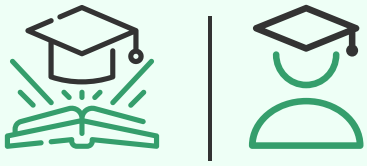
College of Medicine & Dentistry at The Hills

DEPARTMENT OF MEDICAL EDUCATION
COLLEGE OF MEDICINE AND DENTISTRY AT THE HILLS, ABBOTTABAD

RESPIRATORY - I

Module

Block-C (1st Year)
MBBS



Duration: 4 weeks

Year
2024-25

Contents

1 Vision

To be a leading institution in medical education, dedicated to cultivating a workforce of physicians and clinicians who excel in providing equitable, affordable, and exemplary healthcare while addressing the diverse health needs of our nation and the global community.

2 Mission

To deliver a transformative medical education that empowers future healthcare leaders to innovate in clinical care and health system design. Our mission is supported by a passionate and diverse faculty committed to fostering collaboration, upholding the highest ethical standards, and addressing healthcare disparities. We aim to inspire our students to engage with patients and communities, promoting inclusivity and teamwork in service to humanity.

3 List of abbreviations

Bio-L	Biochemistry Lecture	**OSPE**	Objectively Structured Practical Examination
Bio-P	Biochemistry Practical	**Paeds-L**	Pediatrics Lecture
Bio-SGD	Small Group Discussion in Biochemistry	**Patho-L**	Pathology Lecture
C.Med-L	Community Medicine Lecture	**Phar-L**	Pharmacology Lecture
DSL	Directed Self Learning	**Phy-L**	Physiology Lecture
FDT	Film/Demonstration/Tutorial	**Phy-P**	Physiology Practical
F.Med-L	Forensic Medicine Lecture	**Phy-SGD**	Small Group Discussion in Physiology
G.Anat-L	Gross Anatomy Lecture	**PBL**	Problem Based Learning
Histo-P	Histology Practical	**SDL**	Self-Directed Learning
IT	Information Technology	**SL**	Skill Lab
LGIS	Large Group Interactive Session	**SAQs**	Short Answer Questions
MCQs	Multiple Choice Questions	**SEQs**	Short Essay Questions
Med.Edu-L	Medical Education Lecture	**SGDs**	Small Group Discussions
PRIME	Professionalism and Communication Skills, Research, Identity Formation, Management and Leadership, Ethics		

4 Recommended List Of Icons

Introduction To Case

For Objectives

Critical Questions

Assessment

Resource Material

5 Overview of the Module/ Preface

The Respiratory Module, Block C, is a comprehensive educational block designed for 1st-year MBBS students. The module aims to provide a deep understanding of the respiratory system, integrating theoretical knowledge with practical applications.

The Respiratory Module, Block C, covers key topics that provide a comprehensive understanding of the respiratory system. This includes the anatomy of the respiratory system, exploring its structure and organization. Additionally, the module delves into the physiology of breathing and respiration, explaining the mechanisms and processes that govern airflow and gas exchange. The biochemistry of respiratory processes is also examined, revealing the intricate molecular mechanisms that underlie respiratory function. Furthermore, the module addresses various medical conditions affecting the respiratory system, including chest wall injuries, cough, hemoptysis, and breathlessness, equipping students with the knowledge to diagnose and manage these conditions effectively.

By the end of this module, students will have a solid foundation in respiratory medicine, enabling them to diagnose and manage common respiratory conditions, and preparing them for further study in the field

6 Introduction/ Organization of Module

6.1 Introduction:

Upon completing this module, students of the College of Medicine and Dentistry at the Hills, Abbottabad, will possess a comprehensive understanding of the respiratory system, including its fundamental concepts and various disorders. The respiratory system, comprising the respiratory passageways (nose, larynx, pharynx, trachea, and bronchi) and lungs, plays a vital role in facilitating breathing. Its primary function is to enable gas exchange, supplying oxygen to body tissues and eliminating carbon dioxide, a waste product. By the end of this module, students will have acquired the necessary knowledge, attitude, and skills to appreciate the intricate mechanisms of the respiratory system and its associated disorders.

6.2 Rationale:

The respiratory system is a critical component of human physiology, responsible for delivering oxygen to the body's tissues and removing carbon dioxide. Respiratory disorders are a leading cause of morbidity and mortality worldwide, making it essential for medical students to possess a deep understanding of the respiratory system's structure, function, and disease processes.

This module is designed to provide students with a comprehensive foundation in respiratory medicine, enabling them to diagnose and manage common respiratory conditions effectively. By exploring the anatomy, physiology, and biochemistry of the respiratory system, students will gain a thorough understanding of the complex mechanisms that govern breathing and respiration.

Furthermore, this module will equip students with the knowledge and skills necessary to address the unique respiratory health challenges faced by communities in the region, making them more effective healthcare providers in their future careers.

6.3 Organization of the study guide:

The Respiratory Module is a 4 weeks' theme-based module, the contents of which will be thought in Lectures, SGDs, DSLs and Practical.

1- Chest wall injury- 1 week
2- Cough and hemoptysis- 1 week
3- Breathlessness- 2 weeks

Theme 1: Chest Wall Injury (1 week)

This theme focuses on injuries affecting the chest wall, including ribs, sternum, and surrounding muscles. Students will learn to diagnose and manage various types of chest wall injuries, such as rib fractures, flail chest, and chest wall tumors. They will also explore the anatomy and physiology of the chest wall, as well as the clinical presentation, investigation, and treatment options for these injuries.

Theme 2: Cough and Hemoptysis (1 week)

This theme delves into the causes, diagnosis, and management of cough and hemoptysis (coughing up blood). Students will examine the anatomy and physiology of the respiratory tract, as well as the various conditions that can lead to cough and hemoptysis, such as respiratory infections, tuberculosis, and lung cancer. They will also learn about the clinical evaluation, investigation, and treatment options for these conditions**.**

Theme 3: Breathlessness (2 weeks)

This theme explores the complex phenomenon of breathlessness (dyspnea), a common symptom in respiratory medicine. Students will learn to evaluate and manage various causes of breathlessness, including chronic obstructive pulmonary disease (COPD), asthma, pneumonia, and heart failure. They will also examine the pathophysiology of breathlessness, as well as the clinical presentation, investigation, and treatment options for these conditions. The two-week duration allows for a more in-depth exploration of this critical topic.

7 Teaching Strategies:

The following teaching and learning methods are utilized to foster better understanding:

7.1 Large Group Formats:

a. **Interactive Lectures:** In large group settings, the lecturer introduces topics or common clinical conditions, explaining the underlying phenomena through interactive methods such as questions, visual aids, videos of patient interviews, and exercises. Students are actively engaged in the learning process.

b. **Directed Self-Learning:** Directed self-learning is an active approach where learners are provided with predefined learning objectives and receive guidance and supervision throughout the learning process. This method helps establish a strong foundation for independent and deep learning.

c. **Self-Directed Learning:** Students assume responsibility for their own learning through individual study, discussions with peers, and seeking information from the Learning Resource Center, teachers, and other resources both within and outside the college. Students can utilize designated college hours for self-study.

7.2 Small Group Formats:

a. **Small Group Discussions:** This format helps students clarify concepts, acquire skills, and develop attitudes. Sessions are structured around specific exercises, such as patient cases, 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.

b. **Practical Demonstrations:** Basic science practicals related to anatomy, biochemistry, and physiology are scheduled to enhance student learning.

c. **Problem-Based Learning (PBL):** In PBL sessions, students work in small groups to solve complex, real-world problems. This method encourages critical thinking, self-directed learning, and the application of knowledge in practical scenarios. Facilitators guide the process, helping students to develop problem-solving skills and integrate knowledge across disciplines.

d. **Journal Club:** The Journal Club involves students reviewing and presenting recent research articles. This activity promotes critical appraisal skills, keeps students updated with the latest scientific developments, and encourages the integration of evidence-based practices into their learning.

8 Assessment Strategies:

Assessments within the MBBS program at the College of Medicine and Dentistry at the Hills, Abbottabad consist of both formative and summative evaluations. These assessments are crucial for monitoring student progress and academic performance.

8.1 Formative Assessment:

Formative assessments, accounting for 10% of the total marks assigned to each block, serve as ongoing evaluations designed to provide feedback and promote learning. The allocation of this 10% can be determined in accordance with the blueprint of KMU and further distributed as per the recommendations of the academic council at the College of Medicine and Dentistry at the Hills, Abbottabad. Formative assessments are conducted after the completion of each module, ensuring students receive timely feedback to enhance their understanding and performance.

8.2 Summative Assessment:

Summative assessments, comprising 90% of the total assessment weighting, are conducted and overseen by KMU as part of the annual examination process. The summative annual examination is organized and conducted by KMU, which is responsible for evaluation and grading. This summative assessment evaluates students' comprehensive understanding of the curriculum and constitutes a significant portion of their final scores.

8.3 Assessment Tools:

Various assessment tools are employed to measure students' knowledge and competencies. These tools include:

1. **Written Examinations:** These include Multiple Choice Questions (MCQs) and Short Essay Questions (SEQs) that assess students' theoretical knowledge.
2. **Performance Assessments:** Objective Structured Practical Examinations (OSPE) and Objective Structured Clinical Examinations (OSCE) are used to evaluate practical skills and clinical competence.
3. **In-Training Assessments:** Clinical logbooks provide a comprehensive record of students' practical experiences and serve as a valuable tool for tracking their progress.
4. **Assignments:** Presentations, projects, and self-reflection assignments are included in the assessment process to enhance students' critical thinking and research skills.

8.4 Feedback Mechanism:

At the end of each module, a "Module Evaluation Form" will be provided to students, either in hard copy or online. Students will give their feedback on the "Course Content," "Learning Resources," "Teaching Methods," "Engagement & Motivation," and "Assessment Methods."

9 Table Of Specification

Module RES of Black C				
Subject	No. of Hours Allocated in LOs	Percent Distribution	Assessment	
	Total		MCQs	OSPE
Gross Anatomy	35	33.0%	12	03
Histology			04	
Embryology			03	
Physiology	28	27.2%	20	03
Biochemistry	15	14.6%	08	--
PRIME	--	6.8%	--	--
Pharmacology	--	1.9%	--	--
Pathology	--	3.9%	01	--
Community Medicine	--	1.0%	01	--
General Medicine	--	3.9%	--	--
Forensic Medicine	--	1.0%	01	--
IT Skills	--	0%	--	--
Islamiyat	--	1.9%	--	--
SDL	--	4.9%	--	--
Total	**78**	**100%**	**50**	**06**

10 Learning Objectives

10.1 General Learning Outcomes

By the end of this module the students should be able to;

Knowledge

1. Describe the anatomy and abnormalities of thoracic cage
2. Describe the development and gross anatomy of the diaphragm
3. Describe the contents of mediastinum and their relations
4. Describe the anatomy of pleura and its reflections
5. Describe the gross and microscopic structure, development, nerve supply and blood supply of trachea, bronchi and lungs
6. Describe the epithelia and connective tissues lining the respiratory passageways.
7. Describe pulmonary ventilation
8. Discuss the mechanisms of gaseous exchange between alveoli, and blood and blood and tissues
9. Elaborate the transport of gases in the blood
10. Describe the mechanisms of regulation of respiration
11. Define hypoxia, and cyanosis
12. Describe the effect of aging on respiratory system
13. Describe the biochemical structure and functions of enzymes
14. Describe the mechanisms of O2 and CO2 transport in the blood
15. Classify anti-asthmatic and anti-tuberculous drugs
16. Describe the types and signs of asphyxia
17. Enlist the causes and signs of pneumonias, bronchial asthma, tuberculosis, Acute Respiratory Distress Syndrome (ARDS), and pulmonary edema
18. Describe the parameters of Pulmonary Function Tests (PFTs)

Skills

1. Take a focused history of patient with upper respiratory symptoms.
2. Examine the nose and throat of a given subject
3. Examine the lymph nodes of neck on given subject
4. Interpret the ABGs of the patient with chest wall trauma (Respiratory rate and blood pressure).
5. Demonstrate the Grading of pain severity.
6. Examine the respiratory system of patient with chest wall injury with special emphasis on respiratory rate and cyanosis.
7. Draw a normal spirogram, labeling the four lung volumes and four capacities.
8. Examine the chest.
9. Do the spirometry and plot the graph.
10. Demonstrate ABGS and compare the results
11. Demonstrate the use of inhaler to the subject.
12. Calculate the respiratory rate of the subject

Attitude

1. Demonstrate ability to give and receive feedback, respect for self and peers.
2. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals
3. Organize& distribute tasks
4. Exchange opinion & knowledge
5. Develop communication skills and etiquette with sense of responsibility.
6. To equip themselves for teamwork
7. Regularly attend the classes

10.2 Specific Learning Outcomes

THEME–I: (Chest Wall Injuries)

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
	ANATOMY			
1	Gross anatomy of thorax	1. Describe main features of thoracic wall 2. Describe the location and shape of the sternum 3. Describe the parts of the sternum 4. Describe the articulations and muscle attachments 5. Describe the gross features of the thoracic vertebrae a. Vertebral body b. Intervertebral disc c. Laminae d. Pedicles e. Intervertebral foramina f. Processes g. Ligaments 6. Differentiate between typical and atypical ribs. 7. Describe different joints of thorax 8. Discuss Intercostal muscles 9. Discuss the contents of intercostal spaces 10. Describe the origin of intercostal arteries 11. Describe the origin, course and distribution of intercostal nerves 12. Discuss branches and course of internal thoracic artery	01	LGIS
2	Abnormalities of thoracic wall	1. Describe thoracic wall abnormalities and its clinical correlation	01	LGIS
3	Diaphragm	1. Describe the origin, insertion, openings and nerve supply of the diaphragm and its clinical significance.	01	LGIS
4	Mediastinum	1. Describe the contents of the Superior, Anterior & Posterior Mediastinum. 2. Describe the relations of different contents in Mediastinum.	01	LGIS

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
		3. Identify various anatomical landmarks on chest X-Rays, CT and MRI		
	HISTOLOGY			
	Lungs	1. Histology of Lungs -I	01	LGIS
		1. Histology of Lungs -II	01	LGIS
	EMBRYOLOGY			
5	Development of Diaphragm	1. Describe development of diaphragm 2. Describe diaphragmatic hernias and clinical significance	01	LGIS
6	Development of Ribs	1. Describe the development of ribs from costal elements of primitive vertebrae	01	LGIS
	PHYSIOLOGY			
7	Mechanics of Respiration	1. Describe the mechanics of respiration 2. Describe the pressures that cause the movements of the air in and out of the lungs	01	LGIS
8	Lung compliance	1. Define compliance of the lung and elastic recoil 2. Identify two common clinical conditions in which lung compliance is higher or lower than normal.	01	LGIS
9	Lung volumes and capacities	1. Describe changes in the lung volume, alveolar pressure, pleural pressure, and trans-pulmonary pressure during normal breathing 2. Draw a normal pulmonary pressure-volume (compliance) curve (starting from residual volume to total lung capacity and back to residual volume), labeling the inflation and deflation limbs. 3. Explain the cause and significance of the hysteresis in the curves. 4. Draw the pressure-volume (compliance) curves for the lungs, chest wall, and respiratory system on the same set of axes. 5. Show and explain the significance of the resting positions for each of these three structures.	01	LGIS
	SURGERY			
10	Pneumothorax	1. Describe pneumothorax 1. Define Hydro pneumothorax	01	LGIS
	LAB WORK			
	HISTOLOGY			
11	Histology of respiratory epithelium	1. Discuss the histology of respiratory epithelium. 2. Identify the various microscopic tissue types in the 3. Respiratory system	02	Demonstration / Practical
	PHYSIOLOGY			

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
12	Spirometry	1. Draw a normal spirogram, labeling the four lung volumes and four capacities. 2. List the volumes that comprise each of the four capacities. 3. Identify which volume and capacities cannot be measured by spirometry.	02	Demonstration / Practical
DISSECTION				
ANATOMY				
13	Mediastinum	1. Discuss the contents of superior, anterior & posterior mediastinum. 2. Discuss the relations of different contents in mediastinum	02	SGF Dissection
SMALL GROUP DISCUSSIONS				
ANATOMY				
14	Diaphragm	1. Describe the origin, insertion, openings & nerve supply of diaphragm and its clinical significance.	02	SGD
PHYSIOLOGY				
15	Lung Volumes and Capacities	1. Describe changes in the lung volume, alveolar pressure, pleural pressure, and trans-pulmonary pressure during normal breathing	02	SGD
BIOCHEMISTRY				
16	Role of enzymes as a diagnostic tool	1. Explain the role of enzymes as a diagnostic tool	02	SGD
DIRECTED SELF LEARNING				
ANATOMY				
17	Abnormalities of the thoracic wall	1. Describe thoracic wall abnormalities and its clinical correlation	01	DSL
PHYSIOLOGY				
18	Mechanics of Respiration	1. Briefly describe the mechanics of respiration. 2. Describe the pressures that cause the movements of the air in and out of the lungs	01	DSL
BIOCHEMISTRY				
19	Transport of Oxygen	1. Explain the transport of oxygen in the blood	01	DSL

THEME-II COUGH AND HEMOPTYSIS

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
	ANATOMY			
1	Introduction	1. Describe the major components of the (upper and lower) respiratory system and describe their functions	01	LGIS
2	Trachea, bronchi and lungs	1. Describe trachea and bronchi with relations plus subdivisions 2. Describe the neurovascular supply of trachea and bronchi 3. Describe the surfaces anatomy of trachea and bronchi 4. Describe the lungs with their lobes and fissures, relations with surroundings and surfaces and compare between right and left lungs. 5. Describe Broncho-pulmonary segments and their clinical importance 6. Describe innervations, blood supply and lymphatic drainage of the lungs.	01	LGIS
	EMBRYOLOGY			
3	Development of Respiratory system	1. Describe development of trachea, bronchial tree, pleura, lungs 2. Recognize the cephalo-caudal and transverse folding of embryonic disc 3. Describe the extent of intra embryonic coelom after folding and its divisions into three serous cavities 4. State the derivatives of visceral and parietal layers of mesoderm 5. State the pericardio-peritoneal canals and their final fate 6. Discuss the formation of Lung Bud	01	LGIS
	HISTOLOGY			
4	Respiratory epithelium and connective tissues	1. Classify the types of epithelia lining the various parts of respiratory system 2. Differentiate between the histological differences among various parts of respiratory system 3. Describe the structure of trachea and its layer 4. Discuss the microscopic picture of respiratory bronchiole, alveolar ducts, alveolar sacs and alveoli. 5. Describe the different types of cells found in alveoli	01	LGIS
	PHYSIOLOGY			
5	Functions of respiratory passageways	1. Describe the respiratory and non-respiratory functions of the respiratory passageways	01	LGIS

		2. Identify the mechanism by which particles are cleared from the airways.		
PHARMACOLOGY				
6	Anti-Asthmatic drugs	1. Enlist Anti-asthmatic drugs	01	LGIS
7	Anti-Tuberculous drugs	1. Classify Anti-tuberculous drugs	01	LGIS
PATHOLOGY				
8	Pneumonias	1. Define pneumonia and enlist the causative pathogens of pneumonia	01	LGIS
9	Pulmonary Tuberculosis	1. Define primary and secondary Tuberculosis and state its etiology	01	LGIS
10	Bronchial Asthma	1. Describe the etiology, pathogenesis and clinical features of asthma	01	LGIS
11	Pulmonary Edema	1. Define pulmonary edema. 2. Classify pulmonary edema according to underlying causes	01	LGIS
COMMUNITY MEDICINE				
12	Prevention of Respiratory disorders	1. Discuss preventive strategies of different problems related to respiratory system 2. Discuss the relationship of smoking with lung Diseases 3. Describe preventive strategies for smoking	01	LGIS
LAB WORK				
HISTOLOGY				
13	Microscopic structure of the Trachea and Bronchi	1. Identify the various microscopic tissue types in the Trachea	02	Demonstration / Practical
PHYSIOLOGY				
14	Peak expiratory flow determination	1. Determine the peak expiratory flow (PEF) by peak flow meter	02	Demonstration / Practical
DISSECTION				
ANATOMY				
15	Thorax, components of thoracic cavity and their relations	1. Describe the boundaries, components of thorax and their relations.	02	SGF Dissection
SMALL GROUP DISCUSSIONS				
PHYSIOLOGY				
16	Functions of respiratory passageways	1. Describe the respiratory functions of the respiratory passageways. 2. Describe the non-respiratory functions of the respiratory passageways.	02	SGD

		3. Identify the mechanism by which particles are cleared from the airways.		
BIOCHEMISTRY				
17	Role of enzymes as a diagnostic tool	1. Discuss the role of enzymes as a diagnostic tool.	02	SGD
ANATOMY				
18	Components of Respiratory System	1. Describe the major components of the upper and lower respiratory system and describe their functions	02	SGD
DIRECTED SELF LEARNING				
ANATOMY				
19	Lungs	1. Describe the lungs with their lobes and fissures, relations with surroundings and surfaces and compare between right and left lungs. 2. Describe innervations, blood supply and lymphatic drainage of the lungs.	01	DSL
PHYSIOLOGY				
20	Functions of respiratory passageways	1. Describe the respiratory and non-respiratory functions of the respiratory passageways 2. Identify the mechanism by which particles are cleared from the airways.	01	DSL

THEME-III BREATHLESSNESS

S.No.	Subject	Learning Outcomes/Objectives	Hours	MIT
ANATOMY				
1	Mechanics of respiration	1. Describe briefly mechanics of respiration	01	LGIS
2	Pleura	1. Describe the gross features of pleura 2. Describe the pleural cavity and the pleural reflections 3. Describe the surface anatomy related to pleural reflections	01	LGIS
EMBRYOLOGY				
3	Development of Pleural Cavity	1. Describe the development of pleural cavity	01	LGIS
HISTOLOGY				
4	Histology of respiratory tract	1. Discuss surfactant, alveolar septum, alveolar pores and alveolar macrophages	01	LGIS
PHYSIOLOGY				
5	Pulmonary ventilation I	1 Define respiration 2 Compare between the internal and external respiration 3 Enlist the steps of external respiration accomplished by the respiratory system and those carried out by the circulatory system	01	LGIS

		4 State the functions of Type I alveolar cells, Type II alveolar cells, and alveolar macrophages 5 Describe the forces that keep the alveoli open and those that promote alveolar collapse. 6 Define the following terms: anatomic dead space, physiologic dead space, wasted (dead space) ventilation, total minute ventilation and alveolar minute ventilation. 7 Compare anatomic and physiologic dead space 8 Describe the basic concept of measurement of dead space 9 Enlist the factors that changes the dead space		
	Pulmonary ventilation II	1 Define the following terms: hypoventilation, hyperventilation, hypercapnea, eupnea, hypopnea, and hyperpnea. 2 Define surface tension, surfactants, atelectasis 3 Describe the role of surfactants on the lung compliance. 4 Describe the composition of the pulmonary surfactants and its role 5 Describe the pathophysiology of respiratory distress syndrome of the newborn Discuss the work of breathing	01	LGIS
6	Pulmonary Circulation	1. Explain the physiologic anatomy of the pulmonary circulatory system 2. Describe the pressures in the pulmonary circulatory system 3. Describe blood volume of the lungs 4. Describe blood flow through the lungs and its distribution 5. Compare the systemic and pulmonary circulations with respect to pressures, resistance to blood flow, and response to hypoxia. 6. Describe the regional differences in pulmonary blood flow in an erect position. 7. Describe the consequence of hypoxic pulmonary vasoconstriction on the distribution of pulmonary blood flow. 8. Describe the pulmonary capillary dynamics 9. Describe the development of pulmonary edema	01	LGIS
7	Gas Exchange	1. List the normal airway, alveolar, arterial, and mixed venous PO2 and PCO2 values. 2. List the normal arterial and mixed venous values for O2 saturation, [HCO3-]	01	LGIS

		3. List the factors that affect diffusive transport of a gas between alveolar gas and pulmonary capillary blood. 4. Describe respiratory unit 5. Describe the physiologic anatomy of the respiratory membrane and its significance 6. Describe the factors that affect the rate of gaseous diffusion through the respiratory membrane 7. Describe the diffusing capacity of respiratory membrane for O2 and CO2 at rest and exercise. 8. Describe the effect of ventilation/perfusion (V/Q) ratio on alveolar gas concentrations. 9. Identify the average V/Q ratio in a normal lung. 10. Explain the concept of physiologic shunt and physiologic dead space 11. Describe the abnormalities of ventilation perfusion ratio in normal lung and chronic obstructive lung disease. 12. Enlist common causes of hypoxemia		
8	Transport of O2 and CO2 in the blood I	1. Define oxygen partial pressure (tension), oxygen content, and percent hemoglobin saturation as they pertain to blood. 2. Describe Oxyhemoglobin dissociation curve (hemoglobin oxygen equilibrium curve) showing the relationships between oxygen partial pressure, hemoglobin saturation, and blood oxygen content. 3. Describe the relative amounts of O2 carried bound to hemoglobin with that carried in the dissolved form. 4. State Henry's Law (the relationship between PO2 and dissolved plasma O2 content) 5. Describe how the shape of the oxyhemoglobin dissociation curve influences the uptake and delivery of oxygen.	01	LGIS
	Transport of O2 and CO2 in the blood II	1. Define P50. 2. Describe how the oxyhemoglobin dissociation curve is affected by changes in blood temperature, pH, PCO2, and 2,3-DPG. 3. Describe how anemia and carbon monoxide poisoning affect the shape of the oxyhemoglobin dissociation curve, PaO2, and SaO2. 4. List the forms in which carbon dioxide is carried in the blood. 5. Describe the percentage of total CO2 transported as each form.	01	LGIS

		6. Describe the chloride shift and its importance in the transport of CO2 by the blood. 7. Describe the enzyme that is essential to normal carbon dioxide transport by the blood and its location. 8. Describe the carbon dioxide dissociation curves for oxy- and deoxyhemoglobin. Describe the interplay between CO2 and O2 binding on hemoglobin that causes the Haldane effect.		
9	Regulation of Respiration	1 Describe the regions in the central nervous system that play important roles in the generation and control of cyclic breathing. 2 Give three examples of reflexes involving pulmonary receptors that influence breathing frequency and tidal volume. 3 Describe the receptors and neural pathways involved. 4 List the anatomical locations of chemoreceptors sensitive to changes in arterial PO2, PCO2, and pH that participate in the control of ventilation. 5 Identify the relative importance of each in sensing alterations in blood gases. 6 Describe how changes in arterial PO2 and PCO2 alter alveolar ventilation, including the synergistic effects when PO2 and PCO2 both change. 7 Describe the significance of the feedforward control of ventilation (central command) during exercise, and the effects of exercise on arterial and mixed venous PCO2, PO2, and pH. 8 Describe voluntary control of respiration 9 Describe the effect of irritant receptors, J-receptors, brain edema and anesthesia on breathing.	01	LGIS
	MEDICINE			
10	Common Respiratory Abnormalities	1. Describe periodic breathing and basic mechanism of Cheyne-Stokes breathing 2. Define sleep apnea 3. Describe the pathophysiology of Obstructive sleep apnea and central sleep apnea. 4. Describe the pathophysiology of specific pulmonary abnormalities: 5. Describe hypoxia and cyanosis 6. Describe the effect of aging on lung volumes, lung and chest wall compliance, blood gases, and respiratory control.	01	LGIS
	BIOCHEMISTRY			
11	Enzymes	1. Define Enzymes	01	LGIS

		2. Explain the Principals for Nomenclature of enzymes 3. Classify Enzymes on the basis of functions		
12	Structure of Enzymes	1. Explain the general structure of enzymes 2. Define different parts and forms of enzymes 3. Describe the factors involved in structure of enzymes 4. Enlist the factors affecting the activity of enzymes	01	LGIS
13	Co-Factors	1. Define co-factors 2. Explain the function of co-factors 3. Enlist different types of co-factors	01	LGIS
14	Catalysis	1. Define catalysis 2. Explain different mechanism of catalysis	01	LGIS
15	Enzyme Activity	1. Define activation energy 2. Define Gibbs Free energy 3. Describe the mechanism of Enzyme activity 4. Describe roles of factors affecting enzyme activity	01	LGIS
16	Isozymes	1. Define Isoenzymes (Isozymes) 2. Explain Factors affecting the properties Explain the role of enzymes as a diagnostic tool	01	LGIS
17	Transport of O2 and CO2 in the blood		01	LGIS
	FORENSIC MEDICINE			
18	Asphyxia	1. Define Asphyxia 2. Describe different types of Asphyxia 3. Identify classical signs of asphyxia	01	LGIS
	MEDICINE			
19	Introduction to Respiratory symptomatology	1. Enumerate the various symptoms of respiratory disorders	01	LGIS
20	PFT`s	1. Interpret the Pulmonary Function Tests	01	LGIS
21	ARDS	1. Discuss acute lung injury and its correlation Acute Respiratory Distress Syndrome 2. Describe the causes of Acute Respiratory Distress Syndrome 3. Discuss the morphology of Acute Respiratory Distress Syndrome	01	LGIS
	LAB WORK			

	ANATOMY			
22	Microscopic structure of the Bronchioles and Alveoli	1. Microscopic structure of Bronchioles and Alveoli	02	Demonstration / Practical
	PHYSIOLOGY			
23	Chest Examination	1. Examine the chest of the subject 2. Calculate the respiratory rate of the subject	02	Demonstration / Practical / Skill lab
24	Use of Inhaler	1. Describe the use of inhaler 2. Demonstrate the use of inhaler to the subject	02	Demonstration / Practical / Skill lab
	SMALL GROUP DISCUSSIONS			
	ANATOMY			
25	Mechanics of respiration	1 Describe briefly mechanics of respiration	02	SGD
	PHYSIOLOGY			
26	Regulation of Respiration	1. Describe the regions in the central nervous system that play important roles in the generation and control of cyclic breathing. 2. Give three examples of reflexes involving pulmonary receptors that influence breathing frequency and tidal volume. 3. Describe the receptors and neural pathways involved.	02	SGD
	BIOCHMISTRY			
27	Factors affecting enzyme activity	Enlist the factors affecting the activity of enzymes Describe roles of factors affecting enzyme activity	02	SGD
	ABGs		Demonstration / Practical	OSPE
	DIRECTED SELF LEARNING			
	ANATOMY			
28	Histology of respiratory system	1. Identify the various microscopic tissue types in the Respiratory system including	01	DSL

		epithelium of the respiratory system, trachea, bronchi, bronchioles and alveoli		
	PHYSIOLOGY			
29	Composition of pulmonary surfactants and its role	1. Define surface tension, surfactants, atelectasis 2. Describe the role of surfactants on the lung compliance. 3. Describe the composition of the pulmonary surfactants and its role 4. Describe the pathophysiology of respiratory distress syndrome of the newborn	01	DSL
	BIOCHEMISTRY			
30	Isozymes	1. Define Isozymes 2. Explain Factors affecting the properties of isozymes 3. Explain the role of enzymes as a diagnostic tool.	01	DSL

11 Learning Opportunities and Resources

1. Anatomy

Books:

- *Clinical Anatomy by Regions* by Richard S. Snell (Latest Edition)
- *Gray's Anatomy for Students* (Latest Edition)
- *Clinically Oriented Anatomy* by K.L. Moore (Latest Edition)
- *Netter's Atlas of Human Anatomy* (Latest Edition)
- *Last's Anatomy* (Latest Edition)

Online Resources:

- TeachMeAnatomy – Comprehensive anatomy resource with diagrams and explanations.
- AnatomyZone YouTube Channel – 3D anatomy tutorials.

2. Histology

Books:

- *Textbook of Histology* by Junqueira (Latest Edition)
- *diFiore's Atlas of Histology with Functional Correlations* (Latest Edition)
- *Atlas of Human Histology* by Wheater's (Latest Edition)
- *Textbook of Histology* by Laiq Hussain (Latest Edition)

Online Resources:

- Histology Guide – A virtual histology lab with slides and explanations.
- Armando Hasudungan YouTube Channel – Educational videos on histology and related topics.

3. Embryology

Books:

- *Langman's Medical Embryology* (Latest Edition)
- *The Developing Human* by Keith L. Moore (Latest Edition)

Online Resources:

- Embryology at UNSW – Detailed embryology resource from the University of New South Wales.
- Dr. Najeeb Lectures YouTube Channel – In-depth video lectures on embryology and other basic medical sciences.

4. Physiology

Books:

- *Textbook of Medical Physiology* by Guyton and Hall (Latest Edition)
- *Ganong's Review of Medical Physiology* (Latest Edition)

Online Resources:

- Vivo Interactive Physiology – Interactive tutorials on physiology topics.
- PhysioPathoPharmaco YouTube Channel – Physiology explanations and tutorials.

5. Biochemistry

Books:

- *Harper's Illustrated Biochemistry* (Latest Edition)
- *Lippincott's Illustrated Review: Biochemistry* (Latest Edition)

Online Resources:

- MedlinePlus Biochemistry – Basic biochemistry concepts with clinical correlations.

- Osmosis YouTube Channel – Visual and concise videos on biochemistry and other medical topics.

6. Pharmacology
Books:
- *Katzung's Basic and Clinical Pharmacology* (Latest Edition)

Online Resources:
- Pharmacology YouTube Channel by Ninja Nerd – Detailed pharmacology lectures and notes.
- GoodRx Pharmacology Resources – Practical applications of pharmacology in medicine.

7. Pathology
Books:
- *Robbins Basic Pathology* (Latest Edition)

Online Resources:
- PathologyOutlines.com – An online pathology resource with a focus on differential diagnosis.
- Dr. John Minarcik YouTube Channel – Free pathology lectures and tutorials.

8. Community Medicine
Books:
- *Essential Community Medicine* (Latest Edition)
- *K. Park's Textbook of Preventive and Social Medicine* (Latest Edition)

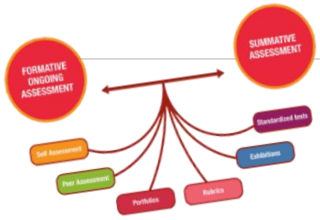
Online Resources:
- CDC Public Health – Extensive resources on public health and community medicine.
- Public Health England YouTube Channel – Videos on various community health topics.

9. Forensic Medicine
Books:
- *Parikh's Textbook of Medical Jurisprudence, Forensic Medicine, and Toxicology* (Latest Edition)

Online Resources:
- Forensic Medicine Online – Detailed forensic medicine resources for students.
- Forensic Pathology Lectures YouTube Channel – Educational videos on forensic pathology.

10. General Medicine
Books:
- *Davidson's Principles and Practice of Medicine* (Latest Edition)

Online Resources:
- Medscape – Comprehensive resource for clinical medicine and continuing medical education.
- Geeky Medics YouTube Channel – Clinical skills and general medicine tutorials.



12 Examination and Methods of Assessment:

12.1 Examination Instructions:

- **Arrival Time:** Students must arrive at the examination venue at least 15 minutes before the scheduled start time. Latecomers arriving 15 minutes after the start of the exam will not be allowed to enter the examination hall, and if permitted, they will not receive extra time.
- **Identification:** Students without a College ID Card and a white Lab Coat will not be permitted to sit for the exam.
- **Emergency Protocol:** In case of an emergency, such as a medical issue, students should immediately inform the examination supervisor.
- **Prohibited Items:** Students are required to submit any prohibited items, such as mobile phones, smartwatches, electronic devices, books, notes, or any unauthorized materials, before entering the examination hall.
- **Conduct:** Students must maintain complete silence within the examination hall. Any communication with fellow students is strictly prohibited, and all invigilator instructions must be followed without exception.
- **Attendance:** Students must properly mark their attendance during the examination.
- Leaving the Hall: No student will be allowed to leave the examination hall before half of the exam time has elapsed. The exam paper must be properly handed over to the examiner before leaving.
- **Compliance:** Failure to adhere to these guidelines may result in disqualification from the examination.

12.2 Internal Assessment (Total 10% Marks):

The internal assessment comprises a module test, featuring MCQs and OSPE, administered at the end of the module in accordance with the university's exam format. This test consists of 120 MCQs, accounting for 10% of the total marks in both theory and practical components, with the results to be submitted to the university prior to the final examination.

Total marks distribution for papers C of year-1 (MBBS) Year 1 Professional Exam in System-based Curriculum.

Theory paper	Modules	Theory marks	Internal assessment theory (10%)	OSPE/OSCE	Internal assessment OSPE/OSCE (10%)	TOTAL MARKS
Paper C	CVS	120	13	90	10	233

12.3 External Assessment: (Total 90% Marks)

- To appear in any university examination, more than 75% attendance in all disciplines is mandatory for the students.

- The Paper C will be comprised of 120 MCQs. The distribution of 90% Marks for Paper C Written Exam will be as under:

Block C (Paper C) Theory Paper			
Subject	**CVS Module-I**	**Respiratory Module-I**	**Total MCQs**
Gross Anatomy	9	12	21
Histology	4	4	8
Embryology	5	3	8
Physiology	34	20	54
Biochemistry	14	8	22
Pharmacology	1	0	1
Pathology	1	1	2
Community Medicine	1	1	2
Forensic Medicine	1	1	2
Total	**70**	**50**	**120**

- The distribution of OSPE stations for Paper **C is** as under:

Block C (Paper C) OSPE		
Specialty	**Practical**	**No. of Stations**
CVS Anatomy	Surface Anatomy Internal features of the heart on models CVS Models Cardiac muscle under the microscope Medium sized artery under the microscope Histological features of veins	5
CVS Physiology	Recording of 12 lead ECG Interpretation of ECG Examination of arterial and venous pulses Recording of blood pressure Examination of the apex beat and heart sounds Demonstrate the effect of posture and exercise on Blood Pressure Basic Life Support	5
CVS Biochemistry	Detection of lipids in a given sample Interpretation of cardiac enzymes	1
CVS Radiology	Identify normal cardiac shadow, borders and cardiomegaly on chest radiographs	1
Respiratory Anatomy	Lung Models Microscopic structure of trachea Microscopic structure of bronchi Microscopic structure of lungs	3
Respiratory Physiology	Spirometry Vitalography Vitalography (Interpretation) Stethography	3
Total		18

13 For inquiry and troubleshooting

Please contact
Department Of Medical Education

14 Module Evaluation Form

MBBS Year: _____ Block: _____ Module: _____

1. (Unsatisfactory) 2 (Fair) 3 (Satisfactory) 4 (Good) 5 (Excellent)

Category: Course Contents

No.	Question	1	2	3	4	5
1	To what extent did the course contents align with the stated learning objectives of the module?					
2	How clear and comprehensive were the course materials provided in this module?					
3	Were the core topics adequately covered, ensuring a well-rounded understanding of the subject?					
4	How current and up-to-date were the course contents in reflecting recent advancements?					
5	Did the module incorporate real-world applications and case studies effectively?					
	Category: Learning Resources					
6	Were the learning resources (e.g., textbooks, online materials, laboratory facilities) readily available and easily accessible?					
7	How helpful were additional learning resources such as supplementary readings or multimedia content?					
8	Did the module offer adequate support for research and independent study?					
9	Were digital resources and online platforms effectively utilized to enhance the learning experience?					
10	Were there sufficient opportunities for hands-on practice and practical application of knowledge?					
	Category: Teaching Methods					
11	How well did instructors engage with students and create a supportive learning environment?					
12	Were diverse teaching methods (e.g., lectures, group discussions, simulations) effectively employed?					
13	How responsive were instructors to questions, concerns, and feedback from students?					
14	To what extent did instructors provide timely and constructive feedback on assignments and assessments?					
15	Were opportunities for collaborative learning and peer-to-peer interactions encouraged and facilitated?					
No.	**Category: Engagement and Motivation**					
16	To what extent did the module use real-world examples and practical applications to engage students?					
17	How well were active learning techniques (e.g., problem-solving, case studies) integrated into the curriculum?					
18	Did the module provide opportunities for students to pursue their individual interests within the subject matter?					
19	Were assessments designed to challenge and motivate students to excel in their studies?					
Category: Inclusivity and Diversity						
20	How well did the module accommodate different learning styles and preferences among students?					

21	Were efforts made to include diverse perspectives, cultures, and backgrounds in the curriculum?					
22	How effectively were accommodations provided for students with varying levels of prior knowledge?					
	Category: Overall					
No.	**Question**	**1 (Very Poor)**	**2 (Poor)**	**3 (Fair)**	**4 (Good)**	**5 (Excellent)**
23	How would you rate the overall quality of this module?					

15 Students Diary/Notes

S.NO	DATE	TOPICS	PENDING/COMPLETED	COMMENTS

PROGESS:_____


College of Medicine & Dentistry at The Hills