak and notochord
11. 3rd week of development II: Neurulation and development of somites
12. Fourth to eighth weeks organogenetic period phases of embryonic development
13. Fourth to eighth weeks organogenetic period highlights of the fourth to eighth weeks
14. Fetal Period (9th Week till birth)
15. Fetal Membranes Amnion (including disorders of amniotic fluid) Chorion  
+umbilical cord, Yolk Sac
16. Placenta, Multiple pregnancies
17. Teratogenesis
18. Prenatal Diagnosis

### PHYSIOLOGY

1. Homeostatic mechanism of major functional system
2. Extra cellular fluid and internal environment
3. Cell membrane (structure and functions)
4. Functions of Cell Organelle
5. Functional systems of cells (endocytosis, exocytosis, pinocytosis, phagocytosis)
6. Cell Signaling Mechanisms and Messenger system
7. Transport of Substances Across Cell Membrane Passive Transport
8. Transport of Substances Across Cell Membrane Active Transport (Special Reference To Sodium Pump)
9. Resting Membrane Potential
10. Action Potential and Propagation of AP
11. Genetic structure and function
12. Genetic control of protein synthesis (transcription and translation)

### BIOCHEMISTRY

1. Water: Structure and Dissociation
2. Physicochemical aspects
3. Carbohydrates: Structure, Classification and Functions
4. Carbohydrates: Isomerism and Monosaccharide Derivatives
5. Carbohydrates: Di and Polysaccharides
6. Amino Acids: Structure, Classification and Functions
7. Proteins: Classification and Functions
8. Structure of Proteins
9. Fatty acids: Structure, Classification and Functions
10. Lipids: Structure, Classification and Functions
11. Extra-cellular Matrix
12. Enzymes: Structure and Functions
13. Enzymes: Mechanism of Action
14. Vitamins & Minerals
15. Energy Flow Within the Cell
16. Bicarbonate buffer system (Tutorial)
17. Biomedical importance of Carbohydrates (Tutorial)
18. Biomedical importance of proteins (Tutorial)
19. Biomedical importance of Lipids (Tutorial)

20. Solutions and serial dilutions (Practical)
21. Detection of carbohydrates by body fluids by glucometer and uristix (Practical)
22. Detection of proteins by uristix (Practical)
23. Enzyme action and estimations (Practical)
24. Nucleic Acids
25. Replication and Repair
26. Transcription
27. Post-Transcriptional Modification
28. Regulation of Gene Expression
29. Translation and Post-Translational Modification
30. Biotechnology and Human Diseases
31. Gene Defects: (Tutorial)

#### **GENERAL PHARMACOLOGY,**

1. Introduction to Pharmacology, Routes of administration of drugs
2. Dosage of drugs, Calculation
3. Factors Modifying the Drug Response
4. Pharmaco-kinetics (overview)
5. Pharmaco-dynamics, (overview)
6. Adverse drug reactions/Drug-Drug interactions

#### **GENERAL PATHOLOGY:**

1. Introduction of pathology
2. Cell injury and cell death
3. Morphologic alterations in cell injury
4. Mechanisms of cell injury
5. Apoptosis
6. Intracellular accumulations

#### **MICROBIOLOGY**

1. Basic bacteriology & Structure of bacterial cell
2. Bacterial Genetics
3. Classification and Growth of bacteria, Normal flora
4. Pathogenesis of microorganisms
5. An account of a Microbiology Lab, Use of microscope for identification of bacteria and different staining methods (Grams Staining, Acid fast staining) Practical
6. Sterilization and Disinfection

#### **COMMUNITY MEDICINE**

1. Introduction to community medicine
2. Origin and determinants of disease
3. Health system research
4. Healthy city

## BEHAVIORAL SCIENCE

1. Introduction to behavioral science web
2. Culture, cultural influences, belief
3. Delivery culturally relevant care
4. Value & attitudinal transformation

## MEDICAL ETHICS

1. Introduction to bioethics (Definition of terms and Major Principals of Bioethics)
2. Clinical Ethics (Autonomy {Informed Consent/Choices}, Maximum Benefits {Beneficence}, No Harm {Non-maleficence}, Resource allocation/fairness/Distributive Justice).
3. Truth Telling
4. Privacy and confidentiality
5. Human Subject research Ethics
6. Plagiarism

**The contents are subjected to be altered according to requirement of academic calendar**



## TEACHING STRATEGIES

### LARGE CLASS FORMATS

- Lectures

### SMALL GROUP DISCUSSION

- Demonstrations
- Tutorial
- Practical
- Skill labs
- Case based learning sessions

## CASE BASED LEARNING

### 1. CBL :1

- Define Osmosis and how hypernatremia disturbs the osmolarity and cellular function
- Enumerate the Factors affecting the movement of water and electrolytes across cell membrane (Between extracellular and intracellular compartment)
- Enumerate the causes of Hypervolemia Hypernatremia , Isovolumic Hypernatremia and Hypovolemic Hypernatremia
- How homeostasis is achieved if water and electrolytes are disturbed

### 2. CBL :2

- What is menstrual cycle.
- What are the phases of menstrual cycle.
- Which hormones are released during the cycle?
- How they are controlled?
- What are their effects?
- Explain histological changes in ovary and endometrium.

### 3. CBL :3

- Structure, function and different parts of cell.
- Importance of cell membrane in regulating various function and defects in disease states.
- Importance of nucleus in defining cell function and determining phenotype and genotype of the species.
- Structure, number and types of chromosomes.
- Effects of Chromosomal anomalies on gross appearance and physiological functions of human body
- Clinical feature of this syndrome and name it.
- Social and ethical issues associated with this syndrome.
- Other syndromes of numerical and structural chromosomal abnormalities.

**4. CBL :4**

- Define Twin pregnancy.
- Classify the twin pregnancy on the basis of fetal membranes.
- Describe the predisposing factor leading to twin pregnancy
- Explain the types and complications of twin pregnancy.

## **LEARNING OBJECTIVES OF SKILL LAB**

**I. First aid Skills part 1 (bleeding, soft tissue injuries)**

**II. First aid Skills part 2 (burns, fractures, vertebral injury)**

- Assemble a First Aid Kit with at least twelve essential contents.
- Demonstrate appropriate communication skills while handling a patient requiring first aid. (especially reassurance to patient)

Following five common injuries will be addressed: -

**I- Bleeding**

- Demonstrate the appropriate methods of managing external bleeding. (Direct pressure, compressing pressure points, elevation).

**II- Soft Tissue Injuries**

- Demonstrate proper management of wounds including assessment, cleaning and dressing (head, forearm and hand, leg and ankle).

**III. Vertebral column Injury**

- Demonstrate correct rolls, moves, and lifts in transporting a patient to avoid spinal cord injury (log roll, spine stabilization)

**IV. Bony Injuries (Fractures)**

- Demonstrate the correct method of splinting fractures in leg and arm.

**V. Burns**

- Demonstrate the correct method of first aid management of burns.

**ASSESSMENT PLAN**

**FOUNDATION MODULE**

	WEIGHTAGE
ANNUAL EXAM	70%
MODULE EXAM INTERNAL EVALUATION	30%

CREDIT HOURS	
Foundation	9

CREDIT HOURS (DISCIPLINE WISE)	
Discipline	Credit Hours
Anatomy	3.5
Biochemistry	2.5
Physiology	0.925
Pathology	0.4
Microbiology	0.5
Pharmacology	0.375
Community Medicine	0.3
Behavioral Sciences	0.275
CBL	0.375
Skill Lab	0.125

## BOOKS

### ANATOMY

- **CLINICALLY ORIENTED ANATOMY**  
**KEITH.L.MOORE, Arthur F. Dalley, Anne M.R. Agur**  
7<sup>th</sup> or Latest EDITION
- **GRAY'S ANATOMY FOR STUDENTS**  
**Drake & Vogl & Mitchell**  
3<sup>rd</sup> or Latest EDITION
- **CLINICAL ANATOMY BY REGIONS (REFERENCE BOOK)**  
**Richard S. SNELL**  
9<sup>th</sup> EDITION
- **LAST'S ANATOMY: REGIONAL & APPLIED (REFERENCE BOOK)**  
**Chummy S. Sinnatamby**  
12<sup>th</sup> or Latest EDITION
- **ATLAS OF HUMAN ANATOMY**  
**FRANK H.NETTER**  
6<sup>th</sup> EDITION

### EMBRYOLOGY

- **LANGMAN'S MEDICAL EMBRYOLOGY**  
**T.W.SADLER**  
13<sup>th</sup> EDITION
- **THE DEVELOPING HUMAN CLINICALLY ORIENTED EMBRYOLOGY (REFERENCE BOOK)**  
**MOORE & PERSAUD & TORCHIA**  
10<sup>th</sup> EDITION

## HISTOLOGY

- **MEDICAL HISTOLOGY**  
**LAIQ HUSSAIN SIDDIQUI**  
**5<sup>TH</sup> or Latest EDITION**
- **WHEATERS FUNCTIONAL HISTOLOGY**  
**BARBARA YOUNG**  
**5<sup>th</sup> EDITION**
- **BASIC HISTOLOGY( TEXT AND ATLAS) (REFERENCE BOOK)**  
**LUIZ JUNQUEIRA, JOSE CARNEIRO**  
**11<sup>th</sup> or Latest EDITION**

## PHYSIOLOGY

- **GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY**  
**GUYTON AND HALL**  
**13<sup>th</sup> EDITION**

## BIOCHEMISTRY

- **LIPPINCOTT'S ILLUSTRATED REVIEWS SERIES**  
**DENISE R. FERRIER**  
**6th EDITION**
- **HARPERS ILLUSTRATED BIOCHEMISTRY (REFERENCE BOOK)**  
**VICTOR RODWELL, DAVID BENDER, KATHLEEN M. BOTHAM, PETER J. KENNELLY,**  
**P. ANTHONY WEIL**  
**28<sup>th</sup> EDITION**

## PATHOLOGY

- **ROBBINS BASIC PATHOLOGY**  
**KUMAR & ABBAS**  
**9TH EDITION**
- **ROBBINS & COTRAN PATHOLOGIC BASIS OF DISEASE (REFERENCE BOOK)**  
**KUMAR & ABBAS & ASTER**  
**9<sup>th</sup> EDITION**

## COMMUNITY MEDICINE

- **PUBLIC HEALTH AND COMMUNITY MEDICINE**  
**SHAH, ILYAS, ANSARI**  
**7<sup>th</sup> EDITION**

## PHARMACOLOGY

- **LIPPINCOTT'S ILLUSTRATED REVIEW PHARMACOLOGY**  
**KAREN WHALEN**  
**6<sup>th</sup> or Latest Edition**
- **BASIC AND CLINICAL PHARMACOLOGY (REFERENCE BOOK)**  
**BERTRAM G. KATZUNG**  
**11<sup>th</sup> EDITION**

## MICROBIOLOGY

- **REVIEW OF MEDICAL MICROBIOLOGY AND IMMUNOLOGY**  
**WARREN LEWINSON**  
**14<sup>th</sup> EDITION**
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Approved by:  
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