



LAHORE  
MEDICAL & DENTAL  
COLLEGE

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# PHYSIOLOGY STUDY GUIDE

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1st Year BDS 2024



DEPARTMENT OF PHYSIOLOGY LM&DC

## **INTRODUCTION**

The purpose of this study guide is to give an insight to the students about their specified course content, assessment plan, teaching strategies and learning resources. It may further facilitate the learners to plan their educational activities in the subject of Physiology. This study guide has been organized keeping in view of PM&DC and UHS guidelines for BDS curriculum. PM&DC has outlined the guiding principles for the undergraduate medical curriculum and has also defined the generic competencies and desired outcomes for a medical graduate; to provide optimal health care for patients and societies. These generic competencies set the standards for all physicians and form a part of the identity of a doctor.

## **DURATION OF PHYSIOLOGY COURSE**

One year

## **LEARNING OBJECTIVES** *(knowledge, skills, attitude)*

1. To equip the students with specific knowledge, essential skills and appropriate attitude in their desired field.
2. To enable the students to understand the functions of each organ system of the body and integrate the functioning with the knowledge of anatomy and biochemistry.
3. To perceive how basic physiological systems, interact to overcome the stressful and challenging conditions.
4. To think critically and apply the physiological relevance with the clinical situations and explain the pathophysiology of common diseases.
5. To become problem solvers, understanding effectively familiar and common problems.
6. To direct their own learning and evaluate this activity. To become lifelong learners.
7. To be able to reason critically, analyze situations and make justifiable decisions regarding common clinical scenarios.
8. To be able to demonstrate professional values of self and professional accountability, probity and ethics.

**Department of Physiology BDS**  
**Organogram/Hierarchy tree**



**Prof. Dr. Uzma Zargham**  
**(MBBS, M.Phil., Ph.D.)**  
**Head of BDS Physiology**



**Dr. Zulfiqar**  
**(BDS)**  
**Demonstrator**

**Dr. Ume Farwa**  
**(MBBS)**  
**Demonstrator**



# PHYSIOLOGY SYLLABUS

Content of the respective syllabus pertains to all three domains of learning, i.e. knowledge, skill and attitude

*Revised Curriculum of BDS - 2003*

## PHYSIOLOGY

The functional organization of human body as whole & homeostasis with special reference to the application of physiology in dentistry and comprising the following:-

### Cell Physiology

Organization of the cell; Physical characteristics – membranous structures, organelles, nucleus; Functional system of the cell – endocytosis, pinocytosis, phagocytosis, synthetic functions, exocytosis, energy production, cell movements & locomotion. Common abnormalities of cell function and their clinical relevance.

### Nerve- Muscle Physiology

Transport of Ions & molecules – diffusion, active transport; Membrane potentials and action potentials; Conduction of nerve impulse. Physiologic anatomy of skeletal and smooth muscle and mechanisms of muscle contraction. Neuromuscular transmission. Common diseases like myasthenia gravis etc

### Cardiovascular System

Structure and physiology of cardiac muscle

Specialized excitatory & conductive system of heart

Cardiac Cycle

Heart Sounds

Regulation of heart pump

ECG basics, recording and interpretation; correlation of cardiac cycle with ECG and heart sounds.

Cardiac arrhythmias

Circulation; the concept of pressure, flow & resistance

Functions of arterial & venous systems

Microcirculation and lymphatic system

Control & regulation of blood flow

Regulation of peripheral vascular resistance

Arterial pulse

Arterial pressure regulation (short-term/ long-term) – hypertension types and consequences

Regulation of venous return

Cardiac output regulation and measurement.

Coronary circulation

Changes in exercise

Ischemic heart disease; cardiac failure; circulatory shock etc heart murmurs and echocardiography

## **Respiration:**

- Basic organization of respiratory system
- Mechanics of pulmonary ventilation
- Pulmonary volumes & capacities and their clinical relevance
- Dead space (anatomical and physiological)
- Principles of gas exchange and transport in blood
- Nervous and chemical regulation of respiration;
- Breathing patterns
- Respiratory changes in exercise, high altitude, deep sea diving

- Hypoxia – causes, types and effects
- Dyspnea – causes, types and effects
- Apnea, including obstructive sleep apnea
- Tachypnea
- Cyanosis – causes, types and effects
- Respiratory insufficiency
- Artificial respiration and oxygen therapy

## **Blood Physiology**

- Red blood cells, production, functions, regulation
- Formation of hemoglobin, iron metabolism,
- Anemia & polycythemia
- Production & functions of leukocytes
- Blood groups transfusion, transfusion reactions, tissue & organ transplantation
- Hemostasis & blood coagulation
- Platelets, production, regulation and functions
- Thrombocytopenias
- The clotting cascade
- Hemophilia, Von Willebrand disease; Christmas disease
- Bleeding time and clotting screen

## **Gastro-intestinal System**

- General structure & organization
- Principles of GIT movements
- Mastication, deglutition,
- Peristalsis mechanism and control
- Vomiting mechanism and control
- Defecation mechanism and control
- Movements and functions of stomach, small intestine and large intestine
- Secretory functions (saliva, gastric juice, pancreatic juice, intestinal juice & bile)
- GIT hormones



Digestion & absorption & assimilation

Functions of liver & bilirubin formation & excretion; Jaundice.

Liver function tests

### Renal Physiology

Structure and functions of kidneys

Glomerular filtration, factors affecting and measurement

Renal blood flow

Urine formation, micturation;

Renal regulation of blood volume & extra cellular fluid volume

Regulation of acid-base balance

### Endocrine System:

General organization & importance of endocrine system

Chemistry, synthesis, storage, functions, control and abnormalities of pituitary, thyroid, parathyroid pancreatic, and adrenal hormones

Hormonal assays and interpretation

### Nervous System:

Organization of the nervous system

Synaptic transmission

Basic concepts of sensory, motor and integrative functions of nervous system including various pathways

Cerebral blood flow and cerebrospinal fluid system

Physiology of pain with emphasis on endogenous pain control mechanisms

Organization and functions of spinal cord

Organization and functions of sensory cortex

Organization and functions of motor cortex; pyramidal and extra pyramidal pathways; presentation and interpretation of common upper and lower motor neuron lesions

Organization and functions of cerebellum & basal ganglia in overall motor control - Parkinsonism

Thalamus- organization, nuclei and functions

Functions of hypothalamus

Temperature regulation

States of brain activity – sleep, brain waves, epilepsy & psychoses.

Organization and functions of autonomic nervous system

Special senses-elementary knowledge of structure and physiology of the special sense organs.

## Laboratory Assignments

### Hematology

- Study of the microscope
- RBCs Count
- Hematocrit
- Determination of Hemoglobin (Hb%)
- Packed cell volume (PVC)
- Total leukocyte count (TLC)
- Differential leukocyte count (DLC)
- Erythrocyte sedimentation rate (ESR)

- Bleeding time (BT)
- Prothrombin time
- Thrombin time
- Blood grouping

### Respiratory system

- Measurement of pulmonary volumes and capacities (Spirometry)
- Stethography

### Nervous system

- Examination of superficial reflexes
- Examination of deep reflexes
- Examination of sensory, motor system
- Clinical examination of cranial nerves

## Cardiopulmonary resuscitation

### Triple response

Examination of arterial pulse

ECG recoding/interpretation

Measurement of arterial blood pressure

Effect of exercise & posture on BP

Examination of apex beat

Heart sounds – auscultation of normal sounds/murmurs

Recording of body temperature

# **1<sup>st</sup> YEAR BDS ACADEMIC PLANNER (2024)**

## **SUBJECT OF PHYSIOLOGY**

<b>Subject</b>	<b>Physiology</b>
<b>Total study Hours</b>	<b>272 hours</b>
<b>Total no. of hours in 36 weeks</b>	<b>7.58 hours per week X 36 = 272 hours</b>
<b>Duration of each session per week</b>	<b>45 minutes = 4 60 minutes = 1 75 minutes = 1 50 minutes = 1 90 minutes = 1</b>
<b>Course of Action</b>	<b>February 2024 to November 2024</b>



## **Teaching Faculty**

1. Prof. Anser Asrar
2. Prof. Uzma Zargham
3. Prof. Zaima Ali
4. Dr. Sadia Nazir (Associate Professor)
5. Dr. Attiqah Khalid (Associate Professor)
6. Dr. Asma (Assistant Professor)

## **ALIGNMENT OF EDUCATION WITH STUDY HOURS**

### **(1<sup>st</sup> year BDS-2024)**

<b>Sr #</b>	<b>Topic</b>	<b>Sessions</b>	<b>Study hours</b>
1.	Cell	9	9 hours
2.	Nerve & Muscle	22	21 hours
3.	Blood	15	20 hours
4.	Endocrinology	22	22 hours
5.	Respiration	18	20 hours
6.	Heart	18	20 hours
7.	Renal Physiology	18	18 hours
8.	Circulation	21	20 hours
9.	Sensory system	14	12 hours
10.	Motor system	24	26 hours
11.	GIT	8	12 hours
12.	Special senses	8 2 1	10 hours
13.	Environmental physiology	10	8 hours
Total	Theory/experimental sessions/hours	210	218
	Practical hours (1.5 hour/week)	36	54 hours
		246	272 hours

## **Academic Calendar**

<b>Dates-2023</b>	<b>Weeks</b>	<b>Lectures</b>	<b>Practicals</b>
26 <sup>th</sup> Feb to 1 <sup>st</sup> March	1	UNIT I -- Introduction to Physiology--The Cell	Microscope
4 <sup>th</sup> to 8 <sup>th</sup> March	2	UNIT I -The Cell and General Physiology UNIT VI -- Blood Cells and Blood Coagulation	Hb estimation
11 <sup>th</sup> to 15 <sup>th</sup> March	3	UNIT I -- The Cell UNIT VI – The Blood	Blood groups
18 <sup>th</sup> to 22 <sup>nd</sup> March	4	UNIT II – Membrane Physiology-Transport UNIT VI - Blood Cells, Immunity and Blood Coagulation	ESR
25 <sup>th</sup> to 29 <sup>th</sup> March	5	UNIT II – Membrane Potentials & Action Potentials UNIT VI - Blood Cells, Immunity and Blood Coagulation	Hemocytometer
1 <sup>st</sup> to 5 <sup>th</sup> April	6	UNIT II – Membrane Potentials & Action Potentials UNIT VI - Blood Cells, Immunity and Blood Coagulation	Red cell count
<b>EID-ul-FITR BREAK 10<sup>th</sup> to 12<sup>th</sup> April</b>			
15 <sup>th</sup> to 19 <sup>th</sup> April	8	UNIT II – Skeletal Muscle UNIT VI - Blood Cells, Immunity and Blood Coagulation	TLC
<b>SPORTS WEEK 22<sup>nd</sup> to 26<sup>th</sup> April</b>			
29 <sup>th</sup> April to 3 <sup>rd</sup> May	10	UNIT III – The Heart UNIT VII -- Respiration	DLC
6 <sup>th</sup> to 10 <sup>th</sup> May	11	UNIT III – The Heart UNIT VII -- Respiration	BT & CT
13 <sup>th</sup> to 17 <sup>th</sup> May	12	UNIT III – The Heart UNIT VII -- Respiration	Spirometer

Dates-2024	Weeks	Lectures	Practicals
20 <sup>th</sup> to 24 <sup>th</sup> May	13	UNIT III – The Heart UNIT VII -- Respiration	ECG
27 <sup>th</sup> to 31 <sup>st</sup> May	14	UNIT III – The Heart UNIT VII -- Respiration	Exam of precordium Exam of Resp System
3 <sup>rd</sup> to 7 <sup>th</sup> June	15	UNIT III – The Heart UNIT VII -- Respiration	BP
10 <sup>th</sup> to 14 <sup>th</sup> June	16	UNIT IV – The Circulation UNIT VII -- Respiration	Pulse
17 <sup>h</sup> Jun to 21 <sup>st</sup> July	17 to 21	SUMMER VACATIONS	SUMMER VACATIONS
22 <sup>nd</sup> to 26 <sup>th</sup> July	22	UNIT IV – The Circulation UNIT VI – The Body Fluids & Kidney	Reflexes
29 <sup>th</sup> July to 2 <sup>nd</sup> August	23	UNIT IV – The Circulation UNIT VI – The Body Fluids & Kidney	Motor System
5 <sup>th</sup> to 9 <sup>th</sup> August	24	UNIT IV – The Circulation UNIT VI – The Body Fluids & Kidney	1, 3 <sup>rd</sup> , 4 <sup>th</sup> 6 <sup>th</sup> , 9 <sup>th</sup> , 10 <sup>th</sup> -12 <sup>th</sup> Cranial nerves

Dates-2024	Weeks	Lectures	Practicals
12 <sup>th</sup> to 16 <sup>th</sup> August	25	UNIT IV – The Circulation UNIT VI – The Body Fluids & Kidney	Perimetry
19 <sup>th</sup> to 23 <sup>rd</sup> August	26	UNIT IV – The Circulation UNIT VI – The Body Fluids & Kidney	Visual acuity
26 <sup>th</sup> to 30 <sup>th</sup> August	27	UNIT IX—The Circulation UNIT XII -- GIT	7 <sup>th</sup> , 5 <sup>th</sup> , cr. nerves
9 <sup>th</sup> to 13 <sup>th</sup> September	28	UNIT IX—Sensory Physiology UNIT XII -- GIT	8 <sup>th</sup> cranial nerves
17 <sup>th</sup> to 20 <sup>th</sup> September	29	UNIT IX— Sensory Physiology UNIT XII – GIT	Revision
23 <sup>rd</sup> to 27 <sup>th</sup> September	30	UNIT XI – Sensory Physiology UNIT XIV -- Endocrinology	Revision
30 <sup>th</sup> Sep to 4 <sup>th</sup> October	31	UNIT XI – Motor Physiology UNIT XIV -- Endocrinology	Revision
7 <sup>th</sup> to 11 <sup>th</sup> October	32	UNIT XI – Motor Physiology UNIT XIV – Endocrinology	Revision
14 <sup>th</sup> to 18 <sup>th</sup> October	33	UNIT XI – Motor Physiology UNIT XIV – Endocrinology	Revision
21 <sup>st</sup> to 25 <sup>th</sup> October	34	UNIT XI – Motor Physiology UNIT XIV – Endocrinology	Revision
28 <sup>th</sup> Oct to 1 <sup>st</sup> November	35	UNIT XI – Motor Physiology UNIT X – Special Senses	Revision
4 <sup>th</sup> to 8 <sup>th</sup> November	36	UNIT X – Special Senses Varied Environment	Revision
	<b>37-38</b>	<b>Term test/Prep Leaves</b>	
	<b>39</b>	<b>Send up</b>	
	<b>40</b>	<b>UHS Exam—Prep Leaves</b>	



## **TEACHING METHODOLOGIES FOR PHYSIOLOGY**

1. Interactive Lectures: for active involvement of students some engagement trigger like Brainstorming, Think, pair, and share, Buzz session, Q&A sessions.
2. Tutorials: set of instructions to complete a task, to an interactive problem-solving session
3. Small group discussions: active involvement by everyone especially shy and less articulate are encourage to contribute Students learn from each other and everyone gets more practice at expressing their ideas
4. Essential skills to be learned in skill lab: provide a safe and protected environment in which the learner can practice clinical skills before using them in real clinical settings, such as performance of CPR.
5. Power point presentations by students: delivering positive learning experiences. And excellent communication (written, oral, and listening) skills.
6. Practical performance to enhance theoretical and clinical concepts
7. Online teaching through Microsoft teams and Google classroom when required

## **ATTENDANCE REQUIREMENT FOR PHYSIOLOGY**

1. Students are expected to attend all scheduled teaching sessions and examinations
2. Attendance in lectures, tutorials, and practical is mandatory. Absence from these sessions will make the students ineligible to sit the final summative assessment.
3. A minimum of 75 % attendance in the lectures & practical is mandatory to appear in the summative UHS examination
4. Attendance will be recorded through a log-in/log-out biometrics system
5. Absence due to illness must be certified appropriately by the General Physician

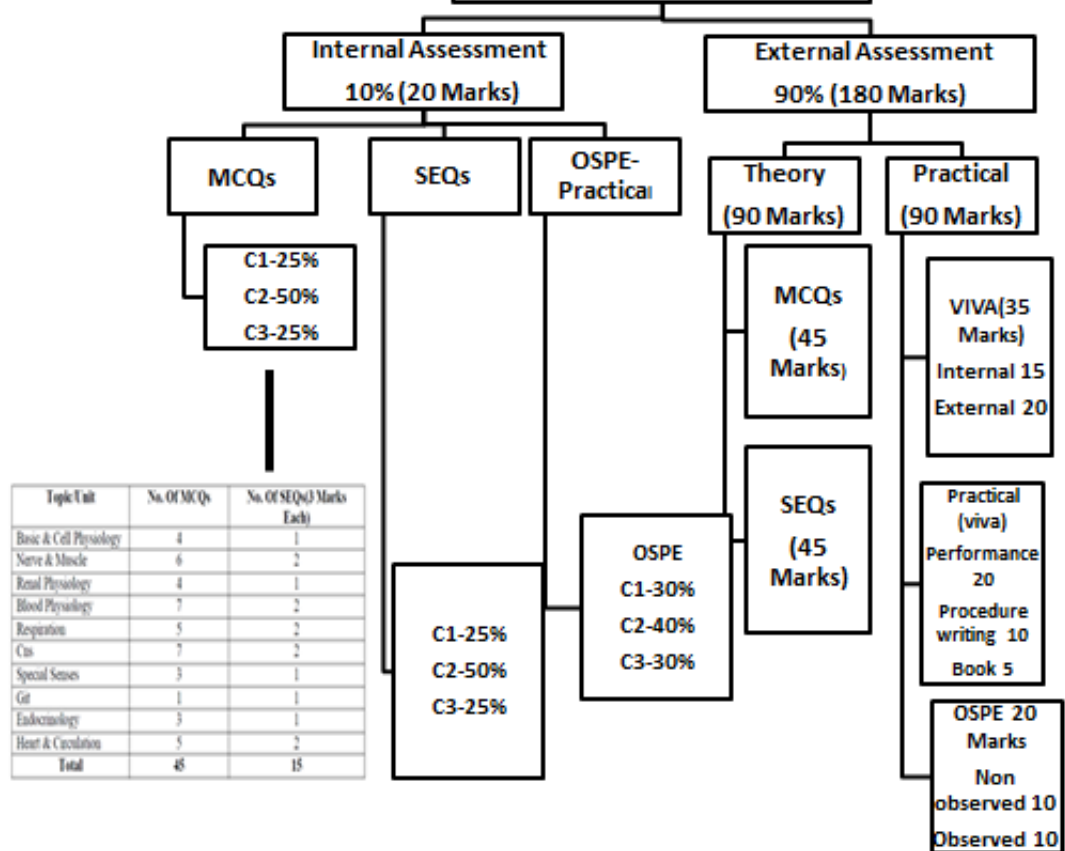
## Weekly distribution of lectures and practicals

Monday	1:30 pm to 2:15 pm	2:15 pm to 3:00 pm	Teaching Faculty
	Experimental Physiology lecture. Lecture Theater No. 10	Experimental Physiology lecture. Lecture Theater No. 10.	Prof. Anser Prof. Uzma Prof. Zaima Dr. Attiqah (Associate Prof) Dr. Sadia (Associate Prof) Dr. Asma (Assistant Prof)
Tuesday	8:am to 9:00am	10:15 am to 11:30 am	
	Experimental Physiology lecture. Lecture Theater No. 10	Physiology lecture. Lecture Theater No. 10	Prof. Anser Prof. Uzma Prof. Zaima Dr. Attiqah (Associate Prof) Dr. Sadia (Associate Prof) Dr. Asma (Assistant Prof)
Wednesday	11:30 am to 12:20 pm		
	Experimental Physiology lecture. Lecture Theater No. 10		Prof. Anser Prof. Uzma Prof. Zaima Dr. Attiqah (Associate Prof) Dr. Sadia (Associate Prof) Dr. Asma (Assistant Prof)
Thursday	10:45 am to 12:15 pm	12:45 pm to 1:30 pm	
	Physiology practical Batch A  Demonstrators (Dr. Zulfiqar and Dr. Ume Farwa)	Exp/Physiology lecture Lecture Theater No. 10	Prof. Anser Prof. Uzma Prof. Zaima Dr. Attiqah (Associate Prof) Dr. Sadia (Associate Prof) Dr. Asma (Assistant Prof)
Friday	8:am to 8:45 am	9:30am to 11:00am	
	Physiology practical Batch B  Demonstrators (Dr. Zulfiqar and Dr. Ume Farwa)	Experimental Physiology lecture. Lecture Theater No. 10	Prof. Anser Prof. Uzma Prof. Zaima Dr. Attiqah (Associate Prof) Dr. Sadia (Associate Prof) Dr. Asma (Assistant Prof)

## **TEST SCHEDULE 1<sup>st</sup> YEAR BDS (2024)**

Test 1	01-04-2024
Test 2	22-04-2024
Test 3	13-05-2024
Test 4	14-06-2024
Test 5(Mid-term)	12-08-2024
Test 6	02-09-2024
Test 7	30-09-2024
Test 8	18-10-2024
Test 9	1-11-2024
<b>Send up</b>	15-11-2024

## Assessment Plan 1st Prof BDS





## **ASSESSMENT METHODOLOGY**

### **1. Formative**

#### **1a. Formal formative**

1. Class tests
2. Send up
3. Viva—semi structured
4. Practical—OSPE

#### **1b. Informal formative**

1. Quizzes
2. Assignments
3. Class presentation/group discussions

### **2. Summative**



UHS professional examination

Test Format

1. Theory: 1) Single best multiple choice questions. 2) Short essay question
2. Viva
3. Practical performance
4. OSPE (observed & non-observed stations)

### **Internal assessment policies**

10% based upon the Departmental test and 90% UHS Professional Examination

## **TABLE OF SPECIFICATIONS (TOS) FOR BDS FIRST PROFESSIONAL EXAMINATION**

UHS has approved the following table of specifications (TOS) for First Professional Annual Examination BDS:

### **For Theory Paper**

Total time allocated = 03 Hours (Including MCQs)

Marks of theory paper = 90 (MCQs = 45 + SEQs = 45)

Internal assessment = 10

Total marks = 100

Pass Marks = 50

45 x MCQs (on separate sheet)      (45 Marks)

Time =50 min

15 x SEQs (on separate sheet)      (45 Marks)

Time = 2 hours & 10 min

<b>Topic/Unit</b>	<b>No. Of MCQs</b>	<b>No. Of SEQs(3 Marks Each)</b>
Basic & Cell Physiology	4	1
Nerve & Muscle	6	2
Renal Physiology	4	1
Blood Physiology	7	2
Respiration	5	2
Cns	7	2
Special Senses	3	1
Git	1	1
Endocrinology	3	1
Heart & Circulation	5	2
<b>Total</b>	<b>45</b>	<b>15</b>

### **For Practical Examination:**

Practical examination marks = 90

Internal assessment = 10

Total marks = 100

Pass Marks = 50

### **Viva Voce (35 marks)**

- Internal ----- 15 marks
- External ----- 20 marks

### **OSPE (20 marks)**

- Non-observed stations 05 of 02 marks each (2 minutes each)
- Observed stations 02 of 05 marks each (4 minutes each)

### **Practical (35 marks)**

- Practical Viva = 20 marks
- Procedure Writing = 10 marks
- Yearly Workbook Assessment = 05 marks

## **LEARNING RESOURCES**

**1. Departmental library**

**2. IT library**

**3. Recommended books**

**1. Textbook of Physiology by Guyton and Hall,  
Latest Ed.**

**2. Guyton Review for MCQs**