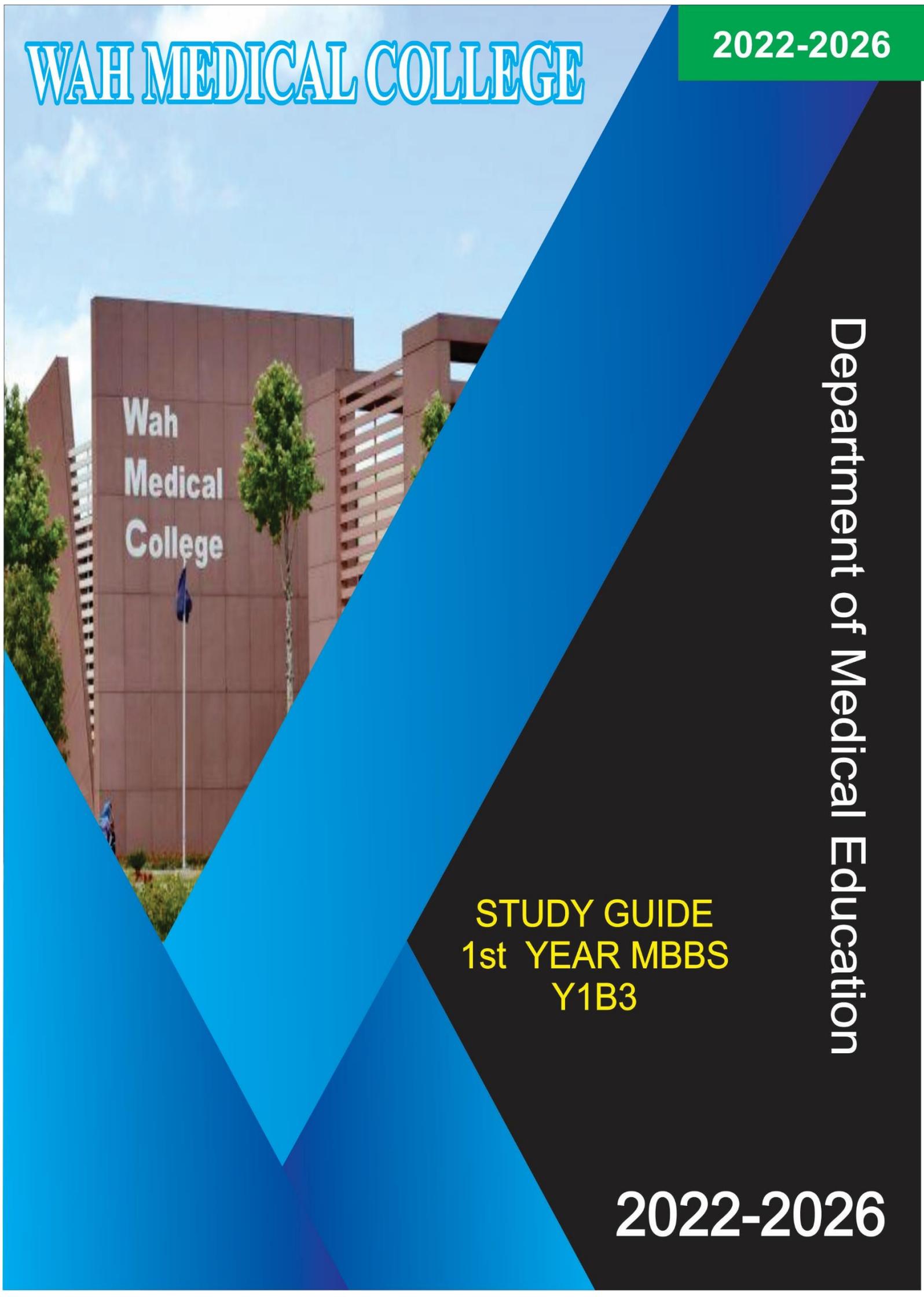


WAH MEDICAL COLLEGE

2022-2026

A photograph of the Wah Medical College building, a large, modern structure with a reddish-brown facade. The words "Wah Medical College" are printed in white on the building's exterior. A flagpole with a blue flag stands in front of the building. The image is partially obscured by large, overlapping geometric shapes in shades of blue and black.

Wah
Medical
College

Department of Medical Education

STUDY GUIDE
1st YEAR MBBS
Y1B3

2022-2026



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VISION

The vision of National University of Medical Sciences is to improve the quality of life through education, research, innovation, and healthcare, thereby, contributing to endeavours to make Pakistan and this world better place to live in.



MISSION

To produce competent professional medical graduates equipped with sound knowledge based on scientific principles, imbued with ethics & moral values primed to serve the community through the profession and pursue advanced training in any branch of medicine

1. Outcomes of WMC MBBS Program:

At the end of our five-year MBBS program, the graduates should be able to:

1. Independently manage common, non-critical clinical problems.
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures.
3. Exhibit the attributes of an ethical professional.
4. Conduct research which brings relevance to health care practices.
5. Act as an efficient community health promoter.
6. Exhibit scientific knowledge in all professional activities.
7. Demonstrate clear and efficient written & verbal communication skills.
8. Exhibit the habits of a lifelong learner.

2. Introduction to the Study Guide:

I. Objectives of the Study Guide

Dear Students,

We, at the Department of Medical Education, Wah Medical College, have developed this study guide especially for you. This study guide aims to:

- Inform you about the organization of learning programs in this block which will help you to contact the right person in case of any difficulty.
- Help you in organizing and managing your studies throughout the block
- Guide you on assessment methods, rules, and regulations.
- Define the outcomes which are expected to be achieved at the end of the block.
- Identify the learning strategies that will be implemented to achieve the block outcomes such as lectures, small group discussions, clinical skills, demonstration, tutorial, and case-based learning
- Provide a list of learning resources such as books, and journals for students to consult to maximize their learning.

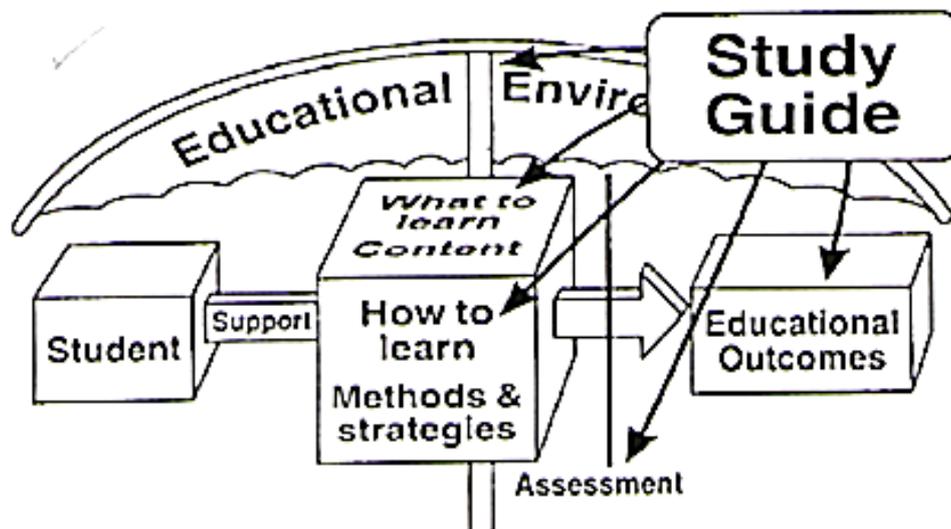


Figure 1.

Objectives of the study Guide(HARDEN, J.M. LAIDLAW, E.A. HESKETH, 1999)

II. Commonly used abbreviations & Logos in the study guide

Learning Outcomes:

Learning outcomes are statements that define the expected goal of your course, lesson, or activity in terms of demonstrable skills or knowledge that will be acquired by you as a result of instruction. In simple words, these are the things that you must be able to tell or do with the required attitude after learning a particular topic.

1. Educational Strategies:

These are the methodologies through which you will be taught by your instructors.

These can include.

Abbreviation	Logos
LGIS: Large Group interactive session/Lecture	
Flipped Classroom	
CBL: Case based learning.	
Practicals	
Demonstrations	
SGD: Small group discussions	
BST: Bed Side Teaching	
Skill Lab	
Clinical Teaching (OPD/ OT/ IPD)	

Large Group Interactive Sessions

In a large group, the lecturer introduces a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patient's interviews, exercises, etc. Students are actively involved in the learning process.

Flipped classroom

A pedagogical approach in which the conventional notion of classroom-based learning is inverted: students are introduced to the learning material before class with classroom time then being used to deepen understanding through discussion with peers and problem-solving activities facilitated by teachers.

Small Group Discussion

This format helps students to clarify concepts, acquired skills or attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews, or discussion topics. Students exchange opinions and apply knowledge gained from lectures, tutorials, and self-study. The facilitator's role is to ask probing questions, summarize, or rephrase to help clarify concepts.

Case-Based Learning

This is a small group discussion format where learning is focused around a series of questions based on a clinical scenario. Specifically designed case scenarios and the learning outcomes to be achieved are shared with the student before the session. Students prepare for the CBL and during class they discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the block. Faculty members are present as a guide and an assessor.

Self-Directed Study

Students assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from the Learning Resource Center, teachers, and resource persons within and outside the college. Students can utilize the time within the college schedule hours for self-study under supervision.

Assessment Strategies:

During the block, you shall be continually formatively assessed.

- The weightage of internal assessment shall be 20% in 1st professional MBBS Examination.
- There shall be three end blocks and one pre-annual examination.
- The scores of tests at the end of each end -block assessment and pre-annual examination shall be used for calculation of the internal assessment.

End Block and Pre-Annual Examination:

- There will be three-block examinations, one at the end of each block.
- There will be only one pre-annual examination.
- The structure of the paper of all the end block examination and pre-annual will be the same as that for the annual examination though the syllabus will be different.
- The syllabus for end block examination will be announced by the department at least 02 weeks prior to examination.
- Pre-annual examination will be from the whole syllabus.
- The date sheet for end block and pre-annual examinations will be prepared by coordinator Basic Medical Sciences while the examinations will be conducted by the respective departments.
- The result will be utilized for calculation of internal assessment which will be submitted to NUMS examination branch at least two weeks prior to the annual exam.

Annual Professional Examination:

- The university shall take the 1st professional Examination as per PMC guidelines at the end of the academic year.
- Each subject section has a table of specifications for annual examination.
- Annual theory and practical Examination shall be of 200 marks each in Anatomy, Physiology and Biochemistry.
- The pass score shall be 50% in theory and practical separately.

4. Block Development Committee

Chairperson	Prof. Zubia Athar	
Block In charge	Dr. Nomana Mahmood	
Members/ Resource persons	Anatomy	: Dr. Nomana Mahmood
	Physiology	: Dr. Sumaira Iqbal
	Biochemistry	: Dr. Rabiah Manzoor
	Medicine	: Dr. Ayesha Rani
	Surgery	: Dr. Sadia Farhan
	Behavioral Science	: Mr. Hassan Ali
	Research Methodology	: Dr. Sadia Nadeem
	Radiology	: Dr. Rubia Ahmad
Study guide developed By	Department of Medical Education Wah Medical College under Supervision of Prof. Dr. Musarat Ramzan	
Resource person for Study Guide	Dr. Ambreen Ansar	

5. Structured Summary of Y1B3-MVI- Respiratory system

Block Code	
Y1BIII-MVI	
Prerequisite Block	Y1BII
Duration	04 weeks
Anatomy	Embryology: development of respiratory system, development of limbs Histology: Respiratory System Gross Anatomy: Lower Limb
Physiology	Respiratory system, High Altitude and Deep-Sea Physiology
Biochemistry	Bioenergetics, vitamins, proteins
Surgery	Acute and chronic limb ischemia, varicose veins and DVT, common injuries of lower limb
Research Methodology	Literature search, operational definition & hypothesis

6. Course content

Anatomy

Program Learning Outcomes (PLOs):

1. Independently Manage common, non-critical clinical problems (SLO 1,2, 3,4)
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures (SLO 1,2,3,4)
3. Exhibit the attributes of an ethical professional (SLO2)
4. Conduct research which brings relevance to health care practices (SLO5)
5. Act as an efficient community health promoter (SLO 1,2,4)
6. Exhibit scientific knowledge in all professional activities (SLO1,2,3,4)
7. Demonstrate clear and efficient written & verbal communication skills (SLO2)
8. Exhibit the habit of a lifelong learner (SLO 1,2,3,4,5)

Subject Learning Outcomes (SLOs):

1. Interpret the anatomical basis of common clinical problems related with limbs, thorax, abdomen, pelvis, brain, head & neck by correlating the normal structure of human body with its functions (PLO 1,2,3,6,7,8)
2. Demonstrate professionalism, effective communication skills, ethics and leadership while participating in all learning activities including dissection, Surface marking, CBLs and practicals (PLO 5,6,7,8)
3. Relate the histomorphological features of cell, basic tissues, & systems of human body with their functions and biochemical features (PLO 1,6,8)
4. Explain the embryological basis of common congenital anomalies related with human development (PLO 1,3,6,8)
5. Identify the basic features of a research article (PLO 4,5)

Block Learning Outcomes (BLOs):

1. Correlate the gross anatomical and light microscopic structure of Respiratory System with their functions and dysfunctions (SLO 3; PLO 1,6,8)
2. Interpret the embryological basis of common congenital anomalies related with development of respiratory system, limbs, muscles, skeletal system and birth defects. (SLO4; PLO 1,3,6,8)
3. Apply the knowledge of Gross Anatomy of lower limb in interpreting the anatomical basis of relevant common clinical conditions in the given scenarios/ published literature (SLO1,5; PLO 1,2,3,4,5,6,7,8)
4. Demonstrate professionalism, effective communication skills, ethics and leadership while participating in all learning activities including dissection of lower limb, Surface marking of neurovasculature of lower limb, CBLs and Practicals (SLO2, PLO 5,6,7,8)

Respiratory System

S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
1.	Histology of Respiratory system (BLO1)	LGIS	Dr Nomana Mahmood	Must know

Topic Learning Outcomes:

- Recognize the light microscopic features of different parts of the respiratory system.
- Correlate the microscopic structure of the respiratory system with its function and dysfunction.

2.	Development of Respiratory System (BLO 2)	LGIS	Prof Zubia Athar	Must know
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Learning Outcomes:

- Correlate the development of the respiratory system with its congenital anomalies.
- Appraise the embryological basis of various types of tracheo-esophageal fistulae & justify their relationship with polyhydramnios.
- Explain different stages of lung maturation and enumerate factors important for normal lung development
- Analyze embryological basis and prevention of Respiratory Distress Syndrome in a premature infant.

1. Reference Books

- a. Medical Embryology by Langman
- b. Medical Histology by Laiq Hussain Siddiqui, Text & Atlas
- c. The developing human by Keith L Moore
- d. Basic Histology Text and Atlas by Junquiera
- e. Gray`s Anatomy for students
- f. Histology Manual

2. Online resources

- g. Online lectures,
- h. Videos &
- i. Reading Material (provided by respective instructors)

3. Library resources

- j. Text & Reference Books

4. Teaching faculty:

Name	Email address
Prof Dr Zubia Athar	zubiaathar@hotmail.com
Prof Dr Uzma Shahid	ua7567@gmail.com
Dr Nomana Mahmood	mahmoodnomana@gmail.com
Dr Ayesha Yasser	ayesha.yasser.a30@gmail.com
Dr Sana Sohail	sanasohailansari@gmail.com
Dr Bushra Mohsin	bushramohsinbukhari@gmail.com

5. Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
<ul style="list-style-type: none">● Assignments● Presentations● Low Stake Quizzes● Discussions in flipped classroom, SGD, SDL & CBL● Reflective writing	<ul style="list-style-type: none">● Block Tests● (MCQs, SEQs, Viva voce)● OSPE/ Observed spotting on models & prosected specimens during viva voce● CBL● Logbook

Physiology

Program Learning Outcomes

1. Independently Manage common, non-critical clinical problems (SLOs 1,2,3,5).
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures. (SLOs 1,2,3,4).
3. Exhibit the attributes of an ethical professional (SLO 5)
4. Conduct research which brings relevance to health care practices (SLO 6)
5. Act as an efficient community health promoter. (SLO3)
6. Exhibit scientific knowledge in all professional activities. (SLOs 1,2,3,6)
7. Demonstrate clear and efficient written & verbal communication skills. (SLO 5)
8. Exhibit the habit of a lifelong learner. (SLOs 1,2,3,4,5,6)

Subject Learning Outcomes

1. Identify the various processes involved in the normal functioning of the body (PLOs 1,2,6,8)
2. Relate the interconnections of various organ systems in maintenance of homeostasis/ normal functioning of the body(PLOs 1,2,6,8).
3. Appraise the pathophysiological features of common clinical disorders(PLOs 1,2,5,6,8).
4. Operate commonly used instruments practiced in clinical & laboratory procedures (PLOs 2,8).
5. Demonstrate effective presentation, communication skills, group dynamics, team building, ethics, professionalism, leadership and role modeling while participating in the group activities/ practicals / CBLs (PLOs 3,7).
6. Enlist the basic features of a research article (PLOs 6,8).

Block Learning Outcomes:

1. Appraise the physiological mechanisms controlling the functions of the respiratory system and its regulation(PLO1,3,6,7,8) & (SLO 1,2,4,5).
2. Relate, compare and interpret the signs & symptoms and pathophysiology related to various respiratory disorders (PLO 1,3,6,7,8)&(SLO 1,2,3,4,5).

Respiratory Physiology

Sr No.	Topic/Theme	Instructional Strategies	Instructor	Importance (Must Know Should know Could Know)
1	Introduction to Respiratory System	LGIS/Lectures /SGD/CBL	Dr. Sumera Gul	Must Know
Learning Outcomes (BLO 1): <ul style="list-style-type: none"> Recognize the functional anatomy of various parts of respiratory system Highlight the non-respiratory functions of respiratory tract 				
2	Pulmonary Mechanics	LGIS/Lectures/SGD /CBL	Dr. Sumera Gul	Must Know
Learning Outcomes (BLO 1): <ul style="list-style-type: none"> Distinguish functions of inspiratory and expiratory muscles during quiet and forceful respiration Correlate normal lung volumes/capacities to various pressures and volume changes during forceful respiration 				
3	Pulmonary Compliance	LGIS/Lectures /SGD/CBL	Dr. Sumera Gul	Must Know
Learning Outcomes (BLO 1): <ul style="list-style-type: none"> Discern lung and chest wall compliance Identify composition & role of surfactant in alveolar surface tension State concept of work of breathing 				
4	Respiratory Membrane & Diffusion of Gases	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must Know
Learning Outcomes (BLO 1): <ul style="list-style-type: none"> Appreciate the layers of respiratory membrane in detail Appraise concept of diffusing capacity through respiratory membrane Identify factors affecting gas diffusion through Respiratory membrane 				
5	Diffusion of gases	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must Know
Learning Outcomes (BLO 1): <ul style="list-style-type: none"> State the mechanics of oxygen diffusion from alveoli to blood Distinguish mechanism of oxygen transport in the arterial blood, tissue fluid and cell 				
6	Oxygen transport & Dissociative curve	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must Know

Learning Outcomes (BLO 1):				
<ul style="list-style-type: none"> ● Identify the role of Hb in oxygen transport ● Analyze normal oxygen-hemoglobin dissociation curve by explaining factors that shift oxygen- hemoglobin dissociation curve to right and left 				
7	Carbon dioxide transport	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must Know
Learning Outcomes (BLO 1):				
<ul style="list-style-type: none"> ● Identify various chemical forms in which CO₂ is transported in blood. ● Discern normal CO₂ dissociation curve explaining Bohr effect, Haldane effect and chloride shift 				
8	Nervous regulation of respiration	LGIS/Lectures /SGD/CBL	Dr. Sumaira Iqbal	Must Know
Learning Outcomes (BLO 1):				
<ul style="list-style-type: none"> ● State different group of neurons composing respiratory center ● Review nervous control of inspiration and respiratory rhythm ● Recognize the regulatory mechanism of hering-breuer inflation reflex 				
9	Chemical regulation of respiration	LGIS/Lectures /SGD/CBL	Dr. Sumaira Iqbal	Must Know
Learning Outcomes (BLO 1):				
<ul style="list-style-type: none"> ● Appraise location, function, and stimulation (by CO₂ and H⁺) of central chemo sensitive area. ● Identify the role of peripheral chemoreceptors for control of respiration. ● Determine the composite effects of PCO₂, pH, & PO₂ on alveolar ventilation. 				
10	Pulmonary circulation VA/Q	LGIS/ Lectures/ SGD/CBL	Dr. Hina Umair	Must Know
Learning Outcomes (BLO 1):				
<ul style="list-style-type: none"> ● Appreciate pressure differences b/w pulmonary & systemic circulation. ● Analyze the pulmonary blood flow and effect of hydrostatic pressure on it and the concept of ventilation perfusion ratio. 				
11	Hypoxia	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must Know
Learning Outcomes (BLO 2):				
<ul style="list-style-type: none"> ● Identify various causes of hypoxia. ● Analyze effects of hypoxia on the body and role of oxygen therapy in different types of hypoxia. 				
12	Cyanosis/ Asphyxia/ Hypercapnia	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must know

Learning Outcomes (BLO 2):

- List causes of cyanosis and asphyxia.
- Enunciate hypercapnia & its association with various forms of hypoxia.
- Interpret effects of very high blood CO₂ levels on respiratory center.

13	Obstructive lung Diseases	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must know
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Learning Outcomes (BLO 2):

- Discuss the causes and pathophysiology of obstructive lung diseases and evaluate its effects on respiration.

14	Restrictive lung Diseases	LGIS/Lectures /SGD/CBL	Dr. Hina Umair	Must know
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Learning Outcomes (BLO 2):

- Discuss the causes and pathophysiology of Restrictive lung diseases and evaluate its effects on respiration.
- Draw and explain the spirogram of obstructive and restrictive lung diseases.
- Differentiate between Obstructive and restrictive lung disease based on spirometry and FEV₁/ FVC ratio.

PRACTICAL

Sr #	Topic/ Theme	Educational Strategies	Instructor	Importance (Must Know Should know Could Know)
1.	Jugular Venous Pulse	Practical	Dr. Atayyab	Must Know

Learning Outcomes (BLO1,2):

- Define the Jugular Venous Pulse.
- Give the clinical importance of JVP.
- Identify and name the different parts of JVP.
- Explain the different methods of measuring JVP.

2.	Examine respiratory system on an SP in a proper sequence of inspection, palpation, percussion and auscultation.	Practical	Dr. Attayab	Must Know
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Learning Outcomes (BLO 1,2):

- Steps for examination of chest

3.	Study the spirometer and operate the instrument.	Practical	Dr. Hira	Must Know
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Learning Outcomes (BLO 1,2):

- Identify the parts of Spirometer and summarize its uses

4.	Record of Tidal Volume, Inspiratory Reserve volume, and Expiratory reserve volume by using Student's spirometer and Kymograph and label it.	Practical	Dr. Hira	Must know
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Learning Outcomes (BLO 1,2):

- Define tidal volume, expiratory reserve volume, inspiratory reserve volume and vital capacity.
- Record tidal volume, expiratory reserve volume, inspiratory reserve volume and vital capacity.
- Name the factors affecting vital capacity.
- Explain the difference between lung capacities and lung volumes.
- Differentiate between static and dynamic volumes and capacities

CASE BASED LEARNING SESSIONS**CBL# 1: Sudden Breathlessness**

A thin lean 9-year-old boy is brought to the emergency department for severe breathlessness after falling from bed while jumping on the bed. After the fall he developed sharp, stabbing chest pain that was worsening on inspiration. He was unable to complete sentences and had tightness in chest. There was no history of allergies or any other diseases.

On examination, he was lethargic and exhausted. His lips and extremities were slightly bluish in color and nasal flaring. He was tender in the left lateral side of chest. His pulse was 122 beats/minutes, BP was 95/65 mmHg, and respiratory rate was 32 breaths /min. The respiratory movements were diminished, and breath sounds were not audible on the left side of the chest.

Learning Outcomes:

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

- Discuss the given case scenario and reach a probable diagnosis.
- Enlist the passages through which air passes from the exterior to the alveoli.
- Discuss various pressures that cause the movement of air in and out of lungs.
- Discuss the significance of pleural pressure.
- Enlist the major muscles involved in respiration, state the role of each.
- Discuss lung compliance and airway resistance.
- Explain the role of surfactant on surface tension.

CBL# 2: Breathlessness after exercise

A 19-year-old boy of thin build decided to start exercise to maintain fitness. On his first day he sprinted 2 kilometers after which he got severely breathless and developed

difficulty in breathing. He was very much worried and went immediately to a nearby clinic. He was given a seat to sit down, and his vitals were recorded. His pulse was 110/min, BP 135/85mmHg and respiratory rate was 25/min.

On auscultation his chest was clear, with normal breath sounds on both sides.

His vitals were repeated after 15 minutes which came out as follows:

Pulse 98/minute, BP 130/80mmHg and respiratory rate 20/min. His peak flow measurement came out to be 500ml, which was normal.

The doctor reassured him and advised him to start with moderate exercise and then increase gradually. He advised him to go for spirometry at rest and as well as after exercise in case the symptoms appear again.

Learning Outcomes:

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

- Discuss the given case scenario.
- Differentiate the volumes and capacities of lungs
- Co-relate the changes in thoracic cage, pulmonary pressures, and compliance of lung at rest and in exercise.
- Explain the concept of work of breathing and factors affecting it.
- Discuss the effect of exercise on pulmonary & alveolar ventilation and zones of pulmonary blood flow.
- Explain the factors affecting diffusion of gases across the respiratory membrane.

CBL# 3: Weight loss and Sleeplessness

A 58-year-old chronic smoker (20 cigarettes /day for the last 30 years) came to medical OPD with complaints of shortness of breath especially when he walks or climbs stairs. He was experiencing a lot of mucus production and coughing for the last many months. The shortness of breath and cough could not let him sleep as well. He often felt fatigued and had lost 5 kg of weight in the last 4 months.

On examination his pulse was 90/minute, BP 145/90 mmHg, respiratory rate 18/min and mild wheezing on both sides of chest. There was no cyanosis.

Chest x-ray reveals hyper lucent lungs of large volume, flattened hemi diaphragms with widened costophrenic angles, horizontal ribs, and a narrow mediastinum. There were no infiltrates or mass seen.



Learning Outcomes:

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

- Discuss the case scenario.
- Discuss the normal respiratory membrane and changes which can be seen in the respiratory membrane of this patient.
- Explain the concept of ventilation-perfusion matching.
- Enlist the possible abnormalities in VA/Q' ratio in chronic long-term smokers.
- Discuss physiological shunt and physiological dead space.
- Detect the changes occurring in the residual volume of this patient.

CBL # 4: Blue lips and fainting

A woman brought her 7-year-old son to the emergency department with complaints of fainting like condition after difficulty in breathing which developed while he was playing football in the evening. The boy had a history of pollen and dust allergy for which he was advised antiallergics and inhaler for symptomatic relief. But now he was complaining of severe breathlessness and difficulty in breathing which didn't relieve after taking antiallergics. He was also complaining of tightness in the chest. Regarding family history his mother was known asthmatic, but her disease was under control and his father was a smoker. On examination the boy was afebrile, pulse was 120 beats /min, BP was 110/70mmHg and respiratory rate was 32 breaths /minute. On examination there was bilateral wheeze present which was more on exhalation. His lips and fingers were cyanosed. The nasal mucosa seemed edematous and there was mucus discharge, and he was sneezing a lot. His mother was holding an inhaler (containing a combination of beta 2-adrenergic agent and steroid). The boy was nebulized, and symptoms were relieved to a large extent.

Learning Outcomes:

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

- Discuss the case scenario.
- Explain the cause of wheezing and the reason why it is prominent during expiration.
- Enlist various obstructive and restrictive lung disease
- Differentiate between obstructive and restrictive lung disease and explain their path physiology.
- Discuss the alteration in dynamic lung volumes in obstructive and restrictive lung disorders.
- Discuss the best treatment option for asthma.

Learning Resources:

Main learning resource:

Guyton and Hall Textbook of Medical Physiology (14th Edition)

Reference Books:

- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition
- BRS Physiology, 5th edition by Linda S. Costanzo
- A textbook of Practical Physiology, 8th edition by CL Ghai
- Guyton and Hall Review, 3rd Edition

Online resources:

- Google Classroom

Library resources:

- Guyton and Hall Textbook of Medical Physiology (14th Edition)
- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition

- BRS Physiology ,5th edition by Linda S.Costanzo
- A textbook of practical physiology,8th edition by CL Ghai
- Guyton and hall review, 3rd edition

Teaching faculty:

Name	Email address
Physiology Department	physiologywmc@gmail.com

Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
CBL Case Discussion	MCQs
CBL Quiz	SEQs
Class Discussion	OSPE
Flipped Class Format	VIVA



Biochemistry

Learning Outcomes:

Apply knowledge of Biochemistry to relate various metabolic disorders presenting as common ailments in the country.

- Integrate the role of different body organs in regulation of metabolisms in health and disease.
- Estimate clinically important metabolites and enzymes in body fluids and co-relate their clinical importance in diagnosis of diseases/disorders, acid base and electrolyte imbalance.

S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
3.	Bioenergetics	LGIS/SDL/CB L	Dr. Anas Khalil	Must Know

Learning Outcomes:

- Discuss Free energy, Free energy change, standard energy change, Endergonic and exergonic reactions and ATP
- Describe
 - electron transport chain and its components, organization, reactions, energetics
 - Phosphorylation of ADP to ATP
 - Chemiosmotic hypothesis
 - Membrane transport systems
 - Inherited defects in OXPHOS Mitochondria & apoptosis
- Describe inhibitors of ETC and inhibitors/Uncouplers of oxidative phosphorylation

4.	Vitamins	LGIS/Practical / SDL/CBL	Prof Syed Tauqeer Abbas	Must Know
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Learning Outcomes:

- Justify the role of ATP and energy metabolism in health and disease
- Classify vitamins.
- Relate the knowledge of water soluble and fat soluble vitamins for understanding of its deficiency and excess manifestations

Learning Resources:

1. Reference Books:

- Lippincott's Biochemistry
 - Harper's Biochemistry
 - Hashmi's Biochemistry
2. Online resources
 3. Library resources

Practical

Learning Outcomes:

1. Diagnose heart, liver, and pancreas related diseases through the use of respective enzyme estimation.

Sr. No.	Topic	Educational Strategies	Name of instructor	Importance (Must Know Should Know Could Know)
1.	Interpret the results of given samples for Vitamins	Demonstration/ Practical	Dr. Sehrish Baber, Dr. Kinza Tallat, Dr. Ahsan Ali	Must Know
Interpret the results of: <ul style="list-style-type: none"> ● Vit C ● Vit D ● Vit A 				

CASE BASED LEARNING

CBL 1: Vitamin A Deficiency

A 4-year-old Italian child was referred to our service for foreign body sensation, dry eye, and ocular redness of two-week duration. His diet was poor in fruits and vegetables, and he suffered from multiple allergic diseases and food intolerances (i.e., eggs and lactose). His best corrected visual acuity (BCVA) was 20/20 in both eyes with normal motility and fundus. Slit-lamp examination showed the keratinization of the temporal and nasal conjunctiva with bilateral Bitot's spots; the cornea was normal. Therapy with oral vitamin A (Retinol Acetate) 150.000 IU/mL/day for 3 days, then with 50.000 IU/mL/week for two weeks, and finally with multivitamin supplementation and correct diet for two months was given, in association with topical treatment with vitamin A ointment. Vitamin A deficiency leads to a variety of ocular manifestations including cornea and conjunctival xerosis, keratinization of the conjunctiva, keratomalacia and potentially corneal perforation, retinopathy, visual loss, and nyctalopia.

Learning Outcomes:

By the end of session, student should be able to:

1. Detailed biochemical mechanisms of chemistry, biochemical functions, and consequences of deficiencies of fat-Soluble Vitamins

REFERENCE BOOKS:

1. Lippincott's Illustrated Reviews Biochemistry
2. Harper's Illustrated Biochemistry
3. Hashmi - A Complete Textbook of Medical Biochemistry
4. Chatterjee - Textbook of Medical Biochemistry

CBL 2: Water Soluble Vitamins

A 10-year-old boy presented with T-Cell acute lymphoblastic leukemia (ALL) in the interim maintenance phase of therapy. He originally presented the ALL with small, raised lesions on his scalp, which were biopsied and found to be T-cell ALL. Bone marrow confirmed the diagnosis. He was started on chemotherapy and tolerated induction relatively well. When he was in the interim maintenance phase of therapy, he presented to hospital with bilateral perifollicular petechiae to the arms, knees, and legs, which progressed into hyperpigmentation suspected to be related to a drug reaction or inflammatory process. He was otherwise well, with no other significant symptoms. Since diagnosis, the patient had consistently poor energy intake, specifically limited in vegetable and fruit consumption, and, as a result, incurred a severe weight loss of 18.5% of his usual body weight. Despite dietary education and recommendations to increase overall energy intake, and specifically dietary consumption of vegetables and fruits, the patient was unable to improve his energy intake. Dermatology service personnel were consulted and post clinical assessment, requesting a serum level of vitamin C for the patient, as they felt the rash was pathognomonic for vitamin C deficiency. The resultant blood work showed low vitamin C levels with serum concentrations of <5 micromol/L, indicative of Vitamin C deficiency. All other investigations were normal.

The patient was placed on treatment doses of oral supplemental ascorbic acid: 125 mg three times a day for 7 days, then once daily for a period of 3 months to normalize serum levels of vitamin C. Vitamin C (ascorbic acid) is a necessary nutrient for immune function, cell regeneration and growth. Dietary sources of vitamin C include fruits and vegetables, with orange juice, guava, red and yellow peppers, and papaya serving as rich sources. Clinical manifestations of vitamin C deficiency or scurvy include gingival inflammation and bleeding, perifollicular petechiae and bone pain. Learning Outcomes: At the end of the session the students should be able to: 1. Detailed biochemical mechanisms of chemistry, biochemical functions, and consequences of deficiencies of Water-Soluble Vitamins

Learning Outcomes:

By the end of session, student should be able to:

1. Detailed biochemical mechanisms of chemistry, biochemical functions, and consequences of deficiencies of Water-Soluble Vitamins

REFERENCE BOOKS:

1. Lippincott's Illustrated Reviews Biochemistry
2. Harper's Illustrated Biochemistry
3. Hashmi - A Complete Textbook of Medical Biochemistry
4. Chatterjee - Textbook of Medical Biochemistry
5. Mushtaq's Essentials of Medical Biochemistry Volume I

Online resources:

- Google classroom

Library resources:

1. Marks' Basic Medical Biochemistry - A Clinical Approach
2. Lehninger - Principles of Biochemistry
3. Baynes - Medical Biochemistry
4. Stryer - Biochemistry

Teaching faculty

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Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
CBLs, SGDs, Quizzes, Vivas	Class Tests End of Block Exams

Surgery

Learning Outcomes

- Recognize basic features of acute and chronic limb ischemia and describe the principle of management
- Describe the clinical features of varicose veins and DVT and enlist the management
- Recognize the common injuries of lower limbs and describe the principles of their management.

S.#	Topic	Educational Strategies	Instructor	Importance
1.	Chronic limb ischemia	LGIS/ PBL	Dr. Saqib	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe clinical presentations of chronic limb ischemia ● Recognize basic features of chronic limb ischemia 				
2.	Acute limb ischemia	LGIS and PBL	Dr. Azhar	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe clinical presentations of acute limb ischemia ● Recognize basic features of acute and chronic limb ischemia ● Describe the principles of emergency management of acute limb ischemia 				
3.	Varicose veins	LGIS	Dr. Naeem Ashraf	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe the various clinical presentation of varicose veins ● Enlist underlying etiology of varicose veins ● Enlist basic principles of management of varicose veins 				
4.	Deep venous thrombosis	PBL and LGIS	Dr. Naeem Akhtar	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Enlist the causes of deep venous thrombosis ● Describe the principles of management 				
5.	Fractures/dislocations of lower limb	LGIS	Dr. M. Ikram	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Identify various causes of fractures, dislocations and sprains ● Enlist different types of fractures, dislocations in lower limb ● Identify effects of fractures, dislocations and sprains in lower limb ● List complications of fractures, dislocations in general 				
6.	Neurological injuries of lower limb	PBL(LGIS)	Dr. Sohail	Should Know
Learning Outcomes: <ul style="list-style-type: none"> ● Correlate different fractures of lower limb with nerve injuries ● Identify common nerve injuries of lower limb 				

- Identify common sites of dislocations/ sprains in lower limb State first-aid principles of fracture / dislocations management

7.	Vascular injuries of lower limb	LGIS/ PBL	Dr. Sadia	Should Know
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Learning Outcomes:

- Describe the common vascular injuries of lower limb
- Enlist the principles of management of vascular trauma of lower limb

Teaching faculty:

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Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
PBL	MCQs

Radiology

Learning Outcomes

- To have basic knowledge about radiation protection and radiation hazards
- Enumerate commonly used imaging techniques used in clinical practice to diagnose fractures and dislocations
- Identify different bones of lower limb on AP and Lateral views on x-rays
- Identify appearance of bone, cartilage. Air, fluid, and fat on x-rays
- Identify fractures, dislocations and sprains in lower limb injuries and correlate with likely important nerve & vessels damage

S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
1.	• How to read x-ray of lower limb	LGIS	Dr. Rubia	Should Know
Learning Outcomes:				
<ul style="list-style-type: none"> • Identify major structures of lower limb in standard lower limb x-rays • Explain the basic principles of different densities on x-rays 				
2.	• Imaging modalities for evaluation of musculoskeletal system	LGIS	Dr. Rubia	Should Know
Learning Outcomes:				
<ul style="list-style-type: none"> • Basic knowledge about imaging modalities of choice related to pathologies of lower limb 				
3.	• Radiological findings in lower limb fractures	LGIS	Dr. Rubia	Should Know
Learning Outcomes:				
<ul style="list-style-type: none"> • How to identify fractures of lower limb on x-rays 				

Learning Resources:

1. Reference Books

- Clinical Anatomy by Regions, Richard S Snell

2. Online resources

- Radiopedia, Radioassistant

3. Library resources

- Textbook of Radiology and Imaging by David Sutton

Teaching faculty

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Assessment formats

Assessment Strategies (Formative)	Assessment Strategies (Summative)
Class discussions	MCQs

Medicine

Learning Outcomes:

- Correlate the relevant basic knowledge with clinical presentation of lung diseases (SLO 1) (PLO 1,6,7)
- Diagnose various lung diseases on basis of clinical features. (SLO 1) (PLO 1,6,7)
- Correlate the relevant basic knowledge with clinical presentation of pleural effusion.
- History taking in a patient with respiratory illness. (SLO 1, 3) (PLO 1, 2, 6, 7)
- Discuss basic management and preventive strategies for lung disease. (SLO 1, 2, 4) (PLO 1, 2, 5, 6, 7)
- Counseling of a patient with lung disease. (SLO 4, 5) (PLO 3, 5, 7)
- To learn the procedure of Examination of Respiratory System. (SLO 3) (PLO 6)

S.No	Topic	Educational Strategies	Name of instructor	Importance Must Know Should Know Could Know
1.	Common Respiratory Symptoms	Flipped Class (Role Play)	Dr. Sadia Babu	Must Know
Learning Outcomes: <ul style="list-style-type: none"> ● History taking in a patient with respiratory illness. ● To understand symptomatology of respiratory disease. 				
2.	Bronchial Asthma	Flipped Class	Dr. Farhat Ul Ain	Must Know
Learning Outcomes: <ul style="list-style-type: none"> ● Counseling of a patient with bronchial asthma. Define and classify Bronchial Asthma according to its severity. ● Describe the clinical presentation of Bronchial Asthma. ● Enumerate possible investigations for Bronchial Asthma. ● Discuss basic management and preventive strategies for Bronchial Asthma. 				
3.	COPD	Flipped Class	Dr. Wajahat S. Baig	Must Know
Learning Objectives: <ul style="list-style-type: none"> ● Describe various varieties of COPD. ● Differentiate clinical features of COPD. ● Describe pathophysiology of COPD. ● Suggest outline of treatment and prevention based on the pathophysiology 				
4.	Restrictive Lung Disease	Flipped Class	Dr. Sadia Fatima	Must Know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe various varieties of Restrictive Lung Disease 				

				<ul style="list-style-type: none"> ● Differentiate clinical features of Restrictive Lung Disease ● Describe pathophysiology of Restrictive Lung Disease ● Suggest outline of treatment based on the pathophysiology
5.	Interpretation of Chest Xray	Flipped Class	Dr. Ayesha Rani	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To identify the anatomy of normal structures in chest X Ray. ● To describe some common abnormalities of chest X Ray. 				
6.	Interpretation and procedure of ABGs	Skill Lab	Dr. Pulmo PG	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To learn the procedure of ABGs. ● To describe some common abnormalities of ABGs. 				
7.	Disease associated with high altitude	Flipped Class	Dr. Ayesha Rani	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To learn the clinical presentation of diseases associated with high altitude to correlate the clinical knowledge with basic physiology. 				
8.	Examination of Respiratory System	Flipped Class	Dr. Pulmo P	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To learn the procedure of Examination of Respiratory System. ● To auscultate normal and abnormal. Breath sounds on mannican. ● To describe some common abnormalities of chest X Ray. 				
9..	Interpretation and procedure of Spirometry	Skill Lab	Dr. Pulmo PG	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To learn the procedure of Spirometry. ● To describe some common abnormalities of Spirometry. 				
0.	Observation of procedure of bronchoscopy	Demonstration	Dr. Pulmo PG	Must Know
Learning Outcomes:				
<ul style="list-style-type: none"> ● To observe the procedure of bronchoscopy. 				

Reference Book:

Davidson's Principles and Practice of Medicine 23 Edition.

Teaching faculty :

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Integrated Sessions

Sr#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
1.	Vascular trauma	LGIS	Dr Bushra Dr Sadia	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe the common vascular injuries of lower limb ● Enlist the principles of management of vascular trauma of lower limb and sprains in lower limb 				
2.	Varicose veins	LGIS	Dr Ayesha Yasir Dr Sadia	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Explain different types of aneurysm and their complications ● Describe the various clinical presentation of varicose veins ● Explain underlying etiology of varicose veins 				
3.	Neurological injuries of lower limb	LGIS	Dr Sohail Dr Ayesha Yasir	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Correlate different fractures of lower limb with nerve injuries ● Identify common nerve injuries of lower limb 				
4.	Radiological Anatomy of lower limb	LGIS	Dr Sana Dr Rubia	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Enumerate the commonly used imaging techniques used in clinical practice to diagnose fractures, dislocations & sprains in lower limb ● Explain the basic principles of different densities on X-rays ● Identify appearance of bone, cartilage, air, fluid and fat on x-rays ● Identify different bones of lower limb on AP and Lateral view of X-rays 				

7. Structured Summary of Y1BIII-MVII- MUSCULOSKELETAL SYSTEM II

Block Code	Y1BIII-MVII
Prerequisite Block	Y1BII
Duration	05 Weeks
Anatomy	Embryology: Development of skeletal system, development of muscles, birth defects Gross Anatomy: Lower Limb
Physiology	Exercise Physiology, Acclimatization at high altitude, AMS/HAPE/HACE, Deep sea physiology ,Space Physiology
Biochemistry	Chemistry of Proteins, Metabolism of Proteins
Behavioral Science	Medical Sociology, Neurological basis of Behavior, Communication, Counseling, personality theories
Research Methodology	Literature Search, Operational Definition & Hypothesis

8. Course content

Anatomy

Program Learning Outcomes (PLOs):

1. Independently Manage common, non-critical clinical problems (SLO 1,2, 3,4)
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures (SLO 1,2,3,4)
3. Exhibit the attributes of an ethical professional (SLO2)
4. Conduct research which brings relevance to health care practices (SLO5)
5. Act as an efficient community health promoter (SLO 1,2,4)
6. Exhibit scientific knowledge in all professional activities (SLO1,2,3,4)
7. Demonstrate clear and efficient written & verbal communication skills (SLO2)
8. Exhibit the habit of a lifelong learner (SLO 1,2,3,4,5)

Subject Learning Outcomes (SLOs):

1. Interpret the anatomical basis of common clinical problems related with limbs, thorax, abdomen, pelvis, brain, head & neck by correlating the normal structure of human body with its functions (PLO 1,2,3,6,7,8)
2. Demonstrate professionalism, effective communication skills, ethics and leadership while participating in all learning activities including dissection, Surface marking, CBLs and practicals (PLO 5,6,7,8)
3. Relate the histomorphological features of cell, basic tissues, & systems of human body with their functions and biochemical features (PLO 1,6,8)
4. Explain the embryological basis of common congenital anomalies related with human development (PLO 1,3,6,8)
5. Identify the basic features of a research article (PLO 4,5)

Block Learning Outcomes (BLOs):

1. Apply the knowledge of Gross Anatomy of lower limb in interpreting the anatomical basis of relevant common clinical conditions in the given scenarios/ published literature (SLO1,5; PLO 1,2,3,4,5,6,7,8)
2. Demonstrate professionalism, effective communication skills, ethics and leadership while participating in all learning activities including dissection of lower limb, Surface marking of neurovasculature of lower limb, CBLs and Practicals (SLO2, PLO 5,6,7,8)

Musculoskeletal System II

1.	Development of skeletal system (BLO 2)	LGIS	Dr Fozia Siraj	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe the development of the axial (other than skull) and appendicular skeleton ● Correlate the development of vertebral column, ribs and sternum with their related congenital anomalies 				
2.	Development of limbs (BLO 2)	LGIS	Dr Uzma Shahid	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Describe the events in the development of limbs ● Identify teratogens causing limb defects ● Correlate the development of limbs with the related congenital anomalies 				
3.	Development of muscles (BLO 2)	LGIS	Dr Uzma Shahid	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Explain the development of skeletal, cardiac and smooth muscles ● Describe the patterning of muscles ● Recognize the embryological basis of various types of congenital anomalies related with muscle development. 				
4.	Birth Defects (BLO 2)	LGIS/SDL	Dr Nomana Mahmood	Must know
Learning Outcomes: <ul style="list-style-type: none"> ● Identify the congenital malformations associated with various common teratogens like: <ol style="list-style-type: none"> 1. Infectious agents (Rubella virus, cytomegalovirus, herpes simplex virus, varicella virus) 2. Physical agents (X-Rays, hyperthermia) 3. Chemical agents (Thalidomide, phenytoin, opioids, warfarin, ACE inhibitors, Alcohol, Vitamin A) 4. Hormones (Androgenic Agents, DES, Maternal diabetes, Maternal obesity) 				
5.	Hip bone, Femur, Tibia, Fibula and Patella (BLO 3)	SGD	Dr Bushra Dr Ayesha Dr Sana Dr Urwa	Must know
Learning Outcomes <ul style="list-style-type: none"> ● Demonstrate the anatomical position of hip bone, femur, tibia, fibula & patella. ● Determine the side of all bones. ● Identify important bony landmarks and attachments of Hip bone, Femur, Tibia and Fibula on gross inspection and radiographs. ● Appraise the importance of blood supply of head of femur in relation to age related complications of fractures of femoral neck. 				
6.	Hip joint (BLO 3)	SGD	Dr Bushra Dr Ayesha	Must know

			Dr Urwa	
Learning Outcomes				
<ul style="list-style-type: none"> Describe the articular surfaces, type, capsule, ligaments, synovial membrane, nerve supply, blood supply and important relations of hip joint Analyze movements of hip joint (muscles responsible for these movements, axes of movements, limiting factors) 				
7.	Fascia of lower limb (BLO 3)	SGD	Dr Bushra Dr Ayesha Dr Sana	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Correlate the attachments and modifications of superficial & deep fascia of lower limb with their clinical significance Trace the lining of fascia Lata on the skeleton highlighting muscles enclosed and saphenous opening. Describe the formation, extent & importance of iliotibial tract. 				
8.	Gluteal region (BLO 3)	SGD	Dr Bushra Dr Ayesha Dr Urwa	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Demonstrate the major functions of muscles of gluteal region. Identify muscles & neurovasculature of gluteal region on the model/prosected specimen. Describe formation of greater and lesser sciatic foramina and enumerate structures passing through them. Enumerate the nerves entering the gluteal region and comprehend the origin, important relations & muscles innervated by each. Recognize the effects of injury to superior, inferior gluteal and sciatic nerves with emphasis on various gaits. Enumerate structures deep to Gluteus maximus. Locate appropriate site of intragluteal injection with anatomical reasoning 				
9.	Compartments of Thigh (BLO 3)	SGD/SDL	Dr Bushra Dr Ayesha Dr Sana	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Explain the contents of anterior fascial compartment of thigh (muscles, neurovascular bundle, lymph nodes) Describe the extent, boundaries, & contents of adductor canal. Distinguish different swellings in front of thigh (inflamed lymph nodes, femoral hernia, inguinal hernia) Appraise the precautionary measures in development of femoral hernia. Describe the functions of muscles of thigh to understand the displacement of fragments of fractured femoral neck Recognize the topography and contents of femoral triangle in a sequential order Describe division of femoral sheath into different compartments while naming their contents 				

- Relate anatomical knowledge of femoral canal and femoral ring with femoral hernia.
- Justify anatomical basis of presence of femoral nerve outside the femoral sheath.
- Describe the area of drainage of different groups of inguinal lymph nodes.
- Explain the contents of medial fascial compartment of thigh (muscles, neurovascular bundle, lymph nodes)
- Explain the contents of posterior fascial compartment of thigh (muscles, neurovascular bundle, vascular anastomoses, lymph nodes)
- Correlate the signs and symptoms of sensory and motor loss with the level of injury of Femoral, Sciatic and Obturator nerves.
- Identify the attachments of muscles of anterior, medial and posterior compartment of thigh on skeleton, cadaver and models.
- Identify the muscles and neurovascular structures of thigh on prosected specimens

10.	Popliteal fossa (BLO 3)	LGIS	Dr Bushra	Must know
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Learning Outcomes

- List the structures forming various boundaries of popliteal fossa.
- Identify the contents of popliteal fossa in a sequential order in upper, middle and lower parts of fossa
- Draw & label genicular anastomosis and discuss its clinical significance.

11.	Knee Joint (BLO 3)	SGD	Dr Bushra Dr Ayesha Dr Urwa	Must know
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Learning Outcomes

- Describe the type, articular surfaces, capsule, ligaments (intra- & extra- articular), synovial membrane, nerve supply, blood supply, important relations of knee joint.
- Demonstrate various movements of knee joint (axes, limiting factors and muscles involved).
- Analyze mechanism of locking and unlocking of knee joint while foot is off or on the ground.
- Correlate various types of bursae (communicating and non-communicating bursae) to their clinical significance.
- Identify the role of Vastus medialis in stability of patella.
- Analyze various meniscal injuries
- Explain the structure and mechanism of knee joint movements
- Illustrate the tibial plateau

12.	Compartments of Leg (BLO 3)	SGD/SDL	Dr Bushra Dr Ayesha Dr Sana	Must know
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Learning Outcomes

- Explain the contents of three fascial compartments of leg (muscles, neurovascular bundle, lymph nodes)
- Justify the role of soleus as peripheral heart with anatomical reasoning
- Justify various clinical presentations in injury to lateral side of knee joint (e.g. fracture of neck of fibula)

				<ul style="list-style-type: none"> Identify the muscles and neurovascular structures of leg on given prosected specimens.
13.	Tibiofibular joints (BLO 3)	SDL	Dr Bushra Dr Ayesha Dr Sana	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Describe the articulation, line of capsular attachment, & synovial membrane of proximal and distal tibiofibular joints, with the help of given bones 				
14.	Ankle joint (BLO 3)	SGD	Dr Bushra Dr Ayesha Dr Sana	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Describe the articular surfaces, type, capsule, ligaments, synovial membrane, nerve supply and blood supply of ankle joint Elucidate the various movements of the joint (axes, limiting factors and muscles involved). Explain important relations of the ankle joint with emphasis on structures related to various retinacula. Justify the sensory /motor loss associated with Tibial Nerve Entrapment in Tarsal Tunnel Syndrome. Describe the anatomical basis of ankle sprain. Identify the arrangement of tendons, arteries, and nerves in the region of ankle joint (in relation to retinacula of ankle) in the given model/ prosected specimen. 				
15.	Articulated Foot Dorsum and sole of foot (BLO 3)	SGD/SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Recognize important bony landmarks, muscular & ligamentous attachments on calcaneus & talus Describe the inversion and eversion of foot with reference to joints, axes and muscles involved. Describe the formation of arches of foot and factors responsible for their stability. Justify the clinical importance of arches of foot (flat foot) Identify the bones in an articulated foot and on radiographs Demonstrate anatomical position and determine the side of calcaneus and talus. Explain the topographic anatomy of dorsum of foot. Explain various layers of sole of foot in a sequence and identify the structures in each layer in the prosected specimen /models. Correlate the clinical presentation of plantar fasciitis to anatomical knowledge of plantar aponeurosis. Recognize the arteries and nerves of sole of foot in given models and prosected specimens. 				
16.	Innervation of lower limb (BLO 3)	LGIS	Dr Bushra Dr Ayesha Dr Sana	Must know

Learning Outcomes

- Describe the cutaneous nerves of lower limb.
- Correlate the knowledge of dermatomes of lower limb to sensory loss.
- Illustrate the cutaneous nerves/dermatomes of lower limb
- Justify the sensory loss in various nerve injuries in lower limb with focus on cutaneous innervation.
- Outline the location and formation of lumbar and sacral plexus.
- List branches of plexi innervating lower limb
- Illustrate lumbar & sacral plexus.

17.	Arterial supply of lower limb (BLO 3)	SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
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Learning Outcomes

- Describe the origin, relations, and main branches of arteries (Femoral, Gluteal and Obturator) with their area of distribution.
- List the vessels participating in Trochanteric and Cruciate anastomosis with clinical significance of these anastomoses
- Palpate the pulse points of the femoral, popliteal and dorsalis pedis artery.

18.	Venous drainage of lower limb (BLO 3)	SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
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Learning Outcomes

- Describe the venous drainage of lower limb (superficial and deep veins)
- Describe the formation, course, tributaries and termination of Great and Small Saphenous veins.
- Analyze a case of varicose veins with emphasis on predisposing factors, causes, clinical presentations, role of valves and perforators
- Appraise the importance of great saphenous vein in CABG.
- Explain the clinical significance of saphenous cutdown.
- Mark great and small saphenous vein on given subject exhibiting effective communication, professionalism and ethics

19.	Lymphatic drainage of lower limb (BLO 3)	SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
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Learning Outcomes

- Apply the knowledge of lymphatic drainage of lower limb to locate the site of infection or malignancy

20.	Surface marking (BLO 3,4)	SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
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Learning Outcomes

- Mark the nerves and vessels of lower limb on the surface of given subject with the help of important bony landmarks exhibiting effective communication skills, professionalism & ethics.

21.	Museum models and prosected specimen (BLO 3,4)	SGD/SDL	Dr Bushra Dr Ayesha Dr Urwa	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Identify muscles & neurovascular structures of lower limb on the given models & prosected specimens. 				
22.	Practicals (BLO 3,4)	SGD	Dr Bushra Dr Ayesha Dr Sana	Must know
Learning Outcomes				
<ul style="list-style-type: none"> Identify the slides of different components of respiratory system under the light microscope at different magnifications and recognize their points of identification Illustrate the histological structure of lung and trachea with the help of Eosin and Hematoxylin pencils and enlist at least two identification points for each. 				

CBLs (ANATOMY)

CBL-I: Case of Sciatica

After slipping in the bathroom, a 55 years old obese computer-operator was brought to the outpatient department with excruciating pain in lower back that radiated to her right buttock and then down to her back of right leg. Eighteen months previously, following a course of antibiotics by intramuscular injection into her right buttock after a major abdominal operation, she had experienced numbness and tingling sensations down the anterior and lateral sides of the right leg and dorsum of the foot. The signs and symptoms suggested it “a case of sciatica”.

Intended Learning Outcome:

Interpret and analyze the common relevant clinical conditions of the Sciatic nerve on the basis of anatomical knowledge.

Learning Objectives:

By the end of this session, students should be able to:

- Justify the symptoms and signs in the given case on gross anatomical basis.
- Define the term sciatica and its causes.
- Demonstrate the effects of injury to superior gluteal, inferior gluteal and sciatic nerves
- Mark the sciatic nerve on the given subject exhibiting effective communication, professionalism and ethics

Learning Resources:

- Clinical Anatomy by regions, Richard S. Snell
- Moore Clinically Oriented Anatomy, Keith L. Moore
- Gray’s Anatomy for students
- Reading material (In G Classroom & library)

CBL-2: Case of Non-union of Fracture and Subsequent AVN of Neck of Femur

A 19-year -old female patient was admitted to the Trauma and Orthopedic ward following a simple fall from standing height at home. X-rays on admission revealed a displaced left

neck of femur fracture. The patient had complained of left hip pain for 6 weeks prior to the injury and was a keen amateur long-distance runner, suggesting that this fracture was the completion of a pre-existing stress fracture. She was otherwise completely fit and well. Three hours after her admission, the patient was operated on. Post-operatively serum blood tests revealed deficiency in 25-hydroxycholecalciferol (Vitamin-D) levels. Other parameters were all within normal limits and the patient was prescribed a Vitamin-D supplement on discharge 3-days post-operatively. The patient was able to fully-weight bear at 12-weeks post-op. At 6-months the patient had some residual hip pain and a CT-scan revealed no evidence of bony union. Examination also revealed internal rotation and flexion of the hip limited by pain. Further imaging in the form of an MRI scan revealed no further evidence of bony union and also an avascular necrosis (AVN) of the femoral head. The patient underwent further surgery and after that there was no evidence of avascular necrosis of the femoral head.

Intended Learning Outcome:

Interpret and analyze the common relevant clinical conditions associated with joints of lower limb on the basis of knowledge of Gross Anatomy.

Learning Objectives:

By the end of this session, students should be able to:

- Demonstrate the articulation, line of capsule attachment, synovial membrane & ligaments of hip joint.
- Describe the type, nerve supply, blood supply and important relations of hip joint.
- Demonstrate the movements of hip joint in an articulated skeleton with special reference to their axes.
- Explain the congenital & traumatic dislocation of hip joint.
- Explain the referred pain of hip joint with anatomical reasoning.
- Determine the cause of avascular necrosis of the neck of femur.
- Demonstrate the positive Trendelenburg's sign, explaining the factors responsible for stability of hip joint

Learning Resources:

- Clinical Anatomy by regions, Richard S. Snell
- Moore Clinically Oriented Anatomy, Keith L. Moore
- A Case of Femoral Neck Fracture in a 19-year-old with Subsequent Non-Union and Avascular Necrosis Gray's Anatomy for students, Francis Sim, Peter V. Giannoudis and Nikolaos K. Kanakaris. Annals of Trauma & Acute Care, Case Report, Published: 10 Aug 2017 (library)
- Reading material (In G Classroom & library)

CBL-3 A case of Congenital Rubella Syndrome

A mother, in her late 20s, reported having a rash around the time of her first missed menstrual period. At the time, she did not know that she was likely a few weeks pregnant. The mother's generalized, erythematous, maculopapular rash lasted 2–3 days. She also reported swollen eyes. She reported having received all of her childhood vaccinations but rubella-containing vaccine had not been part of the routine vaccination schedule. She had no prenatal care.

Her baby was born at 36 weeks' gestation, weighing 4.2 lbs (1,910 g) and was noted at birth to have congenital heart defects, hyperpigmented skin lesions, cataracts, cerebral edema, and pericardial effusion. Hearing impairment was suspected after the infant failed a hearing screening test before hospital discharge, and bilateral profound hearing impairment was diagnosed by an audiologist a few months later. Surgical procedures for correction of congenital heart defects and cataracts were performed the infant was admitted to the pediatric intensive-care unit for observation and was later discharged.

Learning Objectives:

- Explain the embryological basis of the birth defects acquired by the fetus in this case.
- Define terms that explain clinically significant types of birth defects
- Elucidate the principles of teratogenesis and determine factors that influence the action of a teratogen?
- Interpret birth defects caused by drugs, environmental chemicals, and infectious agents?
- Attribute specific birth defects to specific drugs?
- Name some commonly prescribe drugs that are save to use during early pregnancy.

Learning Resources

- Langman's medical embryology
- The developing human, Keith L. Moore
- Reading material (In G Classroom & library)

Learning Resources:

1. Reference Books

- a. Clinical Anatomy by Regions, Richard S.Snell
- b. General Anatomy by Laiq Hussain Siddiqui
- c. Medical Embryology by Langman
- d. Medical Histology by Laiq Hussain Siddiqui, Text & Atlas
- e. Clinically oriented Anatomy by Keith L Moore
- f. The developing human by Keith L Moore
- g. Basic Histology Text and Atlas by Junquiera
- h. Gray`s Anatomy for students
- i. Human Embryology by Laiq Hussain Siddiqui
- j. Netter s Atlas
- k. Histology Manual

2. Online resources

- a. Online lectures,
- b. Videos &
- c. Reading Material (provided by respective instructors)

3. Library resources

d. Text & Reference Books

4. Teaching faculty:

Name	Email address
Prof Dr Zubia Athar	zubiaathar@hotmail.com
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Dr Nomana Mahmood	mahmoodnomana@gmail.com
Dr Ayesha Yasser	ayesha.yasser.a30@gmail.com
Dr Sana Sohail	sanasohailansari@gmail.com
Dr Bushra Mohsin	bushramohsinbukhari@gmail.com

5. Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
<ul style="list-style-type: none">● Assignments● Presentations● Low Stake Quizzes● Discussions in flipped classroom, SGD, SDL & CBL● Reflective writing	<ul style="list-style-type: none">● Block Tests● (MCQs, SEQs, Viva voce)● OSPE/ Observed spotting on models & prosected specimens during viva voce● CBL● Logbook

Physiology

Program Learning Outcomes

1. Independently Manage common, non-critical clinical problems (SLOs 1,2,3,5).
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures. (SLOs 1,2,3,4).
3. Exhibit the attributes of an ethical professional (SLO 5)
4. Conduct research which brings relevance to health care practices (SLO 6)
5. Act as an efficient community health promoter. (SLO3)
6. Exhibit scientific knowledge in all professional activities. (SLOs 1,2,3,6)
7. Demonstrate clear and efficient written & verbal communication skills. (SLO 5)
8. Exhibit the habit of a lifelong learner. (SLOs 1,2,3,4,5,6)

Subject Learning Outcomes

1. Identify the various processes involved in the normal functioning of the body (PLOs 1,2,6,8)
2. Relate the interconnections of various organ systems in maintenance of homeostasis/ normal functioning of the body(PLOs 1,2,6,8).
3. Appraise the pathophysiological features of common clinical disorders(PLOs 1,2,5,6,8).
4. Operate commonly used instruments practiced in clinical & laboratory procedures (PLOs 2,8).
5. Demonstrate effective presentation, communication skills, group dynamics, team building, ethics, professionalism, leadership and role modeling while participating in the group activities/ practicals / CBLs (PLOs 3,7).
6. Enlist the basic features of a research article (PLOs 6,8).

Module Learning Outcomes:

1. Appraise the respiratory and cardiovascular adjustments in body during exercise. (PLO1,3,6,7,8) & (SLO 1,2,5).
Recognize the physiological adjustments in unique environments (PLO1,3,6,7,8) & (SLO 1,2,3,5).

High Altitude and Deep-Sea Physiology				
S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
1.	Exercise Physiology	LGIS/Lectures/SGD/CBL	Dr. Hina Umair	Must know
Learning Outcomes (BLO 3):				
<ul style="list-style-type: none"> Correlate the various muscle metabolic systems used as energy substrates with the type of exercise i.e., aerobic, and anaerobic. Relate the effects of types of exercise, muscle fatigue and VO₂ max on exercise performance. Explain the significance of oxygen debt. Describe the effects of training on the heart and coronary circulation and how these changes contribute to an increase in VO₂max. 				
1.	Acclimatization at high altitude	LGIS/Lectures/SGD/CBL	Dr. Sumaira Iqbal	Must know
Learning Outcomes (BLO 4):				
<ul style="list-style-type: none"> Analyze the mechanism of acclimatization of the body to low O₂. Identify and explain the causes of natural acclimatization in natives of high altitude. Study the principles of acclimatization. 				
3.	AMS/HAPE/HACE	LGIS/Lectures/SGD/CBL	Dr. Sumaira Iqbal	Must know
Learning Outcomes (BLO 4):				
<ul style="list-style-type: none"> Explain causes, path physiology & clinical features of AMS/HAPE/HACE. State prevention and treatment of AMS/HAPE/HACE. 				
4.	Deep sea physiology	LGIS/Lectures/SGD/CBL	Dr. Sumaira Iqbal	Must know
Learning Outcomes (BLO 3):				
<ul style="list-style-type: none"> Analyze changes in physiology under deep sea. Describe the path physiology, clinical features, prevention and treatment modalities of Decompression sickness, Nitrogen Narcosis, Oxygen and carbon dioxide toxicity. Identify uses of hyperbaric oxygen therapy 				
5.	• Space Physiology	LGIS/Lectures/SGD/CBL	Dr. Sumaira Iqbal	Must know
Learning Outcomes (BLO 4):				

Explain the effects of G forces and microgravity on the body.

PRACTICAL

Sr. #	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
1.	Record the forced expiratory Volume by using Student's Spirogram.	Practical	Dr. Atayyab	Must know
Learning Outcomes (BLO 1,2): <ul style="list-style-type: none"> ● Record FEV1/FVC in a given subject. ● Record timed vital capacity and its significance in diagnosis of respiratory diseases. 				
2.	Measure Peak Expiratory Flow Rate (PEFR) and report the reading	Practical	Dr. Khalid	Must Know
Learning Outcomes (BLO 1,2): <ul style="list-style-type: none"> ● Record PEFR in a given subject. ● Describe the significance of PEFR in diagnosis and prognosis of respiratory diseases. 				
3.	Perform Cardiopulmonary resuscitation on a dummy according to the American Heart Association Guideline.	Practical	Dr. Atayyab and Dr.Khalid	Must Know
Learning Outcomes (BLO 1,2 & 4): <ul style="list-style-type: none"> ● Perform Cardiopulmonary resuscitation according to AHA guideline 				

CASE BASED LEARNING SESSIONS

CBL # 1: Dizziness and fatigue

A 25-year-old enthusiastic healthy young man went to Kohsar Gang, Pakistan (height 20,997 ft) in spring. He along with a few friends and other team members reached base camp and stayed for a day. On day 2 of their trip, they started to ascend the mountain from the base camp. After 2 hours, he started feeling dizzy. He complained of severe fatigue and headache. After a few hours he started coughing and developed severe dyspnea and confusion. Their guide, who was a local resident, suggested that they return to the base camp, immediately. After their return to base camp, he was provided 100% O₂. His symptoms subsided within a few hours.

Learning Outcomes:

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

- Discuss the given case scenario.
- Discuss the effects of hypoxia on the subject's body.
- Discuss the mechanism of acclimatization for high altitude by the body.

- Compare and contrast the features of acute and chronic mountain sickness.
- Explain the effect of high altitude on the work capacity of natives when compared to people living at sea level.
- Distinguish the effect of breathing 100% O₂ on arterial partial pressure of oxygen and breathing rate.

CBL # 2: Vomiting and joints pain

A team of scuba divers were assigned a task from national TV to make some videos of deep-sea marine life. One of the scuba divers went to make a video at the depth of about 300 feet. After making a few videos for about an hour he returned to the surface in 30 minutes. After he reached the surface, he started sweating and feeling nauseated, dizzy, and fatigued. He was also complaining of severe pain in joints and head. He immediately consulted his team members who took him to the nearest medical center. On examination his heart rate was 100 beats/min, BP 120/70mmHg and Respiratory rate was 30 breaths /min. He seemed to be irritable, and his skin was pale. He was immediately put into a large compression tank and his symptoms started improving.

Learning Outcomes:

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

- Discuss the case scenario.
- Explain the changes in the arterial partial pressure of oxygen and nitrogen in the deep sea.
- Discuss the pathophysiology of decompression sickness.
- Discuss the mechanism of tank Decompression and Treatment of Decompression Sickness.
- Describe self-contained underwater breathing apparatus (scuba) diving.
- Identify the uses of hyperbaric oxygen therapy.
- Describe the method by which this condition can be prevented.

Learning Resources:

Main learning resource:

Guyton and Hall Textbook of Medical Physiology (14th Edition)

Reference Books:

- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition
- BRS Physiology, 5th edition by Linda S. Costanzo
- A textbook of Practical Physiology, 8th edition by CL Ghai
- Guyton and Hall Review, 3rd Edition

Online resources:

- Google Classroom

Library resources:

- Guyton and Hall Textbook of Medical Physiology (14th Edition)
- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition
- BRS Physiology ,5th edition by Linda S.Costanzo
- A textbook of practical physiology,8th edition by CL Ghai
- Guyton and hall review, 3rd edition

Teaching faculty:

Name	Email address
Physiology Department	physiologywmc@gmail.com

Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
CBL Case Discussion	MCQs
CBL Quiz	SEQs
Class Discussion	OSPE
Flipped Class Format	VIVA

Biochemistry

Learning Outcomes:

Apply knowledge of Biochemistry to relate various metabolic disorders presenting as common ailments in the country.

- Integrate the role of different body organs in regulation of metabolisms in health and disease.
- Estimate clinically important metabolites and enzymes in body fluids and co-relate their clinical importance in diagnosis of diseases/disorders, acid base and electrolyte imbalance.

S.#	Topic	Educational Strategies	Instructor	Importance (Must Know Should Know Could Know)
23	Chemistry of Proteins	LGIS/Practical/SDL/CBL	Dr. Rabbiah Manzoor Malik	Must Know

Learning Outcomes:

- Describe Proteins, Dipeptides, Tripeptides and polypeptides with examples
- Structural organization of proteins and their Biochemical importance
- Classify proteins (physicochemical, functional, structural, nutritional etc)
- Define amino acids. Draw their structure and explain their various properties & functions
- Classify amino acids and give their nutritional significance
- Describe Fibrous and globular proteins
- Describe the dissociation & titration curve and importance of amino acids regarding pH maintenance in human body
- Explain various mechanisms of separation of proteins e.g. salting out, Electrophoresis, Chromatography and Centrifugation etc.
- Explain Folding & Misfolding of proteins along with associated diseases

24	Metabolism of Proteins	LGIS/Practical/SDL/CBL	Dr. Rabbiah Manzoor Malik	Must Know
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Learning Outcomes:

- Describe Amino acid pool, protein turnover and nitrogen balance
- Outline the mechanism of Nitrogen excretion from the human body
- Define and exemplify various mechanisms of transamination, deamination, decarboxylation, deamidation, mechanism of Amino acid oxidation

- Describe the transport of amino group, role of Pyridoxal phosphate, Glutamate, Glutamine, Alanine
- Draw Urea cycle and discuss its regulation in detail
- Describe Genetic defects of Urea cycle
- Explain in detail the concept of Ammonia intoxication
- Explain Carbon skeleton metabolism and its importance
- Describe various metabolic fates of an amino acid

Learning Resources:

1. Reference Books:
 - Lippincott’s Biochemistry
 - Harper’s Biochemistry
 - Hashmi’s Biochemistry
2. Online resources
3. Library resources

Practical

Learning Outcomes:

2. Diagnose heart, liver, and pancreas related diseases through the use of respective enzyme estimation.

Sr. No.	Topic	Educational Strategies	Name of instructor	Importance (Must Know Should Know Could Know)
2.	Qualitative analysis of Proteins	Demonstration/ Practical	Dr. Sehrish Baber, Dr. Kinza Tallat, Dr. Ahsan Ali	Must Know
3.	Chemical examination of urine	Demonstration/ Practical	Dr. Sehrish Baber, Dr. Kinza Tallat, Dr. Ahsan Ali	Must Know
4.	Estimation and interpretation of given sample	Demonstration/ Practical	Dr. Sehrish Baber, Dr. Kinza Tallat, Dr. Ahsan Ali	Must Know
5.	Separation techniques	Demonstration/ Practical	Dr. Sehrish Baber, Dr. Kinza Tallat, Dr. Ahsan Ali	Must Know

Learning Outcomes:

- Interpret the results for following tests for detection of Amino Acids and Proteins in provided samples:

1. Biuret Test
2. Ninhydrin Test
3. Millon's Test
4. Xanthoproteic Test
5. Aldehyde Test
6. Sulphur Test
7. Sulfosalicylic acid test
8. Heat coagulation test

- Estimate and clinically interpret Levels of Serum Urea and Serum Creatinine
- Perform and interpret Paper Chromatography

CASE BASED LEARNING

CBL 1: Hyperammonemia & Urea Cycle

A male in his late teens, lean and non-diabetic, was brought to the Emergency Department by his parents. Over the last several hours, he displayed increasing confusion and lethargy. At the time of presentation, he was stuporous and his function was declining. Liver function tests showed elevated transaminases, and serum ammonia was >1200 g/dL. Acetaminophen was present in therapeutic concentrations; tests for alcohol, salicylates, and tricyclic antidepressants were negative. Urine drug screen was also negative. The parents were questioned about the patient's recent history. The patient was active in high school athletics and an average student. He had been altering his diet to include more protein supplements, was practicing every day with his basketball team, and was under stress due to academic pressures to maintain an acceptable GPA at school. He was not taking any prescribed medications, vitamins, or herbal supplements. He did not display behavior consistent with substance abuse. In the past three weeks, the parents stated that their son had mentioned frequent headaches and had been taking acetaminophen for pain relief (actual dosing used was unknown). The list of differential diagnoses for a teenage male presenting with hyperammonemia includes organic acidemias, carnitine deficiency, Reye syndrome, other toxic exposure or drug toxicity/overdose, and liver disease. While this list is not exclusive—it does point us to some key areas of focus. Toxic exposures and drug toxicity/overdose are on the top of the differential for the patient's age and were the focus of the initial work-up. However, liver enzymes were not elevated as one would expect from an acute hepatic toxicity and both urine and serum tox screens were negative. Other acute hepatic injuries were ruled out because, again, enzymes were normal. Bilirubin, serum protein & albumin were all normal, ruling out the presence of liver damage that impairs metabolic, synthetic, and clearance functionality. It did not take the team long to look to variant forms of inborn errors of metabolism as a potential contributor to the presentation. The high ammonia concentrations raise suspicions for an inherited error of urea cycle metabolism. While the traditional work up for such defects includes plasma amino acid and urine organic acid analyses, this was not a traditional presentation, therefore mutational analysis for ornithine transcarbamylase (OTC) was ordered by the consulting neurologist. OTC deficiency is an

X-linked disorder. For male patients, presentation usually occurs in the neonatal period and is often devastating. In these cases, liver transplantation is the best course of action for preventing early death. Male patients with milder partial deficiencies can present later in life, usually after acute illness or stress, and typically with altered mental status and hyperammonemia. Avoidance of protein-rich diets, and protection of the liver through vaccinations and careful selection of therapeutic drugs, can assist in avoiding severe Outcomes. Patients with partial OTC deficiencies are also candidates for liver transplantation, particularly when they have recurrent bouts of hyperammonemia.

Learning Outcomes:

By the end of session, student should be able to describe:

1. Biochemical consequences of Hyperammonemia
2. Mechanism of transport of ammonia to Liver
3. Urea cycle
4. Genetic disorders of Urea cycle

REFERENCE BOOKS:

1. Lippincott's Illustrated Reviews Biochemistry
2. Harper's Illustrated Biochemistry

CBL 2: Genetic Disorders of Protein Metabolism

A seven-day-old girl was admitted to the pediatric metabolism clinic with a suspicion of PKU after a newborn screening program. She was born at 40 weeks of gestation with a 2300 gr birth weight and hospitalized for 2 days. Her parents were first degree cousins, and the family history was unremarkable for an inherited metabolic disease, however the mother had two miscarriages. Physical examination revealed microcephaly, mild facial dysmorphism, and cardiac murmur in addition to intrauterine growth retardation. Her blood phenylalanine level was 1140 $\mu\text{mol/dL}$, and she was diagnosed as having moderate phenylketonuria. As a ventricular septal defect was detected with echocardiography and the mother was born before the national newborn screening program was available, the mother's blood Phe concentration was measured. Surprisingly her blood Phe level was 1614 $\mu\text{mol/dL}$. The mother was a 25-year-old woman able to graduate from primary school and. complained about only concentration problems and forgetfulness. She also had blond hair and blue eyes on physical examination. Conclusion: Maternal phenylketonuria is a preventable public health problem which causes undesirable results like mental-motor retardation and cardiac defects. Although maternal phenylketonuria is not completely coped with, after the newborn screening program the incidence is decreased. A strict Phe restricted diet beginning before the pregnancy together with frequent controls of blood Phe levels are essential for management. Here, we report this case, as she was diagnosed with both phenylketonuria and maternal phenylketonuria and to emphasize thinking MPKU in the presence of microcephaly, developmental delay, and cardiac defects.

Learning Outcomes: By the end of session, student should be able to:

1. Detailed biochemical mechanisms of genetic disorders of Protein Metabolism

REFERENCE BOOKS:

1. Lippincott's Illustrated Reviews Biochemistry
2. Harper's Illustrated Biochemistry

Teaching faculty

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Prof. Dr. Syed Taouqeer Abbas	syedtaouqeerabbas@gmail.com
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Dr. KinzaTalat	kanzatallat@gmail.com
Dr. Sonia Shahzad	soniainam94@gmail.com

Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
CBLs, SGDs, Quizzes, Vivas	Class Tests End of Block Exams

Behavioral Sciences & Professionalism

Subject Learning Outcomes

1. Develop an understanding of influence and potential implications of culture and community on health behaviors, perceptions and beliefs.
2. A physician will be able to integrate this knowledge into patient care
3. Take detailed, accurate and relevant patient history by taking into account self-awareness and reflective writing using social and behavioral sciences approach
4. Provide patient centered behavioral guidance and interventions
5. Comprehend how social determinants of health influence health outcomes and how physician can use this knowledge in patient care
6. Practice professionalism and leadership qualities
7. Integrate their knowledge and skills gained throughout five years into clinical practice

Block learning outcomes:

1. Describe the concepts of wellness, disease and illness in society, disparities in class, gender, race seeing through lens of medical sociology (SLO 1, 5)
2. Demonstrate basic skills of communication for effective patient care and counseling (SLO 3)
3. Discuss role of counseling in clinical practice (purposes, goals, types) (SLO 4)
4. Discuss human development of personality for doctors' own learning and clinical skills. (SLO 4, 7)

S. #	Title /Theme	Educational Strategies	Instructor name	Importance (Must Know Should know Could Know)
1.	Contemporary bioethics	LGIS	Hafsa Naeem	Should know
Learning Outcomes:				
<ul style="list-style-type: none"> ● Explain the evolution of contemporary bioethics, its characteristics and relevance to research and practice 				
2.	Medical sociology	LGIS	Hassan Ali	Should know
Learning Outcomes:				
<ul style="list-style-type: none"> ● Describe the concepts of wellness, disease and illness in society, disparities in class, gender, race seeing through lens of medical sociology 				
3.	Geography, environment and health	LGIS	Hassan Ali	Should know

Learning Outcomes:			
<ul style="list-style-type: none"> Identify how geographical inquiry can add to a better understanding of the deviations in health consequences 			
4.	Global and environmental issues	LGIS	Hafsa Naeem
Learning Outcomes:			
<ul style="list-style-type: none"> Discuss geography, environment and health and global Environmental issues 			
5.	Neurological basis of behavior	LGIS	Zunaira Naveed
Learning Outcomes:			
<ul style="list-style-type: none"> Examine the structure and function of nervous system. Analyze the function of neuron and neurotransmitters 			
6.	Communication	LGIS/SD L	Hafsa Naeem
Learning Outcomes:			
<ul style="list-style-type: none"> Demonstrate basic skills of communication for effective patient care and counseling Differentiate between Inter, Impersonal and personal communication skills (verbal and non-verbal) 			
7.	Class test		All Faculty
Learning Outcomes:			
<ul style="list-style-type: none"> Assess the knowledge acquired by the students 			
8.	Counseling	LGIS	Zunaira Naveed
Learning Outcomes:			
<ul style="list-style-type: none"> Discuss role of counseling in clinical practice (purposes, goals, types) Discuss different types of counseling in clinical setting 			
9.	Personality theories	LGIS	Zunaira Naveed
Learning Outcomes:			
<ul style="list-style-type: none"> Discuss human development of personality, significance of IQ and EQ in clinical practice of doctor 			

Teaching faculty

Name	Email address
Zunaira Naveed	zunaira@wahmedicalcollege.edu.pk
Hassan Ali	hassan@wahmedicalcollege.edu.pk
Hafsa Naeem	hafsanaeem176@gmail.com

Research Methodology

Learning Outcomes:

By the end of 3rd block students of first year would be able to:

- Interpret measurement of all health problems/issues affecting people at individual and community levels right from birth to death by adopting statistic, research and ethical approaches
- Plan research methodology
- Analyze and present collected data regarding the health issues and health services.

S.no	Topic	Educational Strategies	Name of instructor	Importance Must Know Should Know Could Know
1.	Literature Search	LGIS/ Group Assignment	Dr. Saleh Ahmed	Must know
Learning Outcomes: <ul style="list-style-type: none"> • Perform scientific literature search on selected topics by using different techniques/ methods. 				
2.	Operational Definition & Hypothesis	LGIS/ Group Assignment	Prof. Dr. Sabah Imran	Must know
Learning Outcomes: <ul style="list-style-type: none"> • Formulate operational definition and research hypothesis. 				
0.	Class test	Mcqs / Seqs	All faculty members	

Learning Resources

Reference Books

1. Text Books

- Public Health and Community Medicine (Shah, Ilyas, Ansari, Irfan's)

2. Reference Books/ Library resources

- Basic Statistics for the Health Sciences (Jan W. Kuzma)
- Basic Methods of Medical Research (Indrayan)
- New qualitative Methodologies in Health and Social Care Research (Frances Rapport)

3. Online resources

- **Types-of-research**

Research questions

Aim, objectives & rationale of research

introduction to variables

1. SDL/Handouts by Faculty

4. Teaching faculty:

Name	Email address
Prof. Dr. S. Sabah Imran	sabah_imran@wahmedicalcollege.edu.pk
Dr. Saleh Ahmed	s.ahmed.2345@gmail.com

Assessment formats Assessment Strategies (Formative)	Assessment Strategies (Summative)
MCQs, Home assignments, SAQs/SEQs	MCQs, Home assignments, SAQs/SEQs, viva



9. Rules & regulations:

I. Student's code of conduct

The Student Code of Conduct sets out the standards of conduct expected of students. It holds individuals and groups responsible for the consequences of their actions. Failure to fulfill these responsibilities may result in the withdrawal of privileges or the imposition of sanctions.

Wah Medical College is a community of students, faculty and staff involved in learning, teaching, research and other activities. All members of WMC community are expected to conduct themselves in a manner that contributes positively to an environment in which respect, civility, diversity, opportunity and inclusiveness are valued, so as to assure the success of both the individual and the community. The Student Code of Conduct reflects a concern for these values and tries to ensure that members of the WMC can make use of and enjoy the activities, facilities and benefits of WMC without undue interference from others.

WMC STUDENT CODE OF CONDUCT

- Discipline
- Decent dress
- Good Manners
- Smart Turn Out
- Healthy Activities
- No smoking
- No Abusive Language
- Cooperative Attitude
- Respect for All

II. Attendance policy

- a. Students are required to mark attendance for every class.
- b. The attendance is compiled by respective department and submitted to student affairs by the 10th of each month.
- c. Students Affairs Department will compile the absent report and fine of Rs. 500/- for a lecture or for the whole day will be imposed on absent students. It is pertinent to mention here that fine is imposed on students to compel them to attend classes regularly and not to generate the funds.
- d. A compiled attendance state of all students along with those having attendance less than 75% duly highlighted will be submitted to the Students Affairs Department on monthly as well as quarterly basis by the concerned departments.
- e. At the end of academic year, a consolidated state of attendance of students will be submitted to Students Affairs Department.
- f. Departments will submit the list of those students having attendance less than 75% at the end of academic year.
- g. Admission forms of students having attendance less than 75% will NOT be submitted to NUMS for appearing in Annual University Exams.

10. Study Tips

Dear Students,

Becoming a doctor is a tough job, but you can make it easier for yourself by adopting some time-tested techniques or habits. It's never too early – or too late – to develop good study habits. The sooner you get into a good self-study pattern, the easier everything will be and the more your chances of getting good marks will improve. Here are our top tips for getting the most out of your self-directed study time. And remember **Perseverance is the Key to Success!**



Review the material regularly, create a study schedule

Write it down



Test yourself

Find an effective learning environment with limited distractions and some fresh air



Improve memorization with Mnemonics

Incorporate auditory methods; use online podcasts



Use visuals, images, concept maps & illustration charts

Consider forming a study group or find an accountability buddy



Take strategic breaks

11. Feedback on the study guide

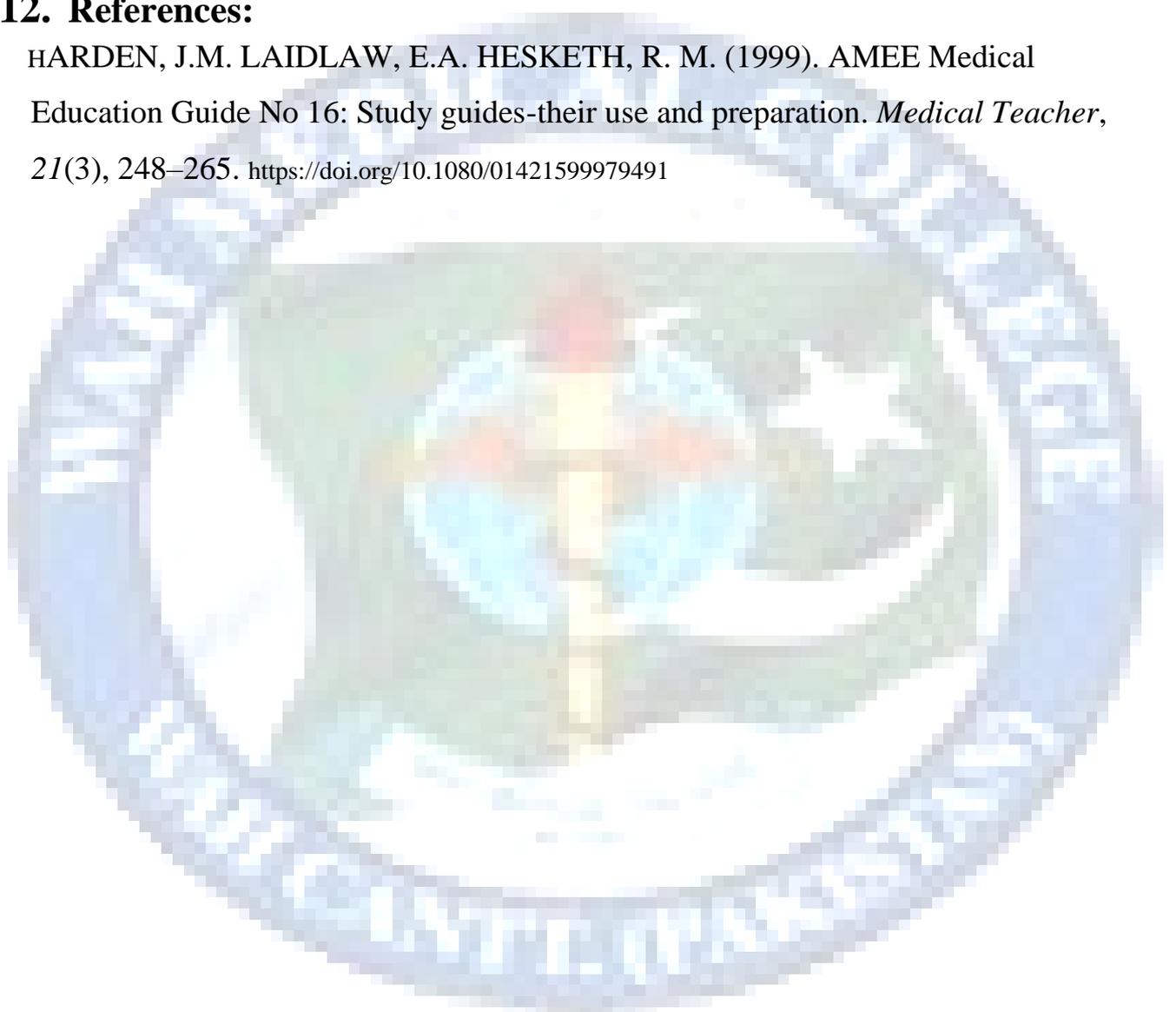
We value your feedback and will use it for improvement of this Study guide. Kindly provide feedback for this study guide. At the email:

dme@wahmedicalcollege.edu.pk

dmewahmedicalcollege@gmail.com

12. References:

HARDEN, J.M. LAIDLAW, E.A. HESKETH, R. M. (1999). AMEE Medical Education Guide No 16: Study guides-their use and preparation. *Medical Teacher*, 21(3), 248–265. <https://doi.org/10.1080/01421599979491>



13. Time Table

Time Table — First Year M.B.B.S 2021
 - - 21 TO - - 21

YIBI
Academic Week:
Theme:

Day/Date	08:00-09:55	09:55-10:15	10:15-11:10	11:10-12:05	12:05-01:00	01:00-01:20	01:20-02:05	02:05-03:00
	SGD / Dissection		Anatomy LGIS	Physiology LGIS	Biochemistry LGIS		Practicals Histology A Dr. Physiology B Dr. Biochemistry ... C Dr.	
Monday - - 21			Anatomy LGIS	Physiology LGIS	Biochemistry LGIS		Practicals Histology C Dr. Physiology A Dr. Biochemistry ... B Dr.	
Tuesday - - 21	Practicals Histology B Dr. Physiology C Dr. Biochemistry A Dr.							
Wednesday - - 21	CBL Biochemistry		Physiology LGIS	Biochemistry LGIS	Clinical LGIS		SGD / Dissection	
Thursday - - 21	CBL Physiology		Physiology LGIS	Anatomy LGIS	BSP LGIS		Physiology LGIS	Pak. Studies
Friday - - 21	08:00-09:00	09:00-10:00	10:00-11:00	11:00-11:15 11:15	11:15-12:00	12:00-01:10	01:10-02:00	02:00-03:00
	Surgery LGIS	Anatomy LGIS	Physiology LGIS	BREAK	Physiology LGIS	CBL Anatomy	PRAYER	CBL Anatomy

BMS Coordinator
 Wah Medical College
 (Prof. Dr. Zubia Athar)

Please Note
 All the lectures will be held
 in Lecture Hall No. I & II

Dean
 Wah Medical College
 (Prof. Dr. Musarat Ramazan)